

Conflict Between Sustainable Development and Conservation of Lachung Valley, North Sikkim

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Abstract

Anjan Chakrabarti in his paper highlights the problem of environmental degradation. Basing in the commonly used theory of "Tragedy of Commons", he points out that, poverty in a nation hinders the process of sustainable development because it is the poor who are unaware of the proper means to use the natural resources. Taking a close look at the conflict between sustainable development and conservation of the Lachung Valley He notes that, to save the forest the Government of Sikkim abolished the 'gothwala system' without providing any alternative livelihood.

Keywords: Sustainable Development, Conservation of Natural Resources, Gothwala system.

Introduction

The neo-Malthusian publication,¹ attracted the attention of the developed world towards the environment and its degradation. He states it in the following manner:

The tragedy of commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons...As rational being, each herdsman concludes that only sensible course for him to pursue is to add another animal to his herd. And another; and another...But this is the conclusion reached by each and every rational herdsman sharing commons. Therein is the tragedy. Each man is locked into a system which compels him to increase his herd without limit in a world that is limited. Ruin is the destination towards which all men rush, each pursuing his own interest in a society that believes in the freedom of the commons. Freedom in commons brings ruin to all.²

Developed world took Hardin's proposition seriously and advocated limiting or doing away with common property regimes which were identified as prime factors in the problem of degradation.

1 Garret Hardin, "The Tragedy of Commons", *Science*, Vol. 162, 1996, pp. 1243-1248.

2 *Ibid.*,

The environment thus became a part of international agenda in June 1972, at the United Nations Conference on Human Environment held in Stockholm. In the same year, the book *The Limit to Growth* commissioned by the 'Club of Rome' was published to show the consequences of a rapidly growing world population on one hand, and finite resource supplies on the other. Five variables (world population, industrialization, pollution, food production and resource depletion) were examined on the assumptions that exponential growth accurately described their pattern of increase; and that the ability of technology to increase the availability of resources only grows linearly. Finally in 1987, the Brundtland Report announced 'the marriage between craving for development and concern for the environment.' In the process, the poor were identified as agents of environmental degradation and the report argues "poverty reduces people's capacity to use resources in a sustainable manner; it intensifies pressure on the environment ...A necessary but not sufficient condition for the elimination of absolute poverty is a relatively rapid rise in per-capita incomes in the third world." The report defined sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs".³ The report of the World Bank (1992) has also offered a generalized version of sustainable development and to them; development is about improving the well-being of people, and sustainable development is development that lasts.

A new wave of state interventions, political governance and regulation was initiated in third world countries to save the planet, to keep society's action under control and to contain the exploitation of nature at tolerable limit. Consequently, centuries-old tribal and peasant practices of survival in harmony with nature in a sustainable manner were completely ignored. Their traditional knowledge base and approach towards natural resource management, role of traditional/communal institution towards the use of common grazing land and forest resources have hardly been taken into consideration by the state.

It is to be noted that in many parts of the poor world, communal governance is preferred over governance based on the law. Over the centuries, pastoral communities located in Central Asia, South West Asia and North-East Africa have been showing great sense of sustainable livelihood practices based on their traditional ecological knowledge, religious belief and communal form of governance. In spite of having no written contract, social codes are implicitly followed. For these people, the village is an ecosystem and their survival and livelihood are deeply interwoven with conservation of the biodiversity of the village or rural hamlet.⁴

The modern and knowledgeable society, however, in most of the cases has been unable to design and implement a social structure that can address the importance

3 url.www.scribd.com/doc/24176124/Brundtland-Report-1987.

