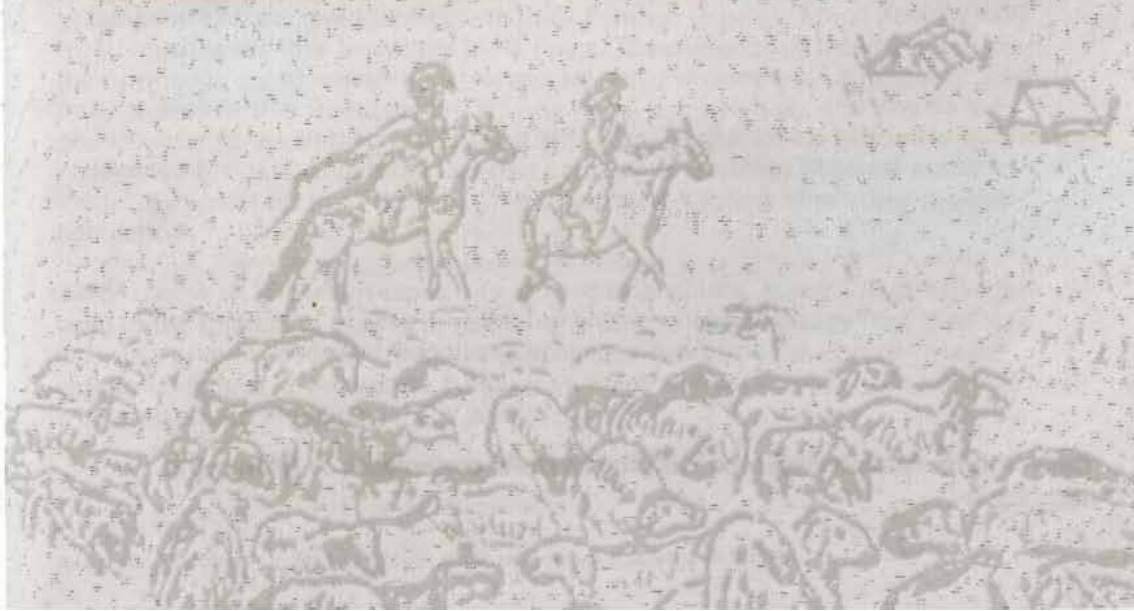


Integrating Yak-herding Communities into Conservation and Resource Management Planning Processes in Jigme Dorji National Park, Northwest Bhutan



Cover Photo: Pastoral landscape in Bhutan (*from the presentation by Tshewang R. Wangchuk*)

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Biodiversity in Jigme Dorji National Park

Jigme Dorji National Park (JDNP) was established in 1974 as the Jigme Dorji Wildlife Sanctuary and was later upgraded to a national park in 1993. It is located in northwestern Bhutan (Figure 1) and is the largest protected area in the country, encompassing 4,349 km². It stretches from warm broadleaved forests at 1,400 masl to snow-capped Himalayan peaks towering over 7000m, and thus harbours plant and animal communities and assemblages representative of various ecosystems within a short lateral distance. The heavy monsoon precipitation and undulating topography have given rise to specialised niches, which support some unique floral and faunal species. JDNP may be the only place on earth where snow leopard (*Uncia uncia*) and Bengal tiger (*Panthera tigris*) habitats overlap. Evidence of tigers have been recorded from the eastern ridge above the small community of Barshong, at an altitude of 4060m. In that same area, snow leopard tracks were seen and recorded by field staff earlier this year [2002].

The park provides adequate habitat for several charismatic species of wildlife such as snow leopard, tiger, wild dog (*Cuon alpinus*) and Himalayan black bear (*Ursus thibetanus*). Ungulate species such as the Bhutan takin (*Budorcas taxicolor*), musk deer (*Moschus chrysogastor*), blue sheep (*Pseudois nayaur*), serow (*Capricornis sumatraensis*), goral (*Nemorhaedus goral*) and sambar (*Cervus unicolor*) support these predator populations. Phasianids such as monal (*Lophophorus impejanus*) and satyr tragopan (*Tragopan satyra*) abound in the forests. Red panda (*Ailurus fulgens*) has been recorded in temperate broadleaved forests with thick bamboo undergrowth at about 2,400 masl, much lower than elsewhere in its range. The presence of these animals, and their presence out of conventional ranges recorded elsewhere, is a matter of interest that requires further investigation. Why do tigers roam so high, and why do red pandas drop so low in their ranges in JDNP? Perhaps the answer lies in the availability of forested habitats, and in the fact that contiguous stretches of forest are still available in most parts of the park. The absence of hunting allows prey species populations to flourish.

