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# The Asiatic Lion and the Maldharis of Gir Forest

## An Assessment of Indian Eco-Development

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This article is an analysis of the India Eco-Development Project (IEP) implemented in Sasan Gir National Park and Sanctuary. Statistical data describing the consumption patterns and financial status of the Maldharis was collected from 13 nesses. This information demonstrates the impact of the Maldharis on Gir, a lack of willingness among people to change environmentally harmful behavior when forest-dependent activities are economically beneficial, and that participatory approaches under IEP have resulted in positive changes in the lifestyle of the Maldharis and enhanced relationships with the forest department but have failed to improve conservation. The research seeks to assess the effectiveness of IEP in reducing the dependency of Maldharis on natural resources by considering (a) appropriateness of IEP strategies for the Maldharis; (b) methods used to apply IEP strategies; (c) amount of understanding of IEP among the Maldharis, particularly women; and (d) the ability and willingness of Maldharis to participate in IEP.

**Keywords:** *eco-development; Asiatic lion; livelihoods; Maldharis; conservation*

## The Asiatic Lion and the Maldharis of Gir Forest

Characterized by a hilly topography and a dry deciduous ecosystem, Gir National Park and Sanctuary located in the Saurashtra region of Western Gujarat (Figure 1), India, is the only habitat for the Asiatic lion (*Panthera leo persica*). Different from its African counterpart (*Panthera leo leo*), Asiatic lions have a less luxuriant mane, a larger tail, and a distinct fold of skin under the belly (Chavan & Karkaria, 2001).

Lions once roamed through Syria, Iraq, Afghanistan, and even Macedonia and Palestine (Chavan & Karkaria, 2001). In India, they were spread across Rajasthan, Haryana, Punjab, Uttar Pradesh, Madhya Pradesh, and Gujarat (Chavan & Karkaria, 2001). Severe hunting by the royalty and colonial powers led to the disappearance of lions from such a wide-ranging habitat. Even in Gir, lion hunting was a popular

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**Author's Note:** This article is based on research conducted for the Master of Philosophy in Environment, Society and Development at the Geography Department, University of Cambridge.

**Figure 1**  
**Gir National Park and Sanctuary**

Image 1:



Note: Map not drawn to scale. Figure is based on the presentation "Problems of Gir" made by the Conservator of Forests, Junagadh.

sport and lion numbers were down to 12 in 1880 (Debnath, Hasan, & Rishi, 2001). In 1901, an invitation for hunting sent to Lord Curzon, the Viceroy of India, by the Nawab of Junagadh, was declined in an effort to raise awareness about the dwindling numbers of lions (Divyabanusinh, 2005). As a result, the Nawab became interested in the protection of the species and the Asiatic lion recovered from the verge of extinction.

To ensure long-term protection of lions, 1,412.1 square kilometers was declared as a sanctuary in 1965, and thereafter, 258.71 square kilometers was notified as a national park under the Wildlife (Protection) Act of 1972 (Casimir, 2001). As per the norms of a national park, no human activity is allowed in the 258.71 square kilometers, whereas the surrounding sanctuary permits human consumption and movement.

Most human activity within the sanctuary comes from the Maldharis, a traditional pastoralist community that has lived in Gir for more than 125 years (Casimir, 2001). The Maldharis are livestock keepers whose livelihood is mainly based on the sale of milk and its byproducts. Nearly 800 families with 15,000 cattle live in 54 informal settlements or nesses within the forest. Lion numbers, along with numbers of other animals such as leopards and wild ungulates, have steadily increased in Gir, which signals the good efforts made by the forest department toward conservation. It also

points to the tolerant and respectful attitude of the Maldharis and local villagers toward wildlife that has allowed for the synergistic relationship between humans and animals in Gujarat. However, as population levels of both wildlife and humans grow, there is an imminent possibility of exceeding the carrying capacity of Gir. Lions and leopards have already dispersed outside the sanctuary area, indicating the need for more forest space.

Combined with this are concerns about meeting the development needs of the Maldharis without conflicting with conservation goals. The Maldharis originally came from Rajasthan and were nomadic pastoralists who regularly visited Gir to graze their cattle. Over time, some settled in the Kathiawar region of Gujarat and brought a colorful and culturally rich heritage into the area. They are a brave and hard-working people who have learned to live with lions and survive in the often drought-ravaged conditions of Gir. They also follow a vegetarian diet (Dyer & Choksi, 1997), which is a unique expression of their integration into the customs of Gujarat. The Maldharis have grazing rights in the sanctuary, unlike the local villagers, which allow each family to keep cows and buffaloes and earn a living based on the sale of milk to villages and regional dairies. Although their lifestyle is seemingly benign, the aggregated pressures of livestock grazing and firewood, topsoil, and grass collection affect the quality of vegetation and soil in the forest (Berwick, 1974b; Khan, Chellam, Rodgers, & Johnsingh, 1996).

Moreover, as the Maldharis have become incorporated into regional markets, awareness has emerged about progress related to urban growth, which is reflected in their demands for electricity, transport, schools, and hospitals—namely a more comfortable everyday life. Although such needs are far from excessive, meeting them raises worries regarding the inadvertent increase in the ecological footprint of the Maldharis that may accompany delivering these services inside the forest. Therefore, if their development and changing requirements are not to be neglected, a balance must be sought heeding both their demands and conservation objectives.

Added to the presence of the Maldharis are 14 forest settlement villages (FSVs) also inside the sanctuary and 97 revenue villages (RVs) on the periphery and within 5 km of the sanctuary. Although the main occupation in the FSVs and RVs is agricultural, they do contribute to the pressures of grazing and fuel wood collection, although they are less intensive. The Gir forest is further under stress by the uncontrolled urban development in surrounding areas, coupled with heavy traffic caused by pilgrims visiting the 23 temples situated inside the sanctuary and state highways that pass through the wilderness areas.

Considering the many factors that interact with and influence Gir's natural resources, there is a clear need for a wider study of the pressures on Gir if the growing population of the Asiatic lion is to be sustained. However, this article seeks to assess the more apparent and measurable interaction of the Maldharis with Gir.