4 P.S. Ramakrishnan, *Ecology and Sustainable Development*, New Delhi, National Book Trust, 2008.

of the natural resource base in the Himalayas. In contrast, traditional communities, without having formal knowledge of 'ecosystem dynamics' have been successful in maintaining 'positive ecosystem-social system linkages'.⁵ On similar ground, N.S. Jodha in 1996, has laid importance in developing indicators which acknowledge local perspectives and goals for sustainability. For example, it is common in many mountain areas to ascribe flooding and landslides to deforestation, overgrazing, and poor land use. However, when careful analysis is done, event frequency and location may show little change over time.⁶ Jodha further pointed out that, in mountain regions the role of forests is all the more important because of limited accessibility and relative isolation of the mountain people. As a result, their dependence on local resources is very high. He went to add that the forest provides important protection against hazards and risks associated with slope-induced fragility of landscape, occupy a central place in sustaining diversified land-based activities, and along with pastures, organically link different biomass-based economic and ecological functions. Ideally, functions and contributions are integrated with positive ecosystem or social system links, wherein community norms and practices are adapted to the attributes of natural resources. However, their nature and magnitude tend to change, following increased external state and market interventions in mountain areas.⁷

In the concept of sustainable development put forward by the Brundtland Commission, there is a total absence of the recognition of the value of living nature, and of nature as an environment of culture and human existence⁸. However, it has been observed not only in the developed world, but also in less developed world, including countries like India, policy formulation to arrest environmental degradation has failed to address the livelihood issues of marginal communities like, pastoralists located in the high altitude of Western and Eastern Himalayas. Their traditional knowledge base, approach towards natural resource management, role of traditional institution towards the use of common grazing land and forest resources, have hardly been taken into consideration by the State. As a result of that, no synergy has been developed among the issues of conservation, natural resource management, and livelihood.

In the first section of this paper, an attempt has been made to study the transhumance activity as a means of livelihood which is in existence in the mountain settlement of North district (*known as gothwala system*,⁹) especially in Lachung valley of

5 P.S. Ramakrishnan, R.K. Rai, R.P.S. Katwal & S Mehndiratta, *Traditional Ecological Knowledge for managing Biosphere Reserves in South and Central Asia*, New Delhi, Oxford & IBH Publication Co. Pvt. Ltd., 2002.

6 J. D Ives, B. Messerli, *The Himalayan Dilemma*, London and New York, Routledge Publication, 1989, pp. 295.

7 N. S Jodha, "Natural Resource Management and Poverty Alleviation in Mountain Areas: Approaches and Efforts", International Conference on Natural assets, January 2003, pp.8-11, Conference paper series, No.11, Political Economy Research Institute and Centre for science and Environment, Tagaytay City, Philippines, 2003.

8 H Pietila, "Environment and sustainable development", IFDA Dossier 77, May-June, 1990, p.63

9 A *goth* may be defined as temporary/permanent cattle shed mainly in the forestland made up of locally available forest material. The local people practicing Goth system of livestock rearing are called *gothwalas*. The gothwalas do not belong to a particular community in the social hierarchy of Sikkim but they generally come

east Himalayan State of Sikkim. In the next section, the role played by traditional local body of governance, the 'Dzumsa'¹⁰ towards managing the natural resources, especially forest and fodder, in a sustainable manner. To protect the forest from extraction of firewood, save the medicinal plants from grazing of cattle in deep inside the forest, the Government of Sikkim has enacted a law to abolish the 'gothwala system' without providing any alternative livelihood. Thus in the final section, the critical evaluation has been made towards the conservation approach followed by formal institutions in the name of sustainable development.

I

The Transhumance Activity, Livelihood and Natural Resource Management in Lachung valley, North Sikkim

Sikkim is a small mountain state and is located in the Eastern Himalayas. The state is administratively divided into four districts: North, East, West and South. North district is the largest in area and the least populated. The State of Sikkim is surrounded by vast stretches of the Tibetan plateau, with Nepal on the west, Bhutan and Chumbi valley of China (Tibet Autonomous Region) on the east, and Darjeeling District of West Bengal in the south. Being a part of inner ranges of the Himalayas, Sikkim is entirely a hilly and land locked state. The topography of Sikkim is characterized by great variation in elevation, ranging from 250 m to 8,598 m. North Sikkim occupies an area of 4226 sq-km, about one-third of the total geographical area of the State. The total population

from the economically weaker section of the society.