JDNP is also an important repository of medicinal plants, about 200 of which are used in the traditional healing system. Important among them are tsgia (*Fritillaria delavayi*), several species of poppies (*Meconopsis* spp.), and the unique Chinese caterpillar-fungus called yarcha gunbu (*Cordyceps sinensis*), which is an association of a caterpillar and a fungus.

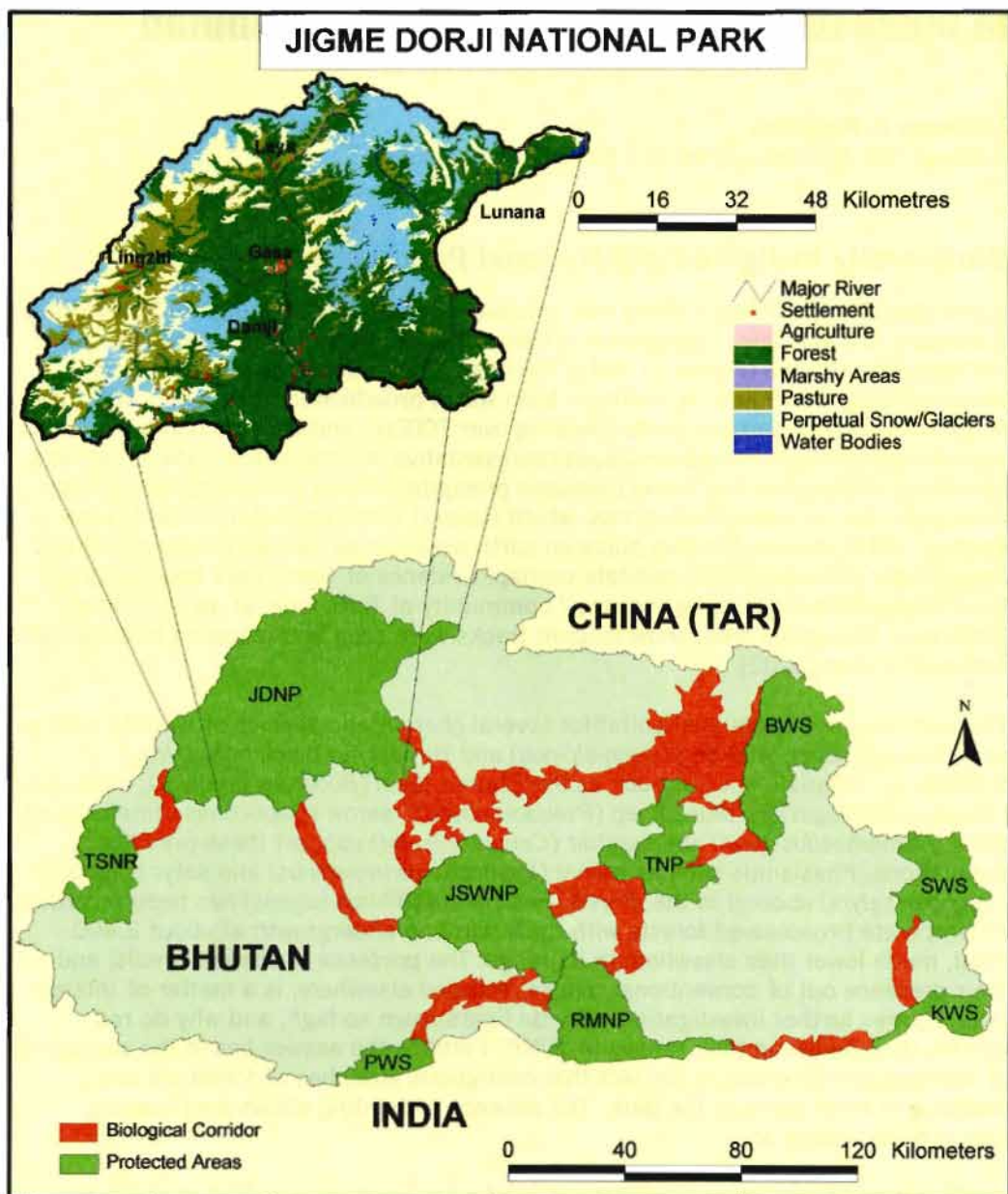


Figure 1: Location map of Jigme Dorji National Park in Bhutan

Resident peoples in JDNP

One important component of the ecosystems in JDNP, and perhaps the most influential, is the resident community. Roughly 6,500 people inhabit the park, and they rely directly on natural resources from the park. For centuries, they have co-existed harmoniously with their environment, utilising resources in a sustainable manner. However, with the onset of modern development, resource consumption patterns have changed. The schools, health centres, and other government institutions required substantial amounts of resources for their establishment. This also meant that more civil servants are now living in these areas. At present, the park covers the whole of Gasa 'dzongkhag' (district) and parts of Thimphu, Paro, and Punakha dzongkhags. Although about 90% of the residents are farmers and herders, livestock rearing is an important occupation for the communities of Soe, Naro, Bey Laga, Laya, Lingzhi and Lunana – these areas cover a significant part of the alpine meadows and scrubland above 3000m. Alpine livestock most predominantly consists of yak (*Bos grunniens*), although some cows, oxen, and equines are maintained in homesteads in the villages. Some sheep (*Ovis ovis*) can be found in the central Bhutan communities of Phobjikha and Sephu, and a government initiative has introduced this species to some other parts of Bhutan.

Yaks are alpine herders' major source of income, as well as the source of a whole array of necessary products ranging from ropes, tents, and burlap sacks to the conventional meat and dairy products. Their sure-footedness and toughness make them excellent for transporting provisions in the rough and snowy mountain terrain. Yaks are also used for draught power to plough fields. Therefore, this species, derived from its wild progenitors in Tibet, has evolved to become the most valuable domestic animal in the mountains of JDNP.

Conservation and development – do they mix?

It is clear that sustainable management of rangelands and efficient animal husbandry practices are critical for the socioeconomic development of those resident peoples who are heavily dependent on their livestock. Also, in the wake of improved animal health services and increasing human population, pressure on rangeland resources is ever on the rise.