## Method

Out of 54 nesses, 13 (locations shown in Figure 1) were randomly selected in the Eastern and Western parts of the forest to draw an overall conclusion about the status of the India Eco-Development Project (IEP) implemented in Gir from 1996 to 2001. Women were the main focus group, as they tend to be most familiar with fuel wood, grass, and water collection. In addition, women are responsible for domestic activities and were trained under IEP to explore alternative incomes. Attempts were made to question at least one female member individually from each household in the ness or to speak to a representative group of women, which was dependent on the natural congregating of women in some cases. This was justifiable because residents of a ness follow similar practices of grazing, livelihoods, and so on and the data could be broadly applied. Interviews were conducted in the late morning or early evening periods to ensure that men were away with the livestock and women felt more comfortable speaking openly. Men were interviewed to reveal incomes from dairy-based activities and to interpret social dynamics between men and women in nesses that influenced IEP strategies.

Numerous discussions were held with forest department officials residing in the sanctuary and officers based at the ministry to gain information about the administrative challenges associated with the implementation of IEP and varying perceptions about why IEP did not work. Moreover, conversations with trekkers who serve as tourist guides were helpful in revealing physical landscape changes that were observed during the course of a trekker's experience in the forest and their perceptions about the impacts of the Maldharis. Thus, the methodology relied on an analysis of interviews conducted, which were supplemented by an examination of project documents.

### IEP and Integrated Conservation and Development Projects (ICDPs)

Funded by the Global Environment Facility and implemented through the World Bank, with a budget of US\$67 million, the IEP was intended to promote conservation efforts by reducing negative impacts of local populations in and around seven protected areas (PAs) in India (Singh & Sharma, 2004). The goal of IEP was that incomes generated from diversified activities would reduce the total dependence of people on the forest, address community development needs, and ultimately lessen severe human pressure faced by habitats.

The validity of involving people in biodiversity protection (Kothari, 1996; Kramer & van Schaik, 1997) versus adopting an exclusionary strategy has been a source of many debates. However, resulting from the view that a "fences and fines" (Barrett & Arcese, 1995) approach has failed to protect biodiversity and that conservation and development are inextricably linked are ICDPs. ICDPs endeavor to

involve people as active participants in conservation by providing development activities as an incentive to comply with environmental policies.

Although achieving both biodiversity protection and improving the condition of people is desirable, ICDP experience has shown that this is usually not feasible (Wells, Brandon, & Hannah, 1992). One of the major challenges of ICDPs is connecting the needs of locals to environmental preservation. A significant problem with ICDPs is the short time spans under which projects are designed and implemented, leading to an inadequate understanding of social and political factors affecting resource use (Wells et al., 1992). Rajvanshi (2005) claims that

this disconnect between development activities and desired conservation impacts within ICDPs has often led to divergence between the benefits obtainable from biodiversity conservation and the benefits obtainable from the project. Many projects start by emphasizing the former but end up concentrating almost entirely on the latter. (p. 515)

Consequently, recipients of development activities do not understand the purpose of ICDPs and simply participate to receive benefits not really altering their behavior and practices in the long term.

Another fundamental shortcoming of ICDPs is their inability to influence broader factors threatening biodiversity (McShane & Newby, 2004). ICDPs usually concentrate on site-specific interventions, overlooking the larger regional influences on forests. But many threats faced by ecosystems are related to external forces, such as unregulated urbanization, institutional nonalignment, and lack of cooperation among different government departments. However, such a vertically and horizontally integrated approach is difficult to achieve in practice, as it involves changing relationships between people and bureaucrats, influencing national policies that are generally focused on economic rather than environmental effects of activities, and altering regional social attitudes that often conflict with biodiversity goals.

In India, the IEP implementation process embodied criticisms of ICDPs with arguments over whether people would stop using natural resources if alternative income sources were available. Skeptics felt that these alternative livelihoods would simply become an additional source of income and not reduce resource use (Singh & Sharma, 2004). To prevent this from happening, forest departments entered into a memorandum of understanding (MoU) with villages. If it was discovered that villages did not fulfill their commitment, deterring measures would be taken (Singh & Sharma, 2004). The fact that many reciprocal commitments were in fact not followed by villagers, or followed for a very short time in some cases, without any penalties is an interesting aspect of IEP. From one perspective, it represents the usual ways in which projects are implemented with tedious efforts and initial fervor from all sides, which ultimately diminishes and people revert to old practices. Alternatively, it indicates the improvement in relationships between local communities and the forest department that resulted because of many amiable interactions and meetings under IEP and was a significant

**Table 1**  
**Population of Nesses in 2007**

Name of Ness	No. of Families	Population			Total
		Males	Females	Children	
Kadeli	3	5	7	8	20
Jambuthala	3	10	13	17	40
Lakkadvera	1	4	4	7	15
Kanthala	5	10	14	19	43
Ghudzinzuva	29	85	78	35	198
Asundrali	28	110	103	55	268
Dodhi	19	73	62	77	212
Mindha	12	20	19	37	76
Khajuri	7	24	20	16	60
Dadhia	10	19	16	36	71
Juni Alavani	8	41	27	56	124
Vaniyavav	10	13	23	47	83
Gangajaliya	15	—	—	—	—

Note: Missing values in the tables denote an inability of interviewees to provide data because of a lack of knowledge or familiarity regarding the issue.

result of the project. However, whether it is worth overlooking the violation of MoUs when it affects habitats, because improvement in people's attitude toward the forest department and vice versa takes place, is an important consideration, as it can lead to the sidelining of conservation for benefits to people.

## Demographic and Economic Data

Demographic information was gathered for each of the 13 nesses from December to January 2007 (see Table 1). Population data are directly related to the amount of impact on forest resources. An increasing number of people within the sanctuary can negatively affect the habitat, as this includes an intensification of vehicular traffic and human movement. A growing population also means more demand for electricity, schools, medical facilities, and transport inside the forest. The total population of 13 nesses, with the exception of Gangajaliya, was found to be 1,210 people.