¹⁰ *Dzumsa*, a traditional governance system is almost two hundred years old and still prevalent in North Sikkim. It is mentioned by Mr. Chewang Gyanchen a village elder of Lachung that there was only 13 household in Lachung when Dzumsa Panchayat System was introduced. It is an assembly composed of the heads of the separate households. All these heads have a voting right to select two Pipons (village headmen) and the two Pipons select two Gyapons, who act as messengers for the Pipons. Election of Dzumsa takes place every year. Village elders or Genthi-Lenge assist Pipon in the effective working of village administration. To become a member of Dzumsa, the concerned person has to be recommended by a person who holds good reputation within the society as well as highly esteemed by the existing Dzumsa members. He also has to take an oath before the Dzumsa members that he would abide by the rules and regulation of Dzumsa and will follow the Dzumsa prescribed code of conduct. Women are generally not eligible to become a Dzumsa member (unless the head of the family is female) and they can not become Pipon. Some of the duties performed by the Pipon are as follows (duties regarding regulating grazing time, cutting of trees etc. are included in the main text):

- i. The Pipon decides upon community policy and makes regulations binding upon his society but he is more concerned in maintaining the existing laws than to alter them.
- ii. He looks after the execution of all public works. For the execution of Development projects, Pipon asks tenders from the local people and the highest bidder gets the permission to carry on the work. If the works are not carried out satisfactorily, Pipon in consultation with the village elders stops the payment and also debars that person to get any further projects.
- iii. Villagers are not allowed to collect firewood or timber required to build their houses without prior permission of Pipon. The whole process is also closely monitored by Dzumsa.
- iv. He provides justice for the oppressed and punishes wrong doers.
- v. He looks after the law and order, and also settles different social disputes (theft, divorce, land disputes, adultery etc.) with the help of elderly people (18 senior members of the village are invited) in the society. A person proved guilty by the Pipon has to pay a fine, depending upon the nature of the case. If it is not sorted out by the Pipon and the senior members of Dzumsa then it is referred to the District Collector of North District, stationed at Chungthang.

of the district stands at 41030, which is around 8 per cent of the State's population.¹¹ Among them, majority of the people belong to the Bhutia community. North district has two sub-divisions Chungthang situated at an elevation of 5150 ft., and Mangan, which is also the district head quarter at an elevation of 3960 ft.

Further up, northwards, on the east, 51 km away from Chungthang, lies the valley of La-chung at an elevation of 8160 ft. The population of Lachung is 2800.¹² The inhabitants of Lachung recognise themselves as La-chungpas.¹³ The area is thinly populated because of inhospitable terrain characterized very steep slopes and high mountains with dense forests especially on the Lachen axis, accompanied by rocky cliffs covered with snow. Since the area is strategically located with respect to Indo-China border, there are restrictions on movement and settlement for security reasons.

Considering the three major components of agro-ecosystems viz., landscape, bioclimate and length of growing period, La-chung and its adjoining areas fall under sub-alpine and alpine zones (in terms of altitude). Consequently, nomadic pastoralism or transhumance and agro-pastoralism are practised as primary means of livelihood and are a major economic activity (Patiram et.al, 2001). As a matter of fact, 30-35 per cent of the population in La-Chung are directly dependent on pastoralism. Prior to Chinese aggression in 1962, border trade contributed to their livelihood. However, free border trade is no longer practiced today.

Transhumance in Lachung Valley

Pastoralism is an economic activity where herds and herdsmen together form a symbiotic community and depends on nature or more precisely on pasture. Transhumance is a highly developed form of pastoralism and is practiced widely in the Himalayas. The seasonal cyclic movements and utilisation of resources in a rotational manner has placed transhumant people in a situation where they are nomadic on the one hand and transitionally or marginally sedentary on the other. This movement is seasonal in nature. In the summer they move from drier and warmer regions to wet and cooler mountains. This movement is reversed in the winter months.¹⁴ The whole cyclical movement of herdsmen along with their herd address the twin objectives of ensuring availability of grass as a fodder for the animals and allowing the grass to regenerate. In addition, dung of the animals helps to replenish the soil fertility. The entire exercise is an ideal example of natural resource management and the knowledge base that is in use is entirely attributable to traditional ecological knowledge which the indigenous society has acquired through centuries by staying in harmony with nature.