On the other hand, conservation of biological diversity has been given high priority by the government, and development planning is not supposed to be carried out at the expense of weakening the ecological stability of ecosystems. Bhutan as a nation has been highly acclaimed globally for its conservation efforts. Its relatively low population (700,000), scattered over numerous valleys and hamlets, has enabled Bhutan to maintain a balance between resource utilisation and conservation. In recent years, the government has formulated strong conservation policies, setting aside about 26% of the country under a protected area network, further connected by biological corridors that amount to an additional nine percent of the country. The Bhutan Forest Act, 1969, was one of the first legal documents in modern Bhutan. This is testimony to the fact that the country's early leaders greatly valued the importance of forest and biodiversity conservation during the socioeconomic and political development of the country. Modern-day conservationists are grappling with the complexities of trans-boundary conservation cooperation. In the 1930s, there was an informal agreement between Sikkim, Tibet, and Bhutan regarding poaching issues

– anyone found guilty of such crimes was to be dealt with as per the laws of the land where the crime was committed (Williamson 1987).

However, conservation efforts and their successes have often been blamed for many of the ills faced by rural communities today. Rural-urban migration, modern education, and conscription into the armed forces and the body of monks have taken farm hands away from the fields. Youth, introduced to a modest schooling and exposed to towns, are reluctant to return to farms. Fragmentation of farmland has made it not worthwhile for some farmers to continue farming. To further exacerbate the problem, wildlife damage to crops and livestock, on the rise in recent years, and encroachment of farms by forests, have made it more difficult for farmers to manage their farms. What does ‘success’ in conservation mean? Is it really to blame for problems on the farms?

‘Success’ of conservation?

It has been convenient to point out the increase in wildlife populations as a success of conservation. However, is conservation really responsible for this? The Bhutan Forest Act was enacted in 1969, when many early development efforts in Bhutan were also taking place. As schools, roads, and hospitals were constructed, vast tracts of forest and agricultural lands were cleared for these developments in infrastructure. In essence, this resulted in the drastic reduction of natural habitats for many species of wildlife. As the country was still largely forested, most negative effects could be cushioned by the existing natural habitat. However, with increasing human and livestock populations and other related issues, it can be assumed that after a span of about four decades, something was bound to give way, and there would be resulting imbalances somewhere in the ecosystem.

