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Source: Mountain Research and Development, 32(2) : 242-252

Published By: International Mountain Society

URL: <https://doi.org/10.1659/MRD-JOURNAL-D-12-00005.1>

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# Managing Rural Development in the Mountain State of Sikkim, India

## Experiences, Innovative Approaches, and Key Issues

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*Rural development is a vast sector that encompasses infrastructure creation, sustainable livelihoods, and decentralized governance. Mountain landscapes, with their inherent constraints of remoteness, sensitive ecosystem, and marginality, pose unique challenges to rural development. We undertook an assessment of the evolution of development themes and rural development progress made in the mountain state of Sikkim over the past decade. We found that a rapidly growing national economy has facilitated a 4-fold rise in investment in key rural development subsectors in Sikkim over the past 5 years. This significant enhancement in financial investment, coupled with good governance and innovative policies, has ensured that human development indicators, along with social infrastructure creation, have shown impressive progress. Setting up village cluster-level support offices to strengthen governance, transforming regular programs to mission mode with great political determination by adopting a saturation approach, financing improved earthquake-resistant housing for poor households, and promoting climate change adaptation measures to enhance rural water security are some of the innovative approaches that have the potential to be transferred to other mountain areas. We propose a further expansion of capacities and economic opportunities in rural areas by prioritizing the self-employment sector, by expanding the nonfarm rural economy, youth training and placement, and continuing commitment to strengthening democratic institutions and procedures to ensure more rapid and inclusive growth of the rural economy.*

**Keywords:** Development planning; five-year plans; mountain perspective;

poverty alleviation; rural nonfarm economy; India.

**Reviewed by the Editors:**  
March 2012

**Accepted:** April 2012

## Introduction

The Himalayan state of Sikkim is the youngest state in the Indian union, having joined in 1975. Before that, Sikkim was a kingdom ruled by the Namgyal dynasty for over 4 centuries (Lama 2001). It is located in the eastern Himalaya and is characterized by steep mountains and deep valleys (Tambe and Rawat 2009). A prominent aspect of this region is its enormous altitudinal range. From a lowly 300 m, the terrain soars to the lofty heights of the mighty Mt Khangchendzonga at 8598 m, which results in climatic zones from the tropical to the tundra (Tambe et al 2011). The state is renowned for its natural wealth, verdant forests, floral wealth, rich biodiversity, vibrant culture, hospitable people, good governance, and calm and peaceful environs.

The rural population of Sikkim is located in the 4 districts and 165 *gram panchayats* (villages). The average number of households per *gram panchayat* is 550, with a population of 2750. According to the Census of India (2011), the total population of the state is 0.61 million, of which, the rural population accounts for 0.46 million and the urban population accounts for 0.15 million. The population grew by 12.36% for the

decade 2001–2011, during which the rural population declined by 5.20% and the urban population shot up by 153.43%. The Census of India (2011) revealed that the rural population declined from 89% to 75% over the past decade (Table 1). This decline is attributed to the fact that new urban areas were carved out and existing ones were enlarged from semi-urban rural areas. This transformation of rural areas to urban ones has been facilitated by the creation of residential complexes, education hubs, and industrial estates.

## Need and objectives

The developmental planning process in India is based largely on 5-year plans. The 11th five-year plan (2007–2008 to 2011–2012) is nearing completion and planning for the 12th five-year plan (2012–2013 to 2016–2017) is currently underway. The present study was necessitated while preparing for the 12th five-year plan, which required a detailed assessment of performance during the 11th plan period. Rural development is a vast sector that involves multifarious activities related to rural infrastructure, institutions of governance, and livelihood opportunities. The key subsectors are water supply, sanitation, housing, roads, wage employment, self-employment, and decentralization.

The objectives of the present article are to assess the evolving themes in rural development, analyze subsectoral progress made especially over the past decade, and

**TABLE 1** Trends for indicators of rural development and the rural economy.

Indicator	1991	2001	2011
Rural population as percentage of total population, %	89	89	75
Rural literacy, %	54	67	80
Infant mortality rate (per 1000 live births)	60	49	30
Percentage of population dependent on primary sector, %	Not available	Not available	65
Contribution of primary sector (% of GSDP <sup>a)</sup> ), %	47	21	17

<sup>a)</sup>GSDP = gross state domestic product.

recommend the way forward for more inclusive and rapid growth of the rural economy. Information pertaining to physical achievements and financial investments made was obtained from the Rural Management and Development Department, Government of Sikkim. Various reliable data sets (Census of India 1991, 2001, 2011; Planning Commission of India 2005, 2011; DESME 2006; NSS 2010; ASER Rural 2011; FSI 2011; MOSPI 2011; RM&DD 2011; SRS 2011) and assessment reports (IIM Shillong 2009; IRMA 2010) were analyzed to quantify progress. Development constraints and priorities were assessed by organizing 3-day village consultations in all the 165 *gram panchayats* to prepare the 165 Village Development Action Plans in a participatory manner (VDAP 2011). Important issues that merit attention are discussed here, and development priorities for the future are detailed in the concluding section. Other mountain states can thus identify ideas and lessons learned that have a potential to be transferred to their local context.