11 Census, Provisional, Series 21, 2001.

12 *Ibid.*,

13 J.S. Lall & A.D. Modie, *The Himalaya: aspects of Change*, New Delhi, Oxford University Press, 1981.

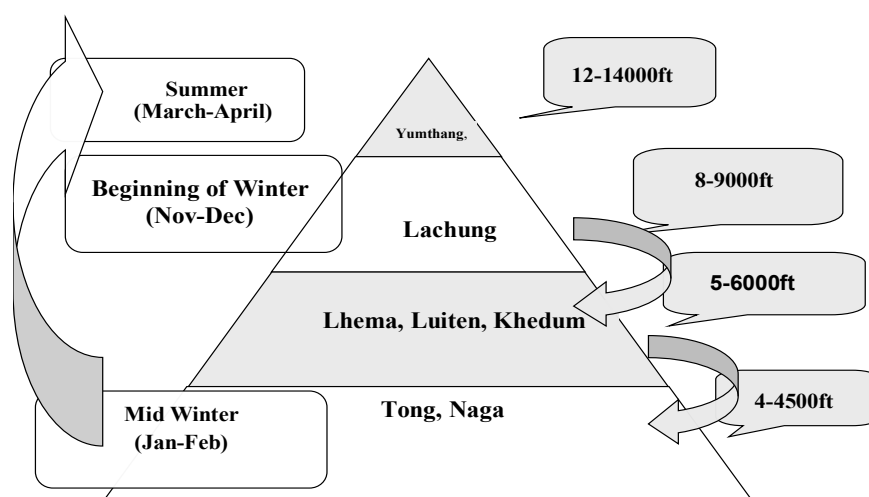
14 R.S Negi, "Symbiotic Relationships between Man, Animal and Nature: A Study of Gujars of Garhwal" in Baidyanath Saraswati (ed.), *Lifestyle and Ecology*, New Delhi, Indira Gandhi National Centre for the Arts, 1998.

During winter: (November- December) the goth is shifted to lower altitude. The date of shifting is decided by the Dzumsa (village council or traditional institute for governance). Generally the Goths are shifted from Lachung (around 8900ft) to Lehma, Luiten, Khedum, (around 6000ft). The village council or Dzumsa specifies the areas where each of the gothwalas is supposed to set up their goth. A fine is imposed on gothwalas if they fail with the decision of the Dzumsa.

During mid-winter: (January-February) the gothwalas move further down towards Tong, Naga (4000-4500 ft) from Lehma, Luiten, and Khedum. They settle there till the second month of Lunar calendar (March-April). Transhumance is carried out by the male members of the family; female members generally stay back in their homesteads and engage themselves in the cultivation of potato, wheat, barley etc.

During summer: the goths get shifted back to higher altitude but certainly away from their residential areas. For example, in Lachung the goths may stay back for 15 days, thereafter it has to be shifted to Yumthang or Yume-samdong, Yakshey and Singba (12000-14000ft) which are at a higher altitude in comparison to Lachung.

The following flow chart (Diagram-1) depicts the transhumance activity practised in Lachung valley.



Livelihood

Gothwalas (pastoralist) in La-Chung have two pronged strategies to earn their livelihoods. First they churn milk for butter and curdle it for cheese (churpi). Dehydrated cheese (supari) is sold in the market. For pastoral people of Lachung, yak, a multi-purpose animal yields valuable products - milk (maximum 1 kg per animal), meat (200- 300 kg per animal), fur, dung manure, hides and the like. Sale of yak and

sheep also helps them to earn. A sale of yak generally brings Rs. 4000-8000 and a sheep brings around Rs. 600-1000. The fur of yak from different parts of the animal are used for different purposes - belly fur for making tents, moulted fur for tents and ropes etc. Horns are used as decorative show pieces. These also generate income for the transhumance population of Sikkim. Animals are their only source of income with no other avenue for additional earnings.¹⁵ Smoke-dried meat is also preserved for winters to supplement the food requirements when heavy snow-fall renders the area inaccessible to the rest of Sikkim. On the other hand, women folk who had stayed back grow potato, wheat, barley in mid-winter and cabbage, pea, radish etc. in summer to meet their food requirement.