A major cause attributed to the rise of pest animal populations is the extirpation of predators in the early 1980s by administering poison in animal carcasses. Many farmers recall poisoning carcasses to get rid of predators such as the wild dog (*Cuon alpinus*). The poison, however, did not discriminate between species and succeeded in impacting various non-target predator species such as leopard (*Panthera pardus*) and sometimes even tiger. In the absence of predators, populations of prey species such as wild pig (*Sus scrofa*), sambar, and barking deer (*Muntiacus muntjac*) increased. According to one theory, it is the amalgamation of two factors – habitat destruction and population increase – that has spilled these wild animals into the farms.

Recently, one school of thought among policy-makers in Bhutan holds strict conservation values, such as the ban on all forest fires and hunting, responsible for these wildlife-related problems. This arises from the assumption that if there were more lenient rules, forest fires and hunting would keep problem animals at bay. Therefore, it is thus elaborated that the ‘success’ of conservation (referring only to stricter laws and their enforcement) has been responsible for wildlife-related problems on farms. Although this may be partly true, due to the fact that vigilance against illegal activities is greater now with increased staff and coverage, the results of many surveys have shown that farmers either did not have the means, or in some cases the will, to kill problem animals. Officially, farmers are now allowed to kill non-endangered wildlife pests on their fields, but actual implementation of this provision is rare. Farmers and agriculturists claim that if animals are first wounded in the fields and then run into the nearby forests to die, they would be accused of performing an illegal

act of killing animals in areas outside their farms. On the other hand, conservationists find this clause, "...animals may be killed on the fields or within 200 metres from agricultural fields" necessary to prevent possible poaching of animals in the forests (DoFS 2000). It is quite surprising that a compromise cannot be found on this issue. One would think that if a kill is verified by other villagers and/or reported to the nearest official, there should be enough trust in the institutional mechanism to solve this problem.

The ban on hunting of all animals, started in 1969, may have resulted in the rise in livestock depredation by wildlife, especially in the alpine areas by predators such as snow leopard. Nonetheless, to a large extent, we must also accredit the increased incidence of livestock depredation to the increased presence of field staff, and thus the increased reporting of incidents. In some cases, anticipation of financial compensation has also spurred increased complaints about depredation.

Based on these arguments, conservation, or its success, cannot be solely blamed for what seems to be the result of a complicated web of factors. However, none of these arguments can be backed by empirical information, as baseline research on these issues has not been conducted. Presently, most of the information available consists of crop loss data and qualitative socioeconomic information, and most conclusions must be made from well-analysed personal observations and experiences of field staff and local residents.

Human-wildlife conflicts

Regardless of how much we like to adhere to terms such as 'sustainable' and 'harmonious co-existence', when humans and wildlife co-exist in the modern context, some conflicts are bound to arise. It is the degree of complexity that differentiates a sustainable management regime from an unsustainable one.

In the lowland areas of JDNP, cattle are lost to leopard, tiger, and wild dog. In the mountains, it is mostly snow leopard and Tibetan wolf (*Canis lupus*) that attack yaks. Himalayan black bear has also been known to take calves in some cases. Since the loss of one head of cattle is a significant loss to the herder (one yak costs about Ngultrums 15,000, equivalent to US\$ 350), any case of livestock depredation is important. In 2000 alone, the park office received 200 claims of livestock lost to wildlife. Although these claims were not fully authenticated, there is reason to believe that many were genuine. At the moment, no retributive killing of endangered predator species has been reported, but if depredation incidents keep increasing, and there is no action from concerned authorities, the threshold of patience may soon be crossed. That is when residents resort to retributive killing of wildlife (see Figure 2).

Bhutan is fortunate not to have entered the retributive phase for protected area residents. However, negative factors, such as increased depredation and inaction by concerned authorities, may catalyse a shift from patience over the threshold and into retribution. On the other hand, positive factors such as timely intervention, direct or indirect compensation, and reduction of depredation incidents will maintain livestock owners' sentiments within the threshold of patience.

Grazing of alpine meadows by yaks has resulted in compaction of the soil. Animal trails traverse the alpine slopes and make them more susceptible to erosion.