### Rural development: development constraints, evolving themes, and progress

#### Developmental constraints and risks

The unique geography, geology, and climate of Sikkim pose unusual

developmental challenges that involve mountain-specific constraints that need to be taken into account in planning rural development (Jodha et al 2004):

- It is the third highest landscape globally, which harbors Mt Khangchendzonga, with an altitude of 8598 m.
- It is among the steepest landscapes globally, as the width of the Himalaya across its 3000 km length is narrowest (80 km) in Sikkim (Schaller 1977).
- It is remotely located in the northeastern part of the country, with no air or rail connectivity within a radius of 100 km from the state capital. During the monsoons, fragile roadways often close down due to landslides.
- There is an acute scarcity of land for development, because 82% of the geographical area is classified as forestland (FSI 2011), diversion of which for nonforestry purposes is restricted under federal legislation.
- It is located in seismic zone IV of the earthquake hazard map of India, which is a high damage risk zone. It was hit by a devastating 6.9 magnitude earthquake on 18 September 2011, which resulted in widespread damage to public and private property.
- Fragile terrain, weak geology, and heavy rainfall make the state prone to frequent natural calamities and

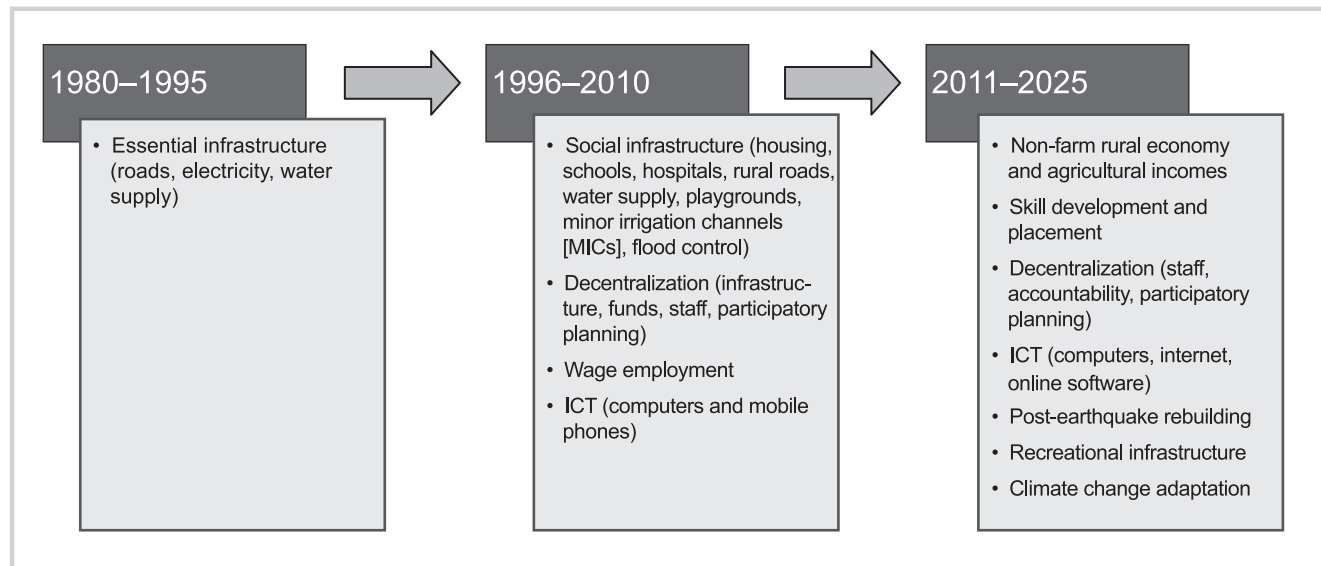
prevent intensive exploitation of natural resources. This heavy rainfall is concentrated in 5 months, which leads to a compressed working season of 5 to 6 months.

#### Evolving themes in rural development

Sikkim merged with the Indian Union in 1975, and, during the initial phase of development, the focus was on essential infrastructure, such as roads, electrification, and water supply (Figure 1). Interventions in agricultural expansion, mineral extraction, and forest clearing also were initiated, which affect the landscape and the environment. The complexity of the mountain terrain was not adequately considered, and development not suited to the local environment was undertaken (Karan 1987). Open grazing in the forests was not regulated, and this led to fragmentation of wildlife habitats. The development of sustainable income-generating industries such as tourism was not given adequate emphasis and consequently internal revenue generation suffered. Most of the planning was top down, and empowerment of the people through strengthening of Panchayati Raj institutions was not pursued vigorously. The lack of strong pro-people and pro-environment policies resulted in poverty levels of 40% coupled with degradation of the environment (Bhasin et al 1984; Karan 1987). However, over the past decade, the state has adopted a unique developmental model with a pro-environment and pro-people perspective. It is the stated policy of the government to develop rural areas on a par with towns and cities by providing all basic amenities and employment opportunities, with a vision to develop an ecocity state (RM&DD 2011).

#### Progress in rural development

Thanks to a rapidly growing national economy, the Indian Government now has substantial financial resources at its disposal. Total

**FIGURE 1** Evolution of rural development priorities in Sikkim.

investment in the 6 key subsectors of rural connectivity, rural water security, decentralization, wage employment, self-employment, and housing has been rising, and priorities have also been evolving. In Sikkim, over the past 5 years (11th plan period), there has been a 4-fold rise in investment in key areas of rural development (Table 2). Total investment in these subsectors rose from INR 385 crore (US\$ 72.73 million) during the 10th planning period (2002–2003 to 2006–2007) to nearly INR 1546 crore (US\$ 291.68 million) during the 11th planning period (2007–2008 to 2011–2012)

(Table 2). During the 10th planning period, decentralization and housing were emphasized, whereas, in the 11th planning period rural connectivity and wage employment emerged as the priority subsectors. The self-employment sector has received limited funding over the last decade (RM&DD 2011). Progress made in the key subsectors is outlined below.