Natural Resource Management, the Dzumsa and Sustainable Development

Dzumsa, a traditional system of governance is almost 200 years old and still functioning in North Sikkim. It is headed by two village headmen (Pipon) and their assistant gyapon. Apart from looking after all the development activities, law and order, it also regulates the natural resource management in the region.

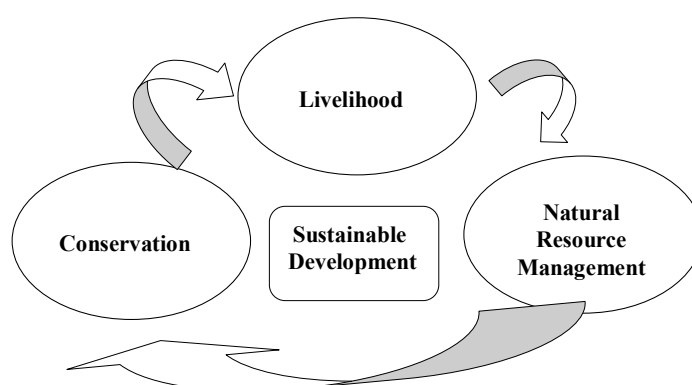
- Trees which have attained exploitable age can be used for timber. However, the felling is closely monitored. Ten trees need to be planted after cutting a tree.
- Without prior permission firewood and timber can not be collected.
- Pipon regulates grazing timings (shifting of goths or cattle sheds) to maintain the balance of fodder availability.
- If the gothwalas fail to maintain grazing timing or do not construct their goths on earmarked areas then they are penalised by the Dzumsa.
- Part of revenue earned by Dzumsa in terms of fine collected from errant goth (cattle shed) owners, registration fees paid by the members and the money paid by the villagers during the submission of tender is spent for the development of monastery and during festivals and the rest is equally divided among all the villagers.

Therefore, pastoralism in La-Chung valley has evolved as a sustainable livelihood practice (though very much subsistence in nature) since it takes care of natural resource management in the one hand and earns livelihood without destroying or degrading the nature. Even though the majority of the pastoralists use wood for constructing houses and for cooking, it is unrealistic to assume that they are destroying forest indiscriminately.

15 R.K Avasthe, "Socio-economic and ecological survey of a high altitude rural ecosystem: A case study from Muguthang, North Sikkim", Proceedings of the National Himalayan Environment and Development, Almora, India, 1996.

The strong sense of conservation of these nomadic pastoralists of Lachung valley could be substantiated on three counts. First their history has constantly shown a sense of conservation and inculcated a way of life that taught people to live in harmony with nature.¹⁶ Second the regulatory role to manage natural resources played by the local institution for governance, the Dzumsa is of great importance. Finally, the age old rich traditional knowledge base inherited and conserved over the ages by these highland people have been of great help. Thus, it can safely be vouched that pastoralism or gothwala system practised in Lachung valley is working in conformity with the definition of sustainable development which cautioned us that on the long run, human and natural systems can not economically be viable unless they are also ecologically sound and socially responsible (Diagram-2).

Livelihood of *Gothwalas* and Sustainable Development



II

State Policy of Environment, Forests and Land Use in Sikkim and emerging Conflict between Livelihood and Conservation

As per the legal standpoint all the reserve forests, sanctuaries and national parks of Sikkim are free from any rights and concessions. Pastoralism and the associated