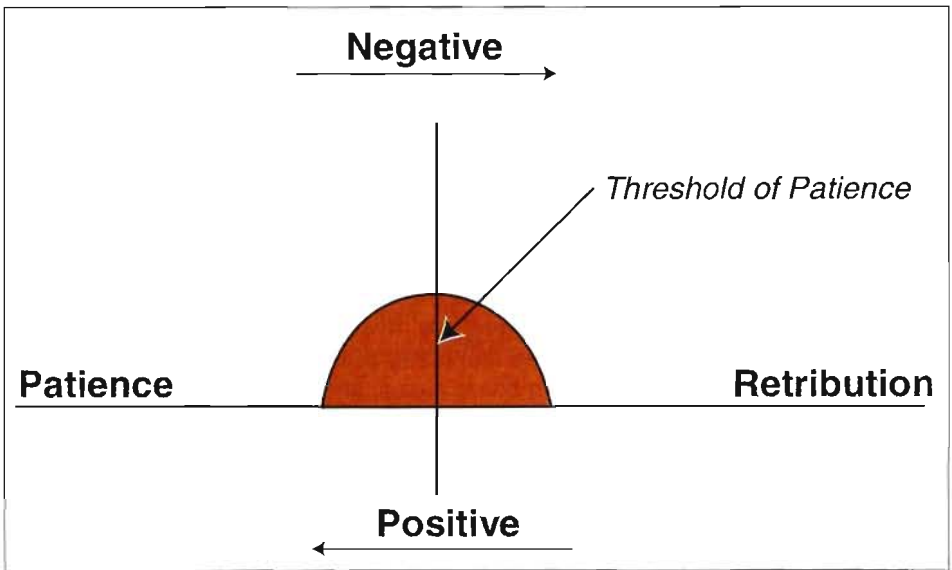


Figure 2: The threshold of patience

Wallowing in the broken soil by yaks has also rendered many areas on the mountain slopes more prone to erosion by wind and rain. Although active competition for forage between blue sheep and yak in summer has not been observed (Wangchuk 1994), there is potentially some competition in fall, when male blue sheep come slightly lower for mating, and in winter when forage is scarce. Other effects include the presence of mastiff guard dogs, which can scare away wildlife and sometimes attack blue sheep, especially in the Lingzhi area. These dogs have also been vectors of gid disease (infection of a parasite *Coenurus cerebralis* which forms a cyst in the brain or spinal cord) in yaks, which might also be passed on to wild ungulates.

Destruction of regenerating plants, both in forests and on meadows, has been well documented. In broadleaved forests, the increasing dominance of invasive or low-seral species of plants such as *Eupatorium*, *Pteridium*, *Artemisia*, *Plantago*, and *Rumex* has been used as an indicator of decline in fodder quality due to continued grazing (Norbu 2001). Grazing was found to reduce the number and density of broadleaved tree species in a study of grazing effects on regeneration in mixed coniferous forests (Roder 2001). In such forests, important catchment areas require broadleaved species. The same study also restated that grazing did not destroy conifer species. In alpine meadows, Gyamtsho (1996) was alarmed at the yak-to-pasture ratio in the rangelands of Lingzhi and Laya, both of which are in JDNP. That study estimated that there was less than two ha of pasture per adult yak equivalent (YAE), with an estimated standing biomass of 400 kg DM/ha (based on clippings on grazed and ungrazed pastures). It is evident from these facts that livestock has a significant impact on the natural environment through its affects on regeneration and plant communities.

Livestock-biodiversity synergies

Livestock is an integral part of the Bhutanese farming system. Rice terraces have been enriched for centuries with organic manure from cattle-sheds composted with

leaf litter from the forest. Many families keep cattle for more than dairy products alone. In the alpine meadows, domestic as well as wild ungulates add nutrients to the soil with their manure. This is useful for the growth of many wild plant species, including palatable fodder species useful for wildlife. In some alpine areas, however; such as Lingzhi, Laya, and Lunana; this process is interrupted by the collection of yak dung for fodder and manure.

In areas like Phobjikha, grazing by livestock maintains the openness of the valley floor. Young shoots of dwarf bamboo (*Yushania microphylla*) and *Arundinaria racemosa* are nipped by livestock and prevented from growing tall, as they do in enclosures in the nearby areas of Longmey and Sengor in central Bhutan. Wintering black-necked cranes (*Grus nigricollis*) prefer this open habitat, as the increased visibility helps them see possible threats approaching from a distance (Caron and Wangchuk 1994).