*Rapidly declining rural poverty:* The Planning Commission of the Government of India defined the family-based rural poverty line in 2009–2010 as living on less than INR 3364 per month (US\$ 63). By this

measure, in rural areas, 33.8% of the rural population in the country and 13.1% (0.08 million individuals) of the rural population in Sikkim live in poverty. In Sikkim, the percentage of poor people (below poverty line) decreased from 41.4% in 1994 to 30.9% in 2005, with a rapid decline to 13.1% in 2010 (Planning Commission of India 2012). This 17.8% rate of poverty reduction in Sikkim State from 2005 to 2010 was the second best in the country. The groups that are vulnerable to poverty are the landless and near landless (owning less than half an acre of land), whose main source of income is wage labor,

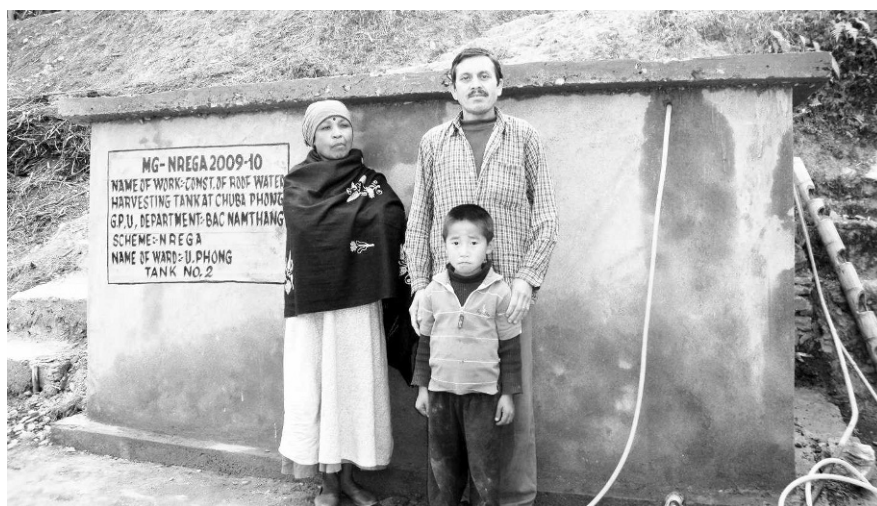
**TABLE 2** Investment trends in key subsectors of the rural development sector during the 10th and 11th five-year periods in million US\$.

Five-year plan	Sector						Total of key subsectors
	Roads and bridges	Water supply and sanitation	Decentralization	Wage employment	Self employment	Housing	
10th Plan (2002–03 to 2006–07)	5.87	15.03	24.77	2.13	0.64	24.29	72.73
11th Plan (2007–08 to 2011–12)	111.51	35.36	48.48	59.39	3.66	33.28	291.68
Percentage increase	1800	135	96	2686	470	37	301

Conversion rate: 1 US\$ = INR 53; Million US\$.



**FIGURE 2** Climate change adaptation measures to strengthen the water storage infrastructure at household, community, and village levels have helped enhance rural water security and endure frequent winter droughts. Household level water storage tanks with a capacity of 10,000 L were constructed with funding support from the MGNREGA wage employment program. (Photo by Sandeep Tambe)



agricultural labor (*khetala*), and share cropping (*adhiadar*, *kutiadar*) (VDAP 2011). Other causes include social vulnerability, such as families headed by single mothers, families headed by the elderly, and persons with disabilities that limit their ability to work (VDAP 2011).

**Extensive rural connectivity program underway:** Roads in mountain terrain have a high cost per beneficiary due to the low number of the population served, high construction costs due to the difficult terrain, and low volume of use per day. However, they offer significant social benefits in terms of access to health and education services by providing market linkages and improving access to government programs (Lobo and Schelling 2001). Rural connectivity has received top priority, with funding support under the *Pradhan Mantri Gram Sadak Yojana* (Prime Minister's Village Road Programme) national flagship program ([www.pmsgy.nic.in](http://www.pmsgy.nic.in)). In the past 5 years, investment has increased from INR 31 (US\$ 5.85 million) crore to INR 591 (US\$ 111.51 million) crore (Table 2). With the construction of 1000 km of new roads, the number of unconnected settlements has now come down from 410 to 244 over the past 5 years. The plan is to connect all settlements with

a population of more than 500 with all-weather paved roads over the next few years. Road construction on fragile mountain terrain needs to use environmentally friendly road construction techniques, such as minimizing cutting into mountain slopes, doing away with traditional cut-and-throw methods, reusing excavated material, and transportation for suitable disposal (EFRC-SP 2005). This will also ensure environmental stability and safeguard against landslides.

**Ensuring rural water security and universalizing sanitation:** Micro water supply schemes are designed to cater to the geographically dispersed households in mountain terrain by tapping local springs and streams to supply drinking water to a cluster of 40–50 households. Under the National Rural Drinking Water Program ([www.ddws.nic.in/NRDWP](http://www.ddws.nic.in/NRDWP)), of the total 2498 settlements in Sikkim, 1833 are fully covered, 665 partially covered, and there are no uncovered settlements. Although the state receives 2500 mm of annual rainfall, the natural ground water recharge is low due to the steep mountain terrain, and most of the rainfall is lost as surface runoff.