The number of cows and buffaloes 150 Maldhari families owned was equally important as the number of people in nesses for determining impact on natural resources. A breakdown of the quantity of cows and buffaloes with milking and nonmilking animals is given in Table 2. These data reveal the wide variance in the number of cattle owned by families. One Maldhari, for example, may own 150 cattle, while another subsists on 30.<sup>1</sup> Moreover, 150 families keep 4,426 cattle that

**Table 2**  
**Statistical Data Regarding Livestock in 2007**

Name of Ness	No. of Families	Total No. of Cattle	Number of Milking Cattle			
			No. of Buffalos		No. of Cows	
			Milking	Total	Milking	Total
Kadeli	3	113	27	105	0	8
Jambuthala	3	90	24	82	2	8
Lakkadvera	1	50	8	35	2	15
Kanthala	5	96	28	92	1	4
Ghudzinzuva	29	728	248	496	28	56
Asundrali	28	734	130	519	40	130
Dodhi	19	694	117	470	37	150
Mindha	12	392	32	131	13	53
Khajuri	7	344	31	125	5	22
Dadhia	10	234	18	74	8	34
Juni Alavani	8	356	43	172	12	50
Vaniyavav	10	220	82	195	10	25
Gangajaliya	15	375	—	—	—	—

graze inside the sanctuary. The number of milking and nonmilking animals further shows the excess cattle that are kept inside the sanctuary and are not a source of livelihood for the people.

In addition to their population and livestock, the interaction of the Maldharis with the Gir forest involves collecting grass for fodder, wood for household purposes, and water for cattle and domestic uses. The Maldharis are charged an annual fee of 5 Rupees per animal to graze in the sanctuary.<sup>2</sup> There are no restrictions regarding grazing and wood collection. People are encouraged to collect dry wood or wood fallen on the ground, but no laws or penalties are in place if this is not practiced. Maldhari men and boys take the cattle for grazing every day, although there were some families where the boys were not involved in grazing. Some remained in the ness, whereas others spent their time in the markets outside the forest.<sup>3</sup>

The amount of wood that is consumed per day varies depending on the requirements of a family. In Jambuthala, one family with seven people used 80 kg of wood per day.<sup>4</sup> Female members of a family usually travel 0.5 to 1 km around the ness to collect wood. Households also use kerosene as an additional fuel, but wood is the main source for cooking, heating, and lighting in houses. It was discovered that people's collection of wood had remained unchanged despite the IEP activities. Women mentioned quantities of wood collected as being constant throughout the years.

Fresh grass is fed to cattle in nesses along with grazing. The distance traveled for grazing ranges from 3 km to 4 km around the ness, but there were some families in



**Table 3**  
**Consumption of Natural Resources in 2007**

Name of Ness	No. of Families	Wood Consumption/Day (kg)	Distance Traveled for Wood (km)	Grass/Fodder Collection/Day (Feb.-Monsoon) (kg)	Distance Traveled for Grass/Fodder (km)	Water Consumption/Day (liter)	
						Winter	Summer
Kadeli	1	5	3	30	3	450	750
	1	3	3	—	5	75	90
	1	10	3	—	—	45	75
Jambuthala	1	80	4	60	10	300	900
	1	40	2	120	—	1,500	2,250
	1	50	—	—	—	1,200	1,500
Lakkadvera	1	8	2	—	3	450	750
Kanthala	1	40	5	80	4	1,200	2,400
	1	40	5	—	4	750	1,050
	1	6	5	—	4	450	750
	1	20	5	—	4	750	900
	1	20	5	—	4	1,350	1,500
Ghudzinzuva	29	126	5	1000	3	58,000	75,000
Asundrali	28	—	—	—	—	50,400	—
Dodhi	19	95	3	—	—	22,000	—
Mindha	12	—	—	—	—	12,000	15,000
Khajuri	7	35	—	—	—	10,500	12,600
Dadhia	10	84	3	na	—	4,500	7,500
Juni Alavani	8	340	3	700	10	9,600	—
Vaniyavav	10	75	—	—	—	—	—
Gangajaliya	15	75	—	—	—	—	—

Jambuthala and Juni Alavani who traveled up to 10 km. One woman commented on the need to travel farther for grazing because there is no grass available nearby compared to the situation 10 years ago.<sup>5</sup> No one was familiar with rotational grazing, and stall feeding was not practiced as a substitute for grazing. Some women claimed that this was because cattle were so used to grazing that stall feeding would not work. There is a visible impact on the soil and vegetation surrounding the nesses because of the constant movement of cattle. The ground becomes compacted on the cattle paths, and no vegetation grows for years.<sup>6</sup> A trekker stated that

there is an increase in weed species [*kuwadiya*] where grazing takes place. Cattle eat the *kuwadiya* and the seeds are not digested but softened as a consequence and then have a 100% better chance of growing compared to a 2% to 5% chance without this process.

There are more weeds in the sanctuary, and there is a noticeable difference in the landscape compared to the national park, which appears to have denser vegetation.

Table 4 describes the incomes of the Maldharis. This information is particularly important in determining the amount people are benefiting from living inside the sanctuary. Some Maldharis have good earnings because of high fat content in the milk, which is sold twice a day. A family in Kadeli sold 150 liters of milk per day,

**Table 4**  
**Sources of Income in 2007**

Sources of Income				
Name of Ness	No. of Families	Milk Sold/Day (Liter/Rs.)	Butter Sold/Year (kg/Rs.)	Fertilizer Sold/Year (Truck/Rs.)
Kadeli	1	80/1,120	na	18/25,200
	1	12/168	na	4/6,000
	1	150/2,100	na	—
Jambuthala	1	40/640	na	12/18,000
	1	72/1,008	na	—
	1	48/672	na	12/15,600
Lakkadvera	1	50/900	na	20/25,000
Kanthala	1	16/192	na	4/5,200
	1	36/432	na	6/7,800
	1	16/192	na	4/5,200
	1	50/600	na	6/10,200
Ghudzinzuva	1	12/120	na	4/5,200
	29	560/8,400	na	40/68,000
Asundrali	28	640/9,600	na	65/97,500
Dodhi	19	240/3,840	na	30/51,000
Mindha	12	100/1200	1,460/219,000	10/25,000
Khajuri	7	160/2,240	5,200/728,000	65/117,000
Dadhia	10	—	—	—
Juni Alavani	8	—	—	—
Vaniyavav	10	—	—	—
Gangajaliya	15	—	—	—

Note: Rs = Rupees.

earning 2,100 Rupees a day. Families in Mindha and Khajuri sold butter and fertilizer in addition to milk. Therefore, the economic condition of the Maldharis varies; there are some with very high incomes and others who are poor.