In JDNP, the Tsharjathang valley is a special sanctuary protected as summer habitat for the Bhutan takin. As no livestock are allowed to graze in the valley in summer, there is adequate grass, which can be collected by herders when they bring in their yaks into the valley in winter. This helps solve problems of winter fodder shortage. At the same time, grazing of the valley by livestock in fall and winter alters the vegetation in a manner favourable to the takin (Wangchuk, 1999). The grass is grazed, and many forbs and shrubs grow in the disturbed areas, like *Aconogonum* spp. *Potentilla fruticosa*, and *Spiraea arcuata*, and are eaten by the takin.

From these few examples, it can be seen that there are also positive relationships between livestock and biodiversity conservation.

Development planning processes

Administrative units in Bhutan are divided into 20 dzongkhags, which are in turn divided into 202 'geogs' (blocks or communities comprising several villages) (Figure 3). With decentralisation of the planning process, local institutions such as the Dzongkhag Development Committee (DYT) and Geog Development Committee (GYT) play important roles in the development planning process. Village concerns are voiced at community meetings and, if endorsed by the GYT, are passed on to district-level meetings. Further endorsement by the DYT warrants that issues be moved to the National Assembly, the highest legislative body in the country. The planning process is molded into five-year development plans (FYP); the ninth five-year plan started in July 2002. FYPs are used as guidelines for annual plans.

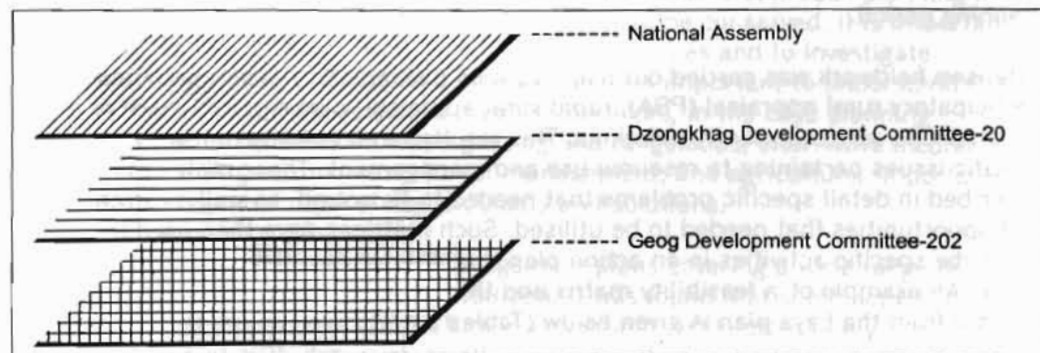


Figure 3: Three-tiered planning and decision-making hierarchy

Bhutan's development philosophy has been centred on maintaining a balance between sustainable resource utilisation and conservation of the natural environment. This is a shift from other development philosophies, wherein economic profit maximisation is the ultimate aim, often at the expense of the natural environment. A balanced development plan focuses on equitable distribution of costs and benefits; as well as on accommodation of religious, social, and cultural values.

JDNP has been working with local residents to assess resource use patterns, identify constraints, and develop management plans for sustainable use. Currently, the park is in the process of completing such plans for all of the ten major communities falling within the park. The first plan was made for Laya geog, and experiences gathered from this exercise were used to replicate the work in other communities. According to the draft Integrated Conservation and Development Plan for Laya (JDNP 2000), the basic premises for such collaborative involvement of the park in socioeconomic development planning of the resident communities lie in the following facts and assumptions.

- People living in the protected area may be considered park managers who derive a significant portion of their livelihood and cultural identity from the use of natural resources.
- There is a high level of uncertainty surrounding the setting of conservation objectives in a continually changing social and political environment (people's livelihood and land-use strategies, government policies, and rights of access to resources).
- Local people can contribute to the conservation of biodiversity if they benefit materially, socially, or culturally from the sustainable use of natural resources.
- The park itself has neither the capability nor the statutory responsibility to undertake many aspects of Integrated Conservation and Development Plan (ICDP) work, such as community development and agricultural extension, and must therefore collaborate with local governments and other local-level institutions.

Based on these premises, a community-based resource management plan called 'Integrated Conservation and Development Plan for Laya Geog' was developed for Laya geog by the ICDP team of the park in collaboration with the residents of Laya, other government agencies, and relevant stakeholders. The planning process involved building the planning capacities of key players – including village elders, government extension agents, planners, and park staff. A series of workshops and training sessions was held to train these people and to discuss issues thoroughly during the planning period.