16 The ancient history of Sikkim shows that nature and rulers were inseparable. The rulers of Namgyal Dynasty were the follower of Tibetan Buddhism and developed a policy for governance where conservation and preservation of nature got the centre stage. The law prevalent in ancient Sikkim tells that if anyone fails to be live in harmony with nature, he or she should either be thrown from a cliff or thrown into deep water. In early 1910, Khasmahal (reserved forest) and Garucharan (grazing) laws were enacted to protect the forest from overexploitation. During Chogyal's (the king) period a law was brought into effect where it was mentioned that for every tree marked for cutting, the owner of the tree had to plant three seedlings during the next plantation season. As a traditional society the Chogyal from time to time issued orders so that the sanctity of the forests, rivers and the landscape was maintained.

firewood, fodder and poles collection are in violation of Section 20 of the Sikkim Forests, Water Courses and Road Reserve (Preservation and Protection) Act 1988 and Section 29 of the Wildlife (Protection) Act 1972. Also it is in contempt of the judgment of the Hon'ble High court of Sikkim delivered on 14/05/1999. The Hon'ble Supreme Court in its WP No 202/95 dated 14/02/2000 has "restrained states from ordering even the removal of dead, diseased, dying or wind fallen trees and grasses from national parks and sanctuaries. As per the orders of the state government and the wishes of the people the Forest Department has been issuing notices and trying to phase out these cattle sheds since 2000.¹⁷ Forest department officials are of the opinion that Gothwalas (pastoralists) are partially responsible for the depletion of forest because during their stay in the forest fringe areas trees are being cut to meet their demand for firewood and to build the cattle shed. It is also mentioned by them that lots of medicinal plants are being lost because cattle enter deep inside the forest while grazing.

Following the National Forest Policy, Government of Sikkim enunciated "State Policy of Environment, Forests and Land Use" and passed resolution in the State Legislative Assembly on 18th March 2000 (vide No. 764/F/ENV & WL).

Among many proposed measures in "State Policy of Environment, Forests and Land Use" few are specifically meant to address the problem of over grazing and its consequences. And they are as follows:

- The rights and concessions if any including grazing should always remain confined to the carrying capacity of the forest.
- Grazing in the forests freely should be discouraged and stall-feeding should be encouraged.
- Social forestry programme should be started in khasmahal (reserve forest) and garucharan (grazing land) areas outside the Reserve Forest to increase the availability of fuel wood and fodder in such areas.
- Establishment of cattle sheds within the Reserve Forest should not be allowed.
- Grazing in Reserve Forest area should be severely restricted / banned.
- Cattle camps (goths) should not be allowed in the Reserve Forest areas. Stall-feeding should be encouraged.
- Adequate grazing fees should be imposed to discourage the people from maintaining large herds of non-essential livestock.
- Tribal people located in remote areas have a symbiotic relationship with the forests. Tribal people and people residing in and around the forest areas should be involved in the protection, regeneration and development of forests to provide them gainful employment.
- Tribal co-operatives should be involved in protection, regeneration and optimum collection of non-wood forest produce.

17 S. Tambe, N.T. Bhutia & M. L. Arrawatia, "People's opinion on the Impacts of 'Ban on Grazing' in Barsey Rhododendron Sanctuary," Sikkim, India, 2005, url.www.sikensis.nic.in/docs/Wildlife/wwfbarsey.pdf.

- Provision of alternative sources of energy for domestic purposes should be made in tribal areas to reduce the pressure on forests.¹⁸

Impact of ban on grazing on the gothwala community of Lachung valley, North Sikkim

From the conservation point of view the ban on grazing seems justified. However, ground observations have revealed some disconcerting features and they are as follows:

First, the ban on grazing is working against the very existence of gothwala system; even many goth owners are now selling their live stocks. Second, those who do not have any alternative occupations are working as wage labourers. In addition, the animal dung is widely used for agriculture, and goths are used to supplement its demand. In absence of goths, the farming procedure will lose its organic flavour and it likely to affect the productivity of various crops and vegetables grown in this region.

Third, in winter, local populace largely depends on meat which they keep in dried form and abolishing of goth might reduce the supply of one of the principle food items. Fourth, to meet up the fodder requirement and lessening the dependence on forest for grazing purposes the cultivation of poplar and salix (two varieties are showing good results) was proposed for cultivation widely, especially in the area which is earmarked for grazing (garucharan). However it did not take place. Therefore, ban on grazing must have an impact on the fodder supply and in that case proposed stall-feeding loses its relevance.