In addition, the expenditure of the people is significant to assess net savings. If the Maldharis are considerably secure financially, this has implications for their willingness to change dependence on natural resources. Most of the earnings are spent on purchasing fodder in the form of khod, kapasuya, and bhuso,<sup>7</sup> which are fed to the livestock to increase milk yield. Some Maldharis in Jambuthala and Lakkadvera bought grass from the market for cattle, but this was a rare expenditure. Finally, the Maldharis spend their money on kerosene that is bought using ration cards at a subsidized rate (Table 5 illustrates main sources of expenditure). Consequently, the monthly savings in Table 6 show that the Maldharis are gaining financially from residing inside the forest. Access to wood, grass, and top soil of the forest, which is sold and mixed with manure as fertilizer, provides a means for income generation. Because of the fact that the Maldharis end up

**Table 5**  
**Sources of Expenditure in 2007**

Sources of Expenditure				
Name of Ness	No. of Families	Cattle Feed (Khod+Kapasuya+Bhuso)	Fodder (Rs.)	Kerosene (Liter/Rs.)
Kadeli	1	228,800	—	180/5,400
	1	57,200	—	180/5,400
	1	—	—	180/5,400
Jambuthala	1	106,500	—	180/5,400
	1	156,000	—	180/5,400
	1	177,937	25,000	180/5,400
Lakkadvera	1	248,200	12,500	120/1,200
Kanthala	1	132,616	—	—
	1	—	—	—
	1	—	—	—
	1	207,666	—	—
Ghudzinzuva	1	33,833	—	—
	29	1,581,666	—	—
Asundrali	28	3,193,750	—	—
Dodhi	19	630,000	—	760/22,800
Mindha	12	533,833	—	180/5,400
Khajuri	7	415,187	—	180/5,400
Gangajaliya	15	144,175	—	180/5,400

Note: Rs = Rupees.

with disposable monthly incomes, many invest in agricultural activities outside the forest and in gold.<sup>8</sup> Thus, there is a misconception that the Maldharis are entirely dependent on the forest for their livelihood. Many are taking advantage of free forest resources by residing inside the sanctuary and have family members living on the outside who are engaged in other activities that do not involve livestock.

### Observations About Microplanning Benefits

An institutional benefit promoted by IEP, in addition to the distribution of benefits for economic and development needs, was the establishment of Eco-Development Committees (EDC).<sup>9</sup> EDCs were set up in each ness and constituted 12 male and 3 female members of the ness. EDCs were responsible for facilitating and determining activities under the village development fund. Whether EDCs are still active and the level of achievement of IEP goals are other indicators of success of the project in nesses.

Under the IEP, the Institute of Rural Management Anand (IRMA) was hired for the microplanning stage. Meetings were conducted in nesses to “identify the felt needs of local people and assess the availability of resources—natural, human,

**Table 6**  
**Monthly Incomes of the Maldharis in 2007**

Monthly Earnings				
Name of Ness	No. of Families	Earnings/Year	Expenditures/Year	Savings/Month
Kadeli	1	434,000	234,200	16,650
	1	67,320	62,600	393
	1	766,500	—	—
Jambuthala	1	251,600	111,900	11,642
	1	367,920	161,400	17,210
	1	260,880	208,337	4,379
Lakkadvera	1	353,500	261,900	7,633
Kanthala	1	75,280	32,616	3,555
	1	165,480	—	—
	1	75,280	—	—
	1	229,200	207,666	1,795
Ghudzinzuva	1	49,000	33,833	1,264
	29	3,134,000	1,581,666	129,362
Asundrali	28	3,601,500	3,193,750	33,979
Dodhi	19	1,452,600	652,800	66,650
Mindha	1	682,000	533,833	11,897
Khajuri	7	1,662,600	42,087	1,353,501
Dadhia	10	—	—	—
Juni Alavani	8	—	—	—
Vaniyavav	10	—	—	—
Gangajaliya	15	—	144,175	—

organisational/institutional, and others—available in the PA which can be used for fulfilling the needs identified” (IRMA, 1998, p. 14). The major needs identified for needs through participatory exercises were as follows:

- potable drinking water,
- access to education and health care facilities,
- jobs for educated youth,
- construction and repairs of houses,
- protection of domestic animals from wild animals,
- adequate feeds and fodder resources for livestock,
- proper marketing facilities for milk and milk products,
- veterinary facilities,
- diversification of the sources of income, and
- electricity and transport facilities (IRMA, 1998).

IRMA prepared 20 microplans from August 1, 1997, to July 31, 1998 (Dyer & Choksi, 1998). It was decided that because of IRMA’s inability to complete the

microplans within an adequate amount of time, the forest department would complete the rest of the microplans.<sup>10</sup> This decision was made because deadlines had to be met under the project.<sup>11</sup>

Based on the requirements of the people, benefits were distributed for the community as a whole and for individual households (see Table 7). Community benefits included the construction of bore wells, walls surrounding a ness, facilitated access to fodder, and distribution of cooking utensils. The type of benefit given to a ness differed depending on its demands. Individually, family benefits included solar lights, steel sheets for roofs (Patra), liquefied petroleum gas (LPG), kerosene stoves, and bella<sup>12</sup> stones. The distribution of LPG and kerosene stoves was highly dependent on the willingness of people to use such methods instead of wood. In most nesses, it was found that people refused LPG. Women felt that they were not capable of understanding how to use LPG and did not like the taste of food cooked on gas. In two families in Jambuthala and Kanthala, however, there was willingness to use LPG if it was given to them. This willingness seemed to be in some younger girls in the ness and in women who came into the forest after marriage.