Extensive fieldwork was carried out using various participatory planning tools such as participatory rural appraisal (PRA), rapid rural appraisal, participatory learning and action (PLA), and community meetings. This resulted in feasibility matrices for specific issues pertaining to resource use and management. These matrices described in detail specific problems that needed to be solved, as well as strengths and opportunities that needed to be utilised. Such matrices were then used to prescribe specific activities in an action plan that defined key players and a time frame. An example of a feasibility matrix and the corresponding action plan for tourism from the Laya plan is given below (Tables 1 and 2).

Table 1: Geog ICDP plan feasibility matrix

Geog: Laya

Problem/opportunity: Community management of tourism

Potential action	Responsible	Some main activities	Who benefits	Expected benefits
Renovation of hot springs	Whole community	<ul style="list-style-type: none"> • Letter of acceptance to undertake the work as labour contribution • Submit budget requisition • Construct tanks and baths • Separate hot and cold water • Put roof over the baths 	Whole community	<ul style="list-style-type: none"> • Better health of the community: good for healing fractures and curing tuberculosis • Will be part of the tourist programme • Will help generate income from tourism
	Dzongkhag and JDNP	<ul style="list-style-type: none"> • Financial support • Assist with work assessment and estimates • Assist with a management plan for using firewood for the stone baths 		<ul style="list-style-type: none"> • Reduce dependency on government supply of medicines • Mineral water will attract wild animals • Will promote tourism in the park
Mule track improvement and bridge maintenance between Laya, Lungo, and the hot springs	Whole community	<ul style="list-style-type: none"> • Acceptance letter to the dzongkhag that labour will be contributed by community • Budget requisition 	Whole community	<ul style="list-style-type: none"> • Will make hot springs more accessible to tourists and other guests • Easier access to monastery and pastures
	Dzongkhag and JDNP	<ul style="list-style-type: none"> • Site visit and assist with assessing the work required • Financial support 		<ul style="list-style-type: none"> • Will contribute to better tourism management • Less disturbance to wildlife by following a single track

(Source: JDNP 2000)

It became evident from the planning exercise that in order to realise conservation objectives (or any other specific objectives), it is important to approach planning from a very comprehensive angle. In order for biodiversity to be conserved, it is important to look into ways of reducing pressure on natural resources and to investigate sustainable management alternatives. In doing so, it is important to understand the socioeconomic implications of such activities. Therefore, in the Laya planning process, specific focus areas included grazing and rangelands, alternative income generation (including eco-tourism), forest management, and agriculture. Importantly, the residents suggested most of the problems and solutions.

Using similar approaches, resource management plans covering a wide range of rangeland and livestock issues were developed. It was found that some activities required financial inputs, such as pasture improvement, while others only required a shift in policies and attitudes, such as allowing for controlled burning of some pasture areas.

Table 2: Geog ICDP detailed action plan
Geog: Laya
Problem/opportunity: Community management of tourism

Activity	Detailed steps including monitoring	Who responsible	Year 1												
			J	A	S	O	N	D	J	F	M	A	M	J	
Renovation of Geyza Tshachu	Survey the site to assess the work required, agree on design, and prepare estimate of costs	JDNP, Dzongkhag, and members of the community													
	Send a letter of acceptance to the dzongkhag to do the work under labour contribution	Gup (village head) and community													
	Construct the baths, divert cold stream waters away from the spring, place roofing over the baths	Community under Zhapto Lemi													
	Develop a management plan for sustainable use of the surrounding forest to provide firewood to heat stones	Community and JDNP													
	Establish a management scheme that generates income for the community	JDNP, dzongkhag, community, and Department of Tourism													
	Monitor the use of the Tshachu by tourists and other guests	Community													
	Monitor the income generated and its distribution within the community	Community													
Mule track improvement and bridge maintenance between Laya/Lungo and Tshachu	Visit and assess site and prepare estimates	Dzongkhag, JDNP, and community													
	Send a letter of acceptance to the dzongkhag to do the work under Zhapto Lemi	Gup and community													
	Improve mule track and repair bridge	Community under Zhapto Lemi													
	Monitor use of the improved track to ensure that other tracks of conservation interest are not used	Community and JDNP													

(Source: JDNP 2000)

Integrating the ICDP plan with the geog plan

Bhutan has embarked on a decentralised planning process called geog-level planning, wherein each geog creates its own development plan. Such plans will cover all developmental needs – such as education, health and sanitation, trade, access and communication infrastructure, and agriculture and livestock services. The ICDP plan developed by JDNP for Laya must mesh with, and become part of, the geog plan in order to avoid duplication of effort and wasting of resources. The ICDP plan, although covering different aspects of socioeconomic development, has a conservation bias in that it ultimately aims to conserve biodiversity through other activities. The geog plan,

therefore, which focuses only on development, will cover areas left out by the ICDP plan. To complete the integration process, the approach illustrated in Figure 4 was used.