With the impacts of climate change and other factors with anthropogenic causes, the problem

of dying water sources is palpable and visible across the Himalaya (Sharma et al 2009; Chaudhary and Bawa 2011; Chaudhary et al 2011; Tambe et al 2011). Hence, to ensure sustainability, water storage structures at the household, community, and village level are being created (Figure 2). These structures help to store unused flowing spring water at nighttime and improve daytime water availability. Also, an integrated program with the title *Dhara Vikas* or “Springshed Development” has been launched to recharge the aquifers and thus revive springs, streams, and hill-top lakes by developing their catchment by using rainwater harvesting, watershed, and springshed approaches. Sanitation was universalized with 100% coverage of household toilets by transforming an ongoing routine development program into mission mode by adopting a saturation approach with time-bound targets.

**Furthering decentralization by intensively managing development:** Decentralization has been firmly anchored by providing adequate funds, functions, and functionaries at the local level. The state has a 2-tier system of local governance in rural areas: the *gram panchayat*, or elected government at the village level, and the *zilla panchayat*, or elected government at the district level. The varied development profiles of the villages, coupled with their diverse needs and aspirations and remote location, make decentralization imperative for need-based development. To meet this objective, Block administrative centers have been recently established to provide administrative, accounting, and technical support to a cluster of *gram panchayats* (Figure 3). These centers function as support offices for clusters of 5 to 6 *gram panchayats* with a population of 15,000. A block administrative center is manned by officers from the administration, accounting, engineering, forestry,

**FIGURE 3** Newly created Block Administrative Centres support a cluster of 5 to 6 *gram panchayats* and have helped strengthen governance and last mile program delivery. (Photo by Sandeep Tambe)



agriculture, and education sectors to support the cluster of *gram panchayats*. Institutions that facilitate decentralization, ie the District Planning Committee, the State Election Commission, and the State Finance Commission, have been made fully functional. In addition, decentralized planning has been formalized with the Village Development Action Plan (VDAP) exercise, in which perspective multisectoral plans are under preparation at the *gram panchayat* level (VDAP 2011).

**Earthquake resistant rural housing:** The traditional house design in rural areas is a 2-story timber-bamboo (*ekra*) frame structure with a corrugated galvanized iron sheet roof on load-bearing stone masonry walls of mud mortar. In the past, under the rural housing assistance program, nominal subsidies and corrugated galvanized iron sheets were provided extensively. During the devastating earthquake of 6.9 magnitude on 18 September 2011, although half of the rural houses in the state had various degrees of damage, in these houses, few casualties were registered, which highlights their inherent earthquake-safe character. Although the upper story, which consists of a

timber-bamboo (*ekra*) frame structure with a light iron-sheet roof, was found to be mostly intact, the ground story, random stone masonry walls of mud mortar, fared poorly.

The rural housing program has now been improved and integrated under the Chief Minister's Rural Housing Mission with the aim of attaining a "*katcha* (temporary) house free status" by 2013. This program will also ensure that the poor in mountain areas have access to improved and safe housing. They will also be able to use their life savings for educating their children, for health care, and for strengthening their livelihood (Figure 4). The innovative elements of this program are

- Single-story earthquake-resistant reinforced concrete frame structures with columns and tie beams with a 605 square-foot plinth area and construction in owner-driven mode.
- A saturation approach obtained by converting existing 6000 *katcha* houses to *pucca* (temporary to permanent).
- A generous financial grant of INR 4 lakh (US\$ 7550) per household to be released in 4 installments.
- Rigorous beneficiary selection by following a bottom-up approach,

with checks and supervision at various levels.

**Transforming a wage employment program into a movement:** The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a National Flagship Program ([www.nrega.nic.in](http://www.nrega.nic.in)), is a guaranteed wage employment program. In 2011 in Sikkim, it provided 85 days of wage employment (compared with the national average of 47) for 60% of the rural households. This program was able to strengthen the livelihood sector by investing in durable livelihood assets such as minor irrigation channels, flood control and anti-erosion works, water source development, horticulture, fodder and forestry plantations, and terracing of barren land. The scheme has stringent transparency safeguards, with universal coverage by independent and quality social audits.