Another family in Jambuthala claimed to have gifted the LPG connection to their daughters who lived outside the sanctuary. In reality, most people sold their connections in the market. There seemed to be a cultural reluctance associated with cooking on gas, and there was a clear preference for wood. This refusal to accept gas was also influenced by a number of other factors. There are no restrictions on wood collection, and it is more convenient and familiar to gather fuel wood. In addition, many Maldharis discovered that access to kerosene would be halted if LPG was accepted. A well-known Maldhari elder in Lakkadvera even claimed to have encouraged other people not to take LPG because supply of kerosene would be stopped. Finally, the provision of LPG cylinders is irregular and inefficient. People have to travel a considerable distance to refill cylinders and find it inconvenient.<sup>13</sup> LPG also entails an additional cost that is seen to be unnecessary when wood is free.

Bella stones were distributed under the need for repairing houses expressed by the Maldharis. Most stones were used in the construction of community walls to protect livestock from predators. In some nesses like Lakkadvera, rooms that serve as a school were built using the stones. This seemed to have been allowed even though it does not in any way serve the purpose of reducing the ecological impact of people under IEP. However, because the ness is located on the border of the sanctuary, there is some leniency accorded, and the ness also has electricity. The forest department encourages nesses to relocate to the boundary of the forest and allows certain facilities that are otherwise not permitted inside the sanctuary presumably to attract the Maldharis.

The distribution of *patras* may have been the only benefit that had some effect on wood consumption. One family in Lakkadvera stated that they asked for *patras* because it reduced the need for wood to cover roofs. However, this form of wood consumption is very small compared to the other uses of wood that remained unaffected under IEP.

**Table 7**  
**Benefits Distributed Under IEP From 1996 to 2001**

Benefits Under Eco-Development							
Name of Ness	No. of Families	LPG	Kerosene Stove	Patra (Steel Sheet for Roofs)	Bella Stone	Water Provision	Cooking Utensils
Kadeli	1	x	x	✓	x	✓	x
	1	x	x	x	x	x	x
	1	x	x	✓	x	x	x
Jambuthala	1	✓	x	✓	x	x	x
	1	✓	x	✓	x	x	x
	1	x	x	✓	x	x	x
Lakkadvera	1	x	x	✓	✓	x	✓
Kanthala	1	x	x	x	✓	✓	x
	1	x	x	x	✓	x	x
	1	x	x	x	✓	x	x
	1	x	x	x	✓	x	x
Gudzinzuva	29	x	x	✓	✓	✓	x
Asundrali	28	x	✓	✓	✓	✓	x
Dodhi	19	x	✓	x	✓	✓	x
Mindha	1	x	x	✓	✓	✓	x
Khajuri	7	x	x	✓	✓	✓	x

Note: IEP = India Eco-Development Project; LPG = liquefied petroleum gas; x = not distributed in ness; ✓ = distributed.

Generating alternative livelihoods intended to reduce dependence on natural resources was a major component of IEP. Self-help groups (SHGs) were formed for women to provide financial assistance and training to make marketable goods such as juice, biscuits, and so on. Women deposited 10 Rupees each month to assist with potential business ventures. Groups of women from nesses were taken to the Agricultural University for hands-on instruction. A woman in Kadeli claimed to have understood the methods that were taught to them to make milk-based products. However, she did not feel that it was something she could pursue because of a lack of necessary machinery. In addition, she stated that the instruction manual given to her was unhelpful, as she could not read. The level of education played a crucial role in the capability of women to take advantage of IEP schemes. Most women were illiterate, and there were rare cases of some having studied till the third or fourth standard.

Consequently, women forgot the training and the instruction manuals were ineffective. There was a further lack of willingness to start a business venture with other women in the ness. In Kadeli, a woman expressed concern about the potential for conflicts arising among women because of such activities. She also claimed that the necessary cooperative spirit was missing in the ness for a joint business.

**Table 8**  
**Statistical Data Describing SHGs, Level of Education Among Women, and**  
**Willingness to Relocate in 2007**

Further Statistical Data					
Name of Ness	No. of Families	Level of Education/ Class (Women)	Active SHG	No. of Cattle Lost to Predators/Year	Willingness to Relocate
Kadeli	1	x	x	1 to 2	x
	1	One till 4th	—	2	x
	1	—	x	—	x
Jambuthala	1	—	x	1	✓
	1	—	—	—	✓
	1	—	x	—	✓
Lakkadvera	1	x	x	1	✓
Kathala	1	—	x	1	✓
	1	—	—	—	—
	1	—	—	—	—
	1	—	—	—	✓
Ghudzinzuva	29	Few till 3rd/4th	x	12 to 24	x
	28	—	—	—	—
Dodhi	19	Few till 2nd/3rd	x	—	—
Mindha	1	—	x	—	✓
Khajuri	7	—	x	—	—

Note: SHG = self-help group; x = no education, no SHGs, unwilling to relocate; ✓ = willing to relocate.

SHGs were not active in any of the nesses (see Table 8). Responses regarding the rationale behind SHGs demonstrated a lack of understanding of its purpose. In one ness, women asked to use the deposited money for a wedding. On being told that it was not for such uses, the women stopped contributing to the SHG. All the women claimed that they deposited 10 Rupees per month as long as the lady employed by the forest department came to collect the amount. Once the project finished in 2002, the lady stopped visiting the nesses and the women stopped depositing money. On being questioned on why the deposits were not continued, the women responded by stating that “no one came to collect the money.” It was clear that women did not grasp the concept of SHGs and did not have enough knowledge or experience to take the initiative to continue with the project once it was implemented.

None of the women were aware of the reason for IEP. The project was interpreted as delivering certain services to improve living conditions. No connection was made between protecting biodiversity and the benefits that were distributed. Women were not familiar with EDCs, although some did recognize the term. IEP was also more successful in the FSVs and RVs compared to the nesses.

The most significant effect of IEP was found to be an overall improvement in the relationship between the forest department and the Maldharis. All the interviewees stated that they were on good terms with forest officials, and there was evidence of many informal social associations between the officials and the Maldharis.