Integration of the community plan into the dzongkhag plan remains a big challenge. It takes a considerable amount of time for the dzongkhag authorities to accept the issues and activities prescribed within ICDP plans as priorities for the people. Long experience with centralised and target-driven planning processes makes it difficult to allow local plans to take precedence.

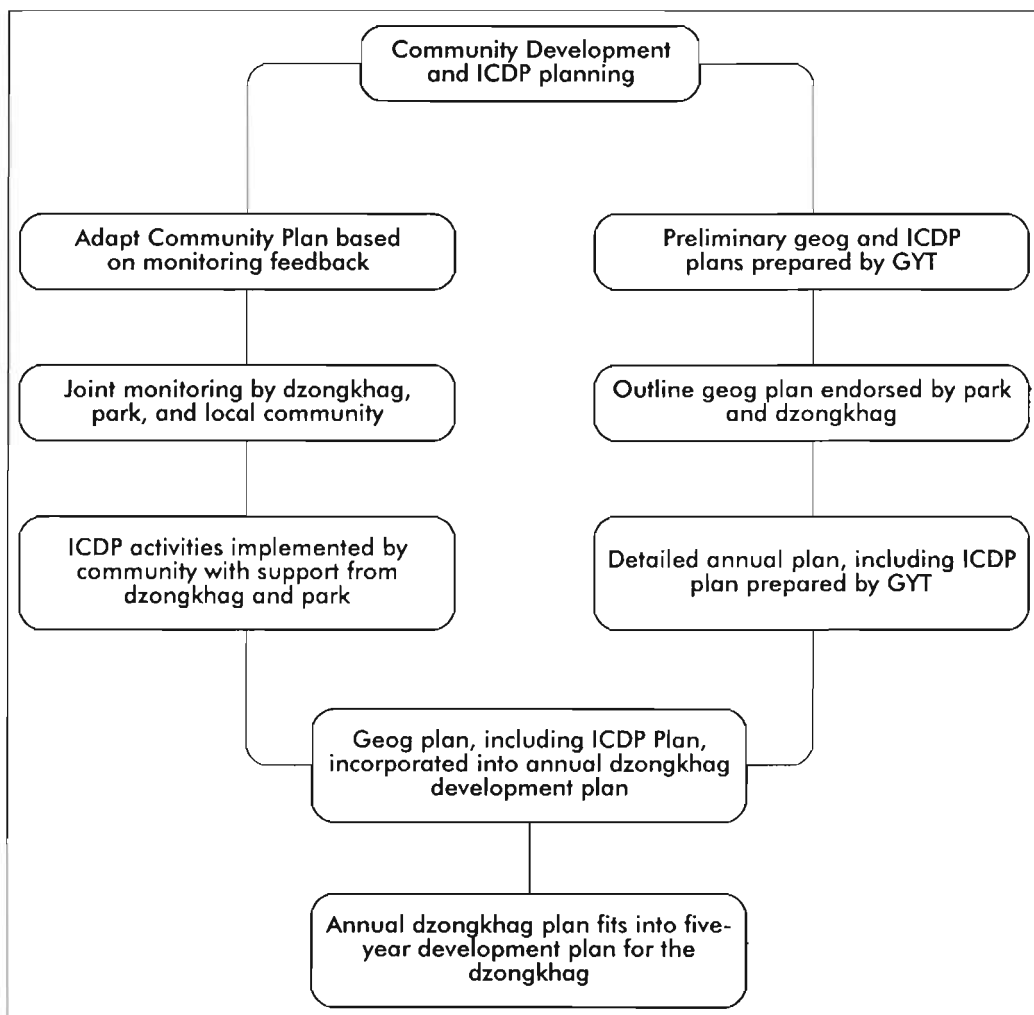


Figure 4: Integrating process for ICDP planning in JDNP

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