Fifth, in Lachung valley most of the grazing land as well as forest areas are considered as common property and its uses are regulated by the rules and regulation put forward by the local body of governance, the Dzumsa. Therefore, government control and prohibitions are creating a conflicting situation between Dzumsa (informal institution) and Government of Sikkim. It is also creating discontent among the people of Lachung. It also raises the question as to why the Government of Sikkim fails to make a distinction between regulated common property resources (CPR) and unregulated common property resources because regulated CPR based on traditional knowledge do not go against the ethics and ethos of conservation.¹⁹

Sixth, we all know that commons offer a larger proportion of the needs of the poor household in comparison to rich. Generally, the poor mostly depend on commons for firewood and fodder. None of the households collect firewood for selling purpose. Though the dependence of the poor on commons is high their actual use is relatively low. It is true even when all the households are taken together, i.e. in terms of total quantities (fodder or fuel wood) consumed by all the households in each economic

¹⁸ url.www.sikkiminfo.net/enviroment_policy.

¹⁹ Partha Dasgupta, "Common Property Resources: Economic Analysis", *Economic and Political Weekly*, Vol. 40, (16-22 April), No. 16, 2005, 1610-1622.

category. This is due to the reason that poor households own less number of cattle even in aggregate terms.²⁰ The gothwalas of Lachung, in general, do not belong to a particular community in the social hierarchy of Sikkim but they generally come from the economically weaker section of the society. Therefore, it is unlikely that they are solely responsible for environmental degradation. It is alleged by the local people of Lachung that Army Cantonment located there in and construction of road carried on by BRO (Border Road Organisation whose primary task of road construction and infrastructure development in the border areas) are overtly or covertly contributing to the depletion of forest there.

Seventh, Joint Forest Management has yet to get into the psyche of these highland people and they still consider the forest does not belong to the government rather they have the common ownership of the forest. In addition, dependence on fire wood can not be ignored since alternative fuel (e.g. LPG) is still scanty in supply.

Lastly, until and unless, the pastoralists of Lachung valley are provided with proper alternative livelihoods, it is difficult for them to do away with pastoral activities. Till date, this is the only viable economic activity that brings sustenance to these pastoralists which they are practicing for many years without destroying the environment.

Conclusion

Therefore, without creating alternative livelihood avenues, the gothwala system should not be abolished. Sustainability must ensure continued welfare of all. Sustainability becomes meaningless when survival is under threat. The traditional knowledge of natural resource management of pastoralists of Lachung valley has thoroughly been ignored. The conservation measures conceived by Government of Sikkim show the high regards that we have for the utilitarian ideology which has dominated resource management science in the West. Regier refers to it as "conventional exploitative development." Accordingly, the nature of socioeconomic transformations, unequal access to resources, localization of growth resulting in wider threat to the survival of people in the hinterlands are all factors contributing to unsustainability in some form or the other.²¹ Sustainable development thus desires to develop from the definite starting point that emphasises that 'it must shield survival options and not bully them'.²² In terms of the functional reality and participation of the people, these newly raised questions are of central importance of global efforts at defining sustainable development. Ban on grazing may lead to similar situation in Lachung since livelihoods of marginal groups are at stake now and there is a complete failure on the part of government of Sikkim to establish a complementary relationship between conservation and livelihood issues.

20 V Ratna Reddy, "Valuation of Renewable Natural Resources User Perspective", *Economic and Political Weekly*, Vol. 34, (05-11 June), No. 23, 1999, 1435-1444.

21 Jayanta Bandyopadhyay, "Sustainability and Survival in the Mountain" *Ambio*, Published by Allen Press on behalf of Royal Swedish Academy of Sciences Stable URL, Vol. 21, No. 4, June 1992, pp. 297-302.

22 M Nerfin, "Environment and development: listen to the south citizen," *IFDA Dossier*, Vol. 77, 1990.