### **The Impacts of IEP**

The major achievement of the IEP was an improvement of associations between the forest department and the Maldharis. Although previously officials were viewed with fear, regular meetings with forest official staff during the implementation stages of IEP resulted in amicable relations. This was significant because natural resource management in Gir was exclusionary in nature, and there was a need to involve people in conservation, both to create an interest in protecting wildlife and to generate willingness to participate in collaborative schemes that environmental policies are shifting toward in India. IEP's achievement in reducing negative impacts of tenses, however, was less successful.

### **An Analysis of the Shortcomings of IEP**

*Time frame of ICDPs.* Wells et al. (1992) discuss the short time frame of ICDPs, of 3 to 5 years, which does not permit ICDP design to be based on "detailed site-specific studies of the local socioeconomic, political and cultural contexts" (p. 13). PA officials are under pressure to meet deadlines, and project activities are completed without meticulous investigation. In Gir, the *2001 II Quarterly Report of IEP* (Shah, Mukherjee, & Joshi, 2001) and the World Bank *Project Performance Assessment Report* (Pati, 2007) revealed the necessity of meeting project deadlines as greatly affecting the analysis conducted under microplanning. IRMA was found to be unsuitable for microplanning, as it could only do discussions with one to two households per day (Shah et al., 2001). To speed up the process, the contract with IRMA was cancelled and the forest department finished microplanning in 6 months (Shah et al., 2001). A forest official claimed that

the project was only for five years and funds needed to be distributed quickly, requiring a rapid completion of microplans. Due to performance appraisals, people were under pressure to achieve targets, and communities were almost forced to take benefits.

Although IEP was extended for 2 years, in the initial stages, enough time was not allocated for capacity building and comprehension of the project among forest department employees and local people. The forest official also stated that

IEP was a new participatory concept that takes time to understand. There were a number of problems within the department and the people that needed to be addressed. The level of maturity required in such a collaborative scheme was not present 10 years ago.



Lacking experience with participatory projects and needing to fulfill set targets, field officers shifted the emphasis of the project to individual benefits so that communities would readily partake in the microplanning process (Shah et al., 2001). Because of the urgent preparation of microplans, there was perhaps little time or realization of the potential impact of this issue in the forest department, and microplans ended up concentrating on listing the benefits that households desired from IEP. Consequently, rather than focusing on discussing and analyzing the ways in which resource use could be reduced with communities, the Maldharis saw IEP as only delivering certain services instead of a cooperative approach with the forest department to address the ecological status of Gir.

Another issue that was not sufficiently dealt with because of the short term of IEP was the development of support mechanisms in the form of nongovernmental organizations (NGOs) to guide implementation of IEP strategies. The *First Annual Participatory Microplanning and Implementation in Gir Protected Area Report* by IRMA (1998) examined a lack of NGOs interested in eco-development activities in the region. IRMA stated that “most NGOs in the project area [had] limited organisational capability for imparting training for self-employment or broad areas of eco-development” (p. 7), and IRMA could not be expected to substitute for this deficiency in local NGOs. Thus, there was no organization with social, cultural, and economic experience in nesses that could provide adequate knowledge about how to connect development to changing natural resource patterns. There was a need to create awareness and education among the NGOs active in the Gir area to become interested in conservation activities. This type of interest in the preservation of biodiversity can only emerge through gradual interactions of NGOs with natural environments that are facilitated by the forest department. However, such development of concern for protection of Gir is a time-consuming process that cannot be expected to emerge in 4 to 5 years, which is the general length of ICDPs.

Furthermore, the fact that there was no access to land in nesses compared to villages entailed more experimentation in nesses to reduce impacts on Gir. Families in FSVs and RVs own agricultural land and community land, belonging to the *panchayat*, and IEP was able to use this land to grow fodder, vegetables, and fruits to add toward the incomes of people. Dhanej, one of the 97 RVs, turned out to be a model for its success in the creation of an Eco-Kunj, where land was allocated for growing fodder and mangos, reducing the need to graze cattle in the forest and creating employment for people in the Eco-Kunj (Shah & Mukherjee, 2002). In nesses, this was not a possibility, and solutions had to be constrained and varied techniques were necessary to generate benefits and reduce dependence on forest resources. This trial-and-error approach may have found success if enough time was available for the Maldharis to become accustomed to new techniques employed under IEP.

*Lack of specific planning.* Moreover, there was a need for differential IEP strategies that matched the unique cultural, social, and economic attributes of nesses. The Wildlife Institute of India’s (Mukherjee et al., 2001) report on eco-development,

however, states that the IEP selected from a predetermined set of activities that did not qualify as good eco-development practices and did not understand the link with park conservation. The distribution of LPG as a benefit, for instance, was not welcome in most of the nesses that were interviewed. Microplans prepared by IRMA for Asundrali and Dodhi nesses included kerosene stoves as a demand of the people, but there was no mention of LPG.<sup>14</sup> The microplans for Karamdadi and Sukhpur RVs, however, included LPG as a desired benefit.<sup>15</sup> This was a reflection of the difference in demands between nesses and villages. The fact that LPG was ultimately offered in the nesses is probably a result of an attempt to get the Maldharis to adopt a less wood-intensive cooking technique than kerosene. It is also a reflection of the application of a broad strategy in two very diverse contexts. The villagers are comparatively modern and willing to use LPG as it requires less work than wood collection. But the Maldharis are more embedded in traditional customs and reluctant to change familiar habits. One official in the forest department stated that

the women were trained on how to operate LPG, but it is difficult to change the mind set of the Maldharis. They are hesitant to accept modern things.

This was clearly reflected in the interviews with women. A focus on gobar gas<sup>16</sup> instead of LPG may have had more success because it is based on dung, which the Maldharis are familiar with. Gobar gas would be cheaper and self-sustaining, as dung is easily available through cattle. It would also require less administrative changes regarding low-cost and efficient distribution of LPG refills. With proper technical assistance drawn from the Gujarat Agro Corporation, which has established gobar gas plants in rural areas, gobar gas would be a better solution for wood consumption as it is harmonious with the Maldhari lifestyle.