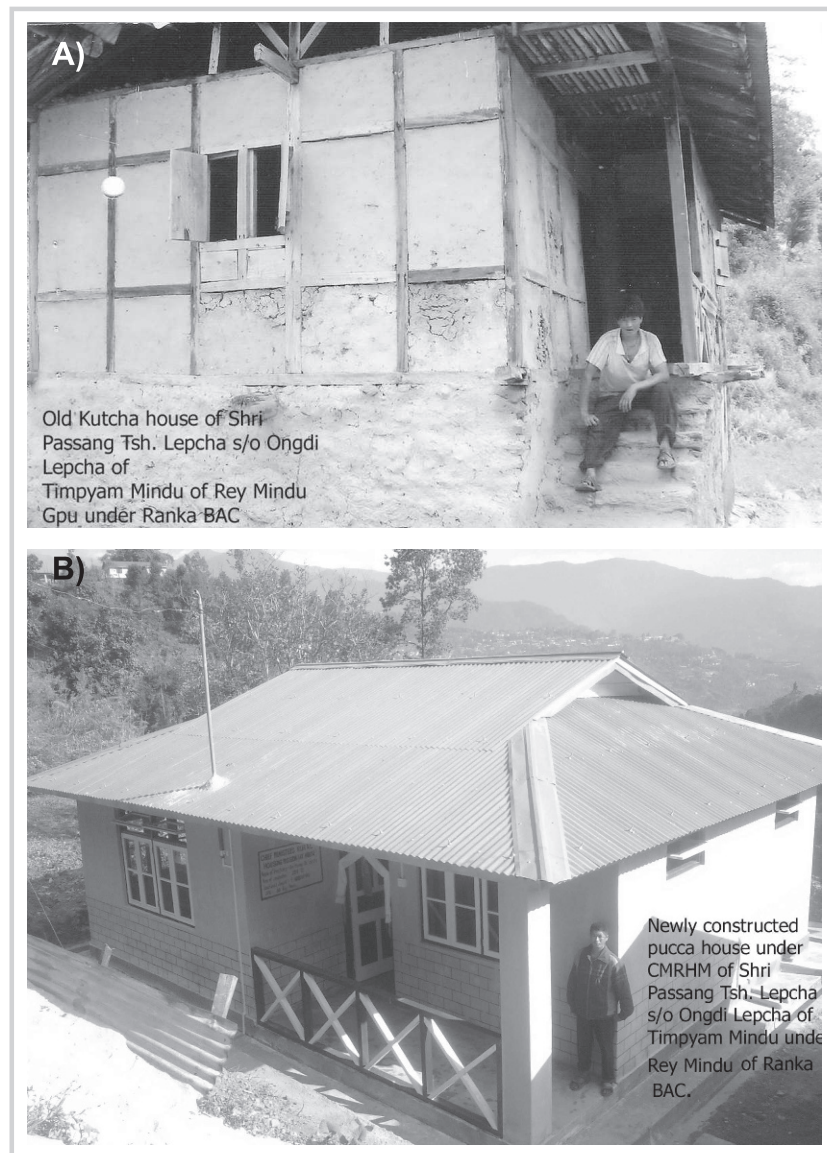
Although the guidelines permit 50% of the implementation to be taken up by line departments, the state government in Sikkim devolved 100% of the implementation to *gram panchayats*. This helped in making the administration of this program people centered and also ensured wide outreach. Hence, the scheme took the form of a community-led social movement with broad participation. Participation by women who may not want to venture far from their homes was encouraged by starting microworks nearby. The findings of independent impact assessment studies indicate that this additional income earned by mothers is being used to purchase better food, clothes, and household items, for health care, and for quality education of their children (IIM Shillong 2009; IRMA 2010).

### Major achievements in rural development

Sikkim is rapidly catching up with the best-performing states and has



**FIGURE 4** Conversion of existing temporary houses to permanent housing by providing a generous housing grant of INR 4 lakh (US\$ 7550) per household. (A) old *katcha* (temporary) house; (B) new *pucca* (permanent) house. This enables poor rural families to invest their life savings in alternative opportunities related to child education, health care, and livelihoods. (Photos by Sandeep Tambe)



already earned a number of prestigious awards:

- **Sanitation:** Sikkim is the first and only *Nirmal Rajya* in the country to have achieved 100% coverage of toilets in 2008 under the Total Sanitation Campaign, a national program. Post-*Nirmal Rajya*, the emphasis is on sustainability and qualitative improvement, with a special focus on school sanitation and solid liquid waste management.
- **Employment:** In 2011, during the MGNREGA Sammelan organized

by the Ministry of Rural Development, Government of India, the state received 3 national awards in the category of best performing *gram panchayat*, with district MGNREGA teams and nongovernmental organizations having found representation among the top 10 districts and top 11 *gram panchayats* selected from all over the country.

- **Decentralization:** In 2010–2011, Sikkim was ranked third in the country by the Ministry of Panchayati Raj, Government of India,

in the performance and accountability of Panchayati Raj Institutions. Moreover, the Mellidara *gram panchayat* received the Rashtriya Gaurav Gram Panchayat Award.

- **Reviving Himalayan springs:** Innovative pilot projects to revive dying Himalayan springs have shown encouraging results (Tambe et al 2012). Resource mapping of the village springs has also been undertaken and the *Village Spring Atlas* [www.sikkimsprings.org](http://www.sikkimsprings.org) for the conservation of Himalayan springs and adaptation to climate change was selected for the “Special Jury Mention” award for its commendable work and scaling up in the category “Environment and Tourism” under eNorth East Awards 2011 ([www.enortheast.in](http://www.enortheast.in)).

#### Development report card

Despite the mountain-specific constraints and risks, the state development indicators compare favorably with national achievements (Table 3). As a result of sustained efforts over the past decade, the state has been able to attain the following development milestones:

- Largely overcome abject poverty and hunger by universalizing access to basic amenities: food, clothing, and shelter. The state poverty rate declined to 13.1% in 2010 (national average, 33.8%), whereas the per capita income rose to nearly INR 81,159 (US\$ 1531), which is 48% higher than India's per capita income of INR 54,835 (US\$ 1035; MOSPI 2011; Planning Commission of India 2012).
- Access to primary education and primary health care has been universalized. Consequently, only 1.9% of children (age 6 to 14 years) are out of school, and literacy levels have risen to 82% (ASER Rural 2011; Census of India 2011). The fertility rate of 2.02 has now dropped to below the replacement fertility rate of 2.1, whereas the infant mortality rate of 30 is much

**TABLE 3** Development progress in Sikkim according to selected indicators, compared with national achievements.

Sector	Indicator	Achievement during 11th plan (2007–2012)		Data source
		Sikkim	National	
Education	Literacy	82%	74%	Census of India 2011
	Children (age 6–14 y) out of school	1.9%	3.5%	ASER Rural 2011
Health	Crude birth rate (per 1000 people)	18.1	20.97	SRS 2011
	Infant mortality rate (per 1000 live births)	30	47	SRS 2011
	Total fertility rate	2.02	2.6	Census of India 2011
	Institutional delivery	81.4%	73%	Census of India 2011
Environment	Forest cover	47.59%	23.81%	FSI 2011
	Protected area coverage	31%	5%	FSI 2011
	Houses with toilets	100%	62%	Planning Commission of India 2011
Poverty	Poverty rate	13.1%	33.8%	Planning Commission of India 2012
Rural housing	<i>Katcha</i> (temporary) houses	7.7%	12.6%	NSS 2010
Rural connectivity	Unconnected settlements with population > 500	244	Not available	Pradhan Mantri Gram Sadak Yojana (PMGSY) Cell, Government of Sikkim
Economy	Per capita income (US\$)	1531	1035	MOSPI 2011
	Growth rate	8.51%	8.2%	Planning Commission of India 2011
Gender	Child sex ratio	944	914	Census of India 2011

better the national rate of 47. Institutional deliveries have also risen to nearly 82% (Census of India 2011; SRS 2011).

- Creation of extensive rural infrastructure in the form of roads, bridges, houses, electrification, water supply, sanitation, schools, hospitals, telecommunication, etc.
- Industrialization received a fillip with the setting up of hydel power

projects, pharmaceutical units, and promotion of ecotourism.

- Amidst this rapid development, forest and tree cover increased from 44.09% in 1997 to 47.59% in 2011, which is nearly double the national forest cover of 23.81% (FSI 2011). This was despite vast alpine and snow-bound areas above the tree line, which do not support tree growth. Moreover, the

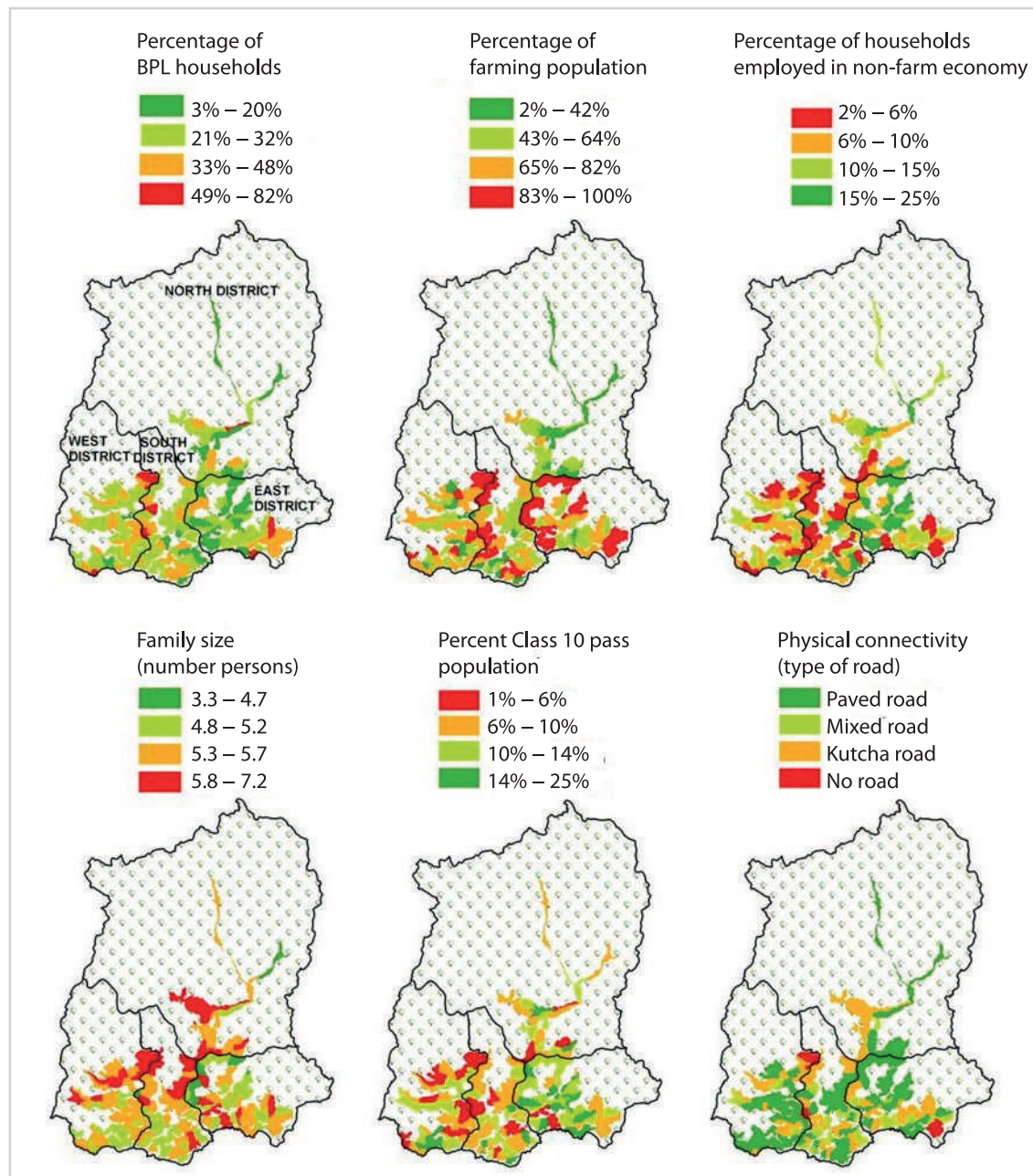
protected area coverage under sanctuary and national parks has risen to 31%, which is highest in the country and far above the national coverage of 5% (FSI 2011).

### Key issues in rural development

The following issues in the rural development sector require urgent attention.



**FIGURE 5** Map showing the diversity of rural development status of the *gram panchayats* of Sikkim. (Source of data: DESME 2006; map by Sandeep Tambe)



### Agriculture-led poverty reduction

Most poor households are farmers of limited land holdings, with the per capita land holding declining from 0.3 ha in 1977 to 0.1 ha in 2010 (Table 1). These constraints of land, water, technology, and market linkages have resulted in a decline in the contribution of the agriculture sector (17%) to the gross state domestic

product (GSDP), which is an area of concern, because 65% of the state's population is still dependent on agriculture and related activities (Table 1). There are several reasons for this, such as lack of access to irrigation, decline in production and productivity of cash crops (ginger, orange, and large cardamom), fragmentation of landholdings, the declining nutrient

status of soils, increasing impacts of climate change, weak marketing linkages, rising input costs, and shortage of cheap labor (RM&DD 2011; Tambe et al 2011; VDAP 2011).

### Potential of rural nonfarm economy

With enabling infrastructure such as better roads, telecommunication facilities, access to formal banking

TABLE 4 Parameters used, their proxy indicators, and sources.

Parameter	Proxy indicators <sup>a)</sup>	Data source
Mean annual rainfall	Mean annual rainfall	NBSSLUP 2000
Elevation	Elevation in meters by using SRTM DEM	Jarvis et al 2006
Slope	Slope in degrees by using SRTM DEM	Jarvis et al 2006
Livelihood progression	% Farming population	Census of India 2001
Livelihood progression	% of households employed in NFRE	DESME 2006
Human health	Family size	DESME 2006
Economic capacity	% of below poverty line households	DESME 2006
Human capacity	% of population beyond 10th class	DESME 2006
Physical connectivity	Rural connectivity	Census of India 2001

<sup>a)</sup>SRTM DEM = Shutter Radar Topography Mission - Digital Elevation Model; NFRE = Non Farm Rural Economy.

services, and more urbanized centers, this sector has enormous potential to fuel the rural economy. In the future, rural incomes will increasingly become multioccupational and multilocational. Remittances from the young work force geographically located outside the village will also play a significant part (Ashley and Maxell 2001; Ellis and Biggs 2001). Transport and construction are 2 sectors, along with MGNREGA, that contribute significantly to off-farm rural incomes. Nearly 60% of the rural households are participating in the MGNREGA program in rural areas, earning additional annual off-season incomes of nearly INR 10,000 (US\$ 189) per household.

#### Poverty pathways in a rural economy

Poverty is inherently dynamic and is the net result of escapes from and descents of households into poverty (Krishna 2006). Poverty eradication requires actively accelerating escapes and blocking descents. Analyzing the reasons for escape and descent help in policy planning, because the escape pathways can then be broadened and the pathways for descent narrowed (Krishna 2006). In Sikkim, better education has helped the young workforce to secure government jobs. Also, new farming practices such as floriculture in green houses, vegetable farming, dairy farming, tomato farming, backyard poultry, and employment opportunities in the

transportation and construction sectors have helped households escape from poverty. Well-off and middle class households fell into poverty largely as a result of the breadwinner being afflicted by poor health (tuberculosis, cancer, heart ailment, diabetes, high blood pressure, etc) and alcoholism, which resulted in high health care costs during treatment in private clinics, usually outside the state (VDAP 2011).

#### Inherent diversity in the development status of rural areas

Rural areas are highly heterogeneous, whether in terms of physical features, climate, dependence on agricultural economy, distance from urban areas, or the level of human development indicators such as literacy, health, etc. However, it is possible in particular to distinguish peri-urban, middle, and remote areas (Ashley and Maxell 2001). The various parameters used and their indicators, along with sources of information, are shown in Table 4. Spatially disaggregated maps that highlight this diversity are provided in Figure 5.

Comparison between development progress in the remote village of Karzi-Mangnam in West Sikkim with Rawatey-Rumtek at the outskirts of the state capital of Gangtok reveals this striking contrast. Karzi-Mangnam was found to have a large average family size (7), rainfed farming was the sole source of livelihood, the educational level was

low (1% have gone beyond the tenth class), the poverty rate was high (82%), and road connectivity was poor. Comparatively, Rawatey-Rumtek, a semiurban village, was found to have a smaller average family size (5), diversified livelihood opportunities, good irrigation facilities, and also good connectivity to the Gangtok urban center. The population dependent on farming (61%) was much lower here, the poverty rate also was much lower (8%), and the level of education (25% beyond the tenth class) was much higher (Census of India 2001; DESME 2006).

#### Applicability of centralized criteria

Concerns have been raised about the “invisibility” of mountain states in national policy, possibly because they are considered too sparsely populated to be of political importance (Browne et al 2004). Most of the national programs have uniform centralized guidelines that sometimes do not fit perfectly in the local context of Sikkim. Concentration of scheduled caste and scheduled tribal populations is commonly used as a surrogate indicator to measure economic underdevelopment in India (Planning Commission of India 2005). The concentration of scheduled castes and tribes is highest at 85% for the North district, whereas it is 51% for West district, 41% for the East district, and 37% for the South district (DESME 2006). Consequently, the North district

is often given higher priority in developmental planning compared with the other districts. In 2006, the North district was chosen as the first phase district to launch the MGNREGA (<http://nrega.nic.in/>). In 2007, the North district was identified as the most underdeveloped district of the state, in which the national program Backward Regions Grant Fund (<http://brgf.gov.in/>) was to be implemented. This program is specially designed to redress regional imbalances in development. According to DESME (2006), in terms of poverty levels, the South and West districts form one cluster, with 24% and 26% of the households being below the poverty line. The North and East districts form the other cluster, with a 17% and 16% poverty level, respectively. The poverty rate of the 3 main caste groups in the state did not vary greatly; it was 23.98% for other backward castes (OBC), 23.58% for scheduled castes (SC), and 20.81% for scheduled tribes (ST) (DESME 2006). Hence, although this proxy indicator may generally hold true for other states, in Sikkim this proxy indicator was not found to be appropriate (Tambe et al 2010).

#### Accurate identification of poor households

Accurate identification of poor households, and providing these households with identity cards, enables them to access various targeted entitlements in national programs, such as housing (<http://iay.nic.in/>), health insurance (<http://rsby.gov.in/>), food transfer ([http://fcamin.nic.in/dfpd\\_html/aay.htm](http://fcamin.nic.in/dfpd_html/aay.htm)), self-employment (<http://sgsy.gov.in/>), etc. The national Socio-Economic and Caste Census 2011 (<http://rural.nic.in/sites/BPL-census-2011.asp>) is currently underway, with the objective of identifying these poor households objectively. After successful completion of this exercise, the targeting of poor households in various developmental

programs in the state will be strengthened.

#### Democratic division of schemes

Often schemes are divided equally among all the elected representatives geographically, which results in a number of micro-developmental schemes, thereby limiting the opportunity to initiate larger need-based interventions with more visible outcomes.

#### Impact assessment and sustainability

Rapid economic development sometimes results in unique socioeconomic and environmental problems. There is a need to undertake impact assessment studies, especially in rural areas to ascertain such impacts. Also, this fast-track development has been largely funded by federal schemes. Hence, sustainability of this development model is dependent on sustained financial support from the federal government. Although a number of capacity building programs are underway, to strengthen the self-sustainability of this growth, greater and more focused emphasis is needed on entrepreneurship, skill development and capacity building for self-sustaining income generation activities.

#### Conclusions

Rural development has been central to developmental thinking in the state. Over the past decade, the state has made significant achievements in attaining human development and creating extensive rural infrastructure. Now, as detailed above, there is a need to prioritize rural livelihoods and the rural economy to accelerate economic development in rural areas (Figure 1). We propose further expansion of capacities and economic opportunities in rural areas by expanding the nonfarm rural economy, skill development and placement for youth, strengthening self-employment, and continued commitment to fostering

democracy for more rapid and more inclusive growth of the rural economy.

Over the past decade, despite formidable mountain-specific constraints, the state has been able to transform its rural areas. Sizeable enhancement in financial investment, good governance, and innovative policies have resulted in this significant improvement in human development and near-universal access to basic amenities, such as roads, bridges, electricity, toilets, housing, and sanitation. These good governance and innovative approaches have the potential to be transferred to other mountain areas with local customization, which can occur, first, by furthering decentralization by intensively managing development made possible by establishing *gram panchayat* cluster-level support offices to strengthen governance and last mile delivery. Second, the saturation approach adopted to achieve universal coverage of sanitation and recently permanent housing has helped to transform ongoing routine development programs into mission mode, with time-bound targets and has garnered political will as well. Third, financing earthquake-resistant, improved houses for the poor households can be provided. Fourth, the climate change adaptation measures initiated to revive springs, streams, and lakes, and strengthen the water storage infrastructure at household, community, and village level have helped enhance rural water security.

#### ACKNOWLEDGMENTS

We gratefully acknowledge the support received from the Rural Management and Development Department, Government of Sikkim. Mr Amitangshu Acharya and the editors helped to improve the quality of the manuscript significantly.

#### REFERENCES

ASER Rural [Annual Status of Education Report (Rural)]. 2011. Annual Status of Education Report (Rural). Mumbai, India: Pratham Resource Centre.



- Ashley C, Maxell S.** 2001. Rethinking rural development. *Development Policy Review* 19(4): 395–425.
- Bhasin MK, Kumar V, Sehgal A.** 1984. Impact of human activities on the ecosystem and vice-versa with reference to the Sikkim-Himalaya MAB (Man and Biosphere) Programme, UNESCO. *Mountain Research and Development* 4(3):267–271.
- Browne T, Fox R, Funnell D.** 2004. The “invisible” mountains: Using GIS to examine the extent of mountain terrain in South Africa. *Mountain Research and Development* 24(1):28–34.
- Census of India.** 1991. *Provisional Population Totals: Paper 1 of 1991*. Gangtok, Sikkim: Government of India.
- Census of India.** 2001. *Provisional Population Totals: Paper 1 of 2001*. Gangtok, Sikkim: Government of India.
- Census of India.** 2011. *Provisional Population Totals: Paper 1 of 2011*. Gangtok, Sikkim: Government of India.
- Chaudhary P, Bawa KS.** 2011. Local perceptions of climate change validated by scientific evidence in the Himalayas. *Biology Letters* 7(5):767–770. <http://dx.doi.org/10.1098/rsbl.2011.0269>.
- Chaudhary P, Rai S, Wangdi S, Mao A, Rehman N, Chettri S, Bawa KS.** 2011. Consistency of local perceptions of climate change in the Kangchenjunga Himalayas landscape. *Current Science* 101(4):504–513.
- DESME [Directorate of Economics, Statistics, Monitoring and Evaluation].** 2006. *State Socio-Economic Household Census 2005*. Gangtok, Sikkim: DESME, Government of Sikkim.
- EFRC-SP [Environmentally Friendly Road Construction Support Project].** 2005. *Evaluation on Environmental Assessment and Environmental Management Plans of Rural Access Project Roads*. Thimphu, Bhutan: Department of Roads, Royal Government of Bhutan.
- Ellis F, Biggs S.** 2001. Evolving themes in rural development 1950s–2000s. *Development Policy and