The difference in the characteristics of Maldhari women and village women further necessitated the adoption of a distinctive strategy to transform practices in nesses. A vegetable vending business was successfully started in Dhanej, an RV, because of the entrepreneurial spirit demonstrated by a female member of the community. Maldhari women, however, lack this type of confidence to pursue unfamiliar tasks. They are embedded in traditional customs and require more guidance and handholding to change practices. Forest officials claimed that once Maldhari women used LPG, they preferred it for its convenience, but it was difficult to get them to start using it. Furthermore, the social dynamics between ness men and women defined the behavior of women. During the interview with the elderly Maldhari in Lakkadvera, one man stated that

there is no LPG in this ness because women do not know much. Their duty is to teach the children about the jungle.

Maldhari men dominate decision making, and women are assigned to household chores. There is a possibility that even in nesses where women did show an interest in LPG, it was not given because men decided that women were incapable of using

it. Considering the subdued position of women in nesses, there was a need for greater amounts of assistance. The brief training provided under SHGs may have been sufficient for village women to begin businesses, but Maldhari women required guidance for longer time periods. Deeper understanding of the dynamics of a community is necessary when attempts are made to transform practices influenced by social and cultural factors.

In addition, failure to implement appropriate strategies suitable for the Maldharis was evident in IEP's inability to address population growth, grazing, and increase in livestock, which have a significant influence on natural resources. The Maldhari population has steadily grown since the census in 1971.<sup>17</sup> Dodhi, for instance, had 6 families with 185 residents in 1998,<sup>18</sup> which increased to 19 in 2007 with 212 ness inhabitants. Livestock furthermore grew from 131 in 1971 to 637 in 1998<sup>19</sup> and 694 in 2007 (see Table 2). If conservation efforts are to succeed in Gir, there is a need to deal with the growth of nesses that is taking place. Many forest officials claimed that nesses are beginning to resemble villages, which contradicts attempts to reduce pressure on the Gir forest. However, the fact that IEP did not give enough attention to these aspects of the Maldharis besides some voluntary relocation of nesses illustrates an overemphasis in ICDPs on economics. ICDPs tend to focus on poverty alleviation as being essential for "successful project implementation" (Robinson & Redford, 2004, p. 18) and conservation. There is an assumption that reducing poverty is the main objective for better management of environmental resources (Robinson & Redford, 2004). Although minimizing destitution of people is a good way to gain support in biodiversity preservation, it is not always the case that better incomes lead to improved conservation (Robinson & Redford, 2004), and there are other equally important social and cultural factors that must be considered.

The issue of population growth could have been explored in nesses through an implementation of proper identification techniques of permanent ness residents, strategies to control physical expansion of nesses, and so forth, under IEP.<sup>20</sup> Similarly, in terms of livestock, reciprocal commitments during microplanning should have included an understanding with the Maldharis to remove unproductive cows and buffalos from the forest.<sup>21</sup> The Maldharis are earning quite well from the sale of milk and fertilizer. Three families in Kadeli sold a total of 105 liters a day of milk in 1999 (Pati, 2000, p. 1123), which rose to 242 liters a day in 2007 (see Table 4). This increase in quantity of milk sold means better incomes, which is evident through investments taking place in agriculture and gold. The removal of a certain number of cattle will then not be detrimental to livelihoods of people but can significantly lessen impact of grazing in the forest.

*Need for regulation in participatory planning.* The inability of IEP to affect these issues is a consequence of the limits of voluntary techniques in participatory endeavors to change harmful behavior. Kramer and van Schaik (1997) stress the importance of combining participation with regulation for better management of resources. In Gir,

there is a clear need for limits on natural resource consumption. Microplans included an MoU with the nesses expecting voluntary rotational grazing in exchange for IEP benefits (Mukherjee et al., 2004). However, none of the nesses interviewed claimed to follow such a technique, and free grazing was the main method for fodder provision.

In addition, demand for wood has grown from 2.55 kg per family in Dodhi in 1998 to 5 kg per family in 2007 (see Table 3). If such an increase in wood consumption is characteristic of all nesses, the effect on vegetation and biodiversity can be detrimental. Moreover, the Maldharis are collecting the topsoil of the forest, which is mixed with dung and sold as fertilizer to nearby farmers (Berwick, 1974a). This is proving to be ecologically damaging as nourishing properties are drawn out of the forest.<sup>22</sup> If unconstrained access to resources is proving to be financially lucrative, there is no reason for the Maldharis to curb consumption. This is especially relevant if they are not aware of the long-term consequences of their actions. The responses of the women revealed that although they had noticed a change in vegetation near the nesses, no association was made with grazing. Taking such factors into account, better management of resources will only result when command and control methods consisting of limits on resource collection and penalties are put in place accompanying solutions devised through negotiatory methods. This would maintain a pattern of balanced consumption of resources by the Maldharis and ensure that conservation requirements are not overlooked in the quest to allow equitable access for people.

*Bureaucratic culture.* Besides a short project time span and a lack of differential strategies for nesses, IEP was not successful in improving conservation in Gir because of its incapability to change “the relative apathy and disinterest of the higher echelons of bureaucracy” (Singh & Sharma, 2004, p. 317) that are not connected to the forest through everyday interaction but have an equal or larger influence. Wells et al. (1992) claim that this is a significant flaw of ICDPs that are unable to influence wider societal issues affecting natural resources.

In Gir, the IEP did not manage to merge interests of various governmental departments that often take conflicting actions. Senior forest officials in Gujarat expressed frustration toward cooperation with other state departments. Protection of Gir is viewed as an impediment for regional economic development that requires land for mining and industrial purposes, land that is important for wildlife movement. IEP did not make any efforts to improve awareness about the regional benefits of ecological preservation of Gir. Consequently, the extent of ICDPs’ ability to protect environments is uncertain, as considerable societal factors that put pressure on biodiversity are not addressed by ICDPs.

## **Can Conservation and Development Be Realized Together?**

The implementation of IEP in the nesses revealed many challenges associated with ICDPs. IEP was clearly a success in improving the relations between people

and forest officials and in meeting many of the demands of the Maldharis through the distribution of benefits. Overall, however, IEP failed to change several ecologically detrimental practices of the Maldharis that have to be addressed if biodiversity preservation is desired.

Although the failure of IEP was to a large extent a cause of mistakes in implementation, it does highlight the difficulties in pursuing conservation and development together. More often than not, either development or conservation ends up taking precedence in projects (Berkes, 2003), unless forest staff are knowledgeable enough to recognize this and constantly adjust strategies based on results. Solutions adopted under projects should clearly demonstrate whether they are intended to better conservation efforts or improve the lives of people. In nesses, the major problem was that microplans were unable to connect the actions necessary to meet the needs of the Maldharis to enhance biodiversity management. Coupled with this was a lack of institutional factors like suitable NGOs to facilitate the effectiveness of IEP. Therefore, although the mutual goal of conservation and development is highly desirable, whether development and conservation can be simultaneously achieved is very context dependent.

## Conclusion

As environmental protection increasingly involves people, especially with litigation like the Tribal Bill<sup>23</sup> in India, situation-specific assessments are required to determine whether a voluntary negotiatory method is sufficient to reduce harmful effects on natural resources or if a balanced application of regulatory techniques with participatory processes remains necessary to curb impacts on biodiversity. It is likely that a broader investigation of the results of IEP in FSVs and RVs reveals a better picture about the capability of ICDPs to change resource practices and serve the needs of people. An in-depth examination of the various reasons for the difference in success of IEP strategies in nesses and villages would be an interesting and important area for future research. Perhaps a comparative analysis of the functioning of EDCs in villages and nesses would be beneficial in revealing the types of social understandings necessary for better IEP implementation.

In addition, the IEP involved the voluntary relocation of some nesses to areas outside the sanctuary. This article did not address the relocation aspect of IEP, but the negotiations between the forest officials and the Maldharis, benefits provided to nesses that shifted, and the change in lifestyle of the people should be analyzed. This information would be extremely useful to determine the impact of the move on people and reveal the ability and willingness of the Maldharis to change their practices to fit agriculture and so forth, which may have been adopted instead of livestock keeping as a source of livelihood. If there is evidence of successful integration into mainstream jobs without a detrimental impact on the culture of people, the potential of relocation as a technique to reduce pressure on Gir will be important.

At a broader level, the urbanization and growth taking place around Gir necessitates a regional plan that coordinates the actions of the forest department and other government departments to avoid conflicting scenarios. The pressures on Gir in the form of pilgrims, vehicular traffic, and a large number of tourists require detailed investigation. The impact of temples, especially, must be studied because of the growth in visitors and physical expansion of some temple complexes. Finally, if the growing numbers of lions and other animals are to be sustained, more attention needs to be given on developing plans to expand PAs and on carefully examining the possibilities of relocating a certain number of lions outside of Gujarat.<sup>24</sup>

## Notes

1. The prevalence of this disparity was mentioned by a senior forest official.
2. This information was obtained through the interviews conducted in Kadeli ness.
3. There was an observable absence of young Maldhari boys throughout the duration of the interviews, which was explained by a number of women in Kadeli ness as being caused by their preference to be engaged with the outside market rather than accompanying livestock for grazing during the day.
4. Quantity was noted during interviews in Jambuthala ness.
5. A number of women in Kanthala ness discussed the increase in distance traveled to collect grass each year.
6. Information is based on interviews with trekkers, and there was an observable impact on cattle paths that were dry and lacked vegetation.
7. These are cakes consisting of jaggary, legumes, and grass.
8. Information is based on conversations with a forest official who personally knew many of the Maldharis and was familiar with their customs.
9. Local communities in each ness were organized into EDCs to reduce the negative impacts of the people on the forest, provide better and alternative market opportunities to sell dairy-based products, and facilitate the distribution of social benefits. SHGs were designed to ensure that women had an equal opportunity to participate in the project. SHGs created a monthly savings structure and attempted to diversify incomes by training women to make juice, biscuits, and so on.
10. This information was provided by a senior forest official in Gir.
11. The time constraints were described as a limiting factor in the successful implementation of appropriate strategies.
12. *Bella* can be translated as limestone.
13. A senior official expressed this as an impediment in the acceptance of LPG.
14. The interaction between the Maldharis and the pre-implementation IRMA team to determine development needs can be found in the microplan for Asundrali ness (McShane & Newby, 1998a).
15. In Sukhpur, in contrast to Asundrali, LPG was noted as a desired benefit by the people as evident in the microplan for Sukhpur RV (McShane & Newby, 1998b).
16. Cow dung is collected and put in pits and allowed to emit gas. This gas can be captured and used for lighting, heating, and cooking.
17. For a detailed documentation of the data, please refer to *Biodiversity Conservation Plan for Gir* (Berwick, 2002).
18. The microplan for Dodhi ness (IRMA, 1998) contains a breakdown of the numbers of male and female adults and children in 1998.
19. A comprehensive description of characteristics of the cattle is contained in the microplan of Dodhi ness (IRMA, 1998).
20. The Maldharis very often have extended family members move into the forest. Livestock are given to them, and rooms are added in the ness.

21. The Maldharis have developed an interesting strategy to protect buffalos from predators. Unproductive animals, especially cows, are kept so that they are lost to lions during attacks. Cows present an easier prey because they disperse and run away from lions, unlike buffalos, which group together and resist attacks.

22. All the nesses stated that fertilizer was sold to nearby farmers. Topsoil is mixed with dung because it enhances the quality of fertilizer.

23. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Bill (2006) gives people residing in forests ownership of land and rights to collect and manage forest produce through the formation of Gram Sabha's. The bill seeks to secure earnings of traditional forest-dwelling communities and clarify land ownership so that people have incentives to protect natural resources. Whether the Tribal Bill will achieve this dual purpose of poverty reduction and improving biodiversity protection remains uncertain.

24. The forest department plans to introduce three females and two males to the Kuno Wildlife Sanctuary, Madhya Pradesh in 2008 (Johnsingh, Goyal, & Qureshi, 2007). The fear of disease, hunting, and low genetic diversity necessitates the establishment of a second population in a separate location to ensure survival of the Asiatic lion. However, there is a lack of agreement among forest officials over the suitability of Kuno for lions. Further assessments of Kuno, recognizing the significance of a second population, are required.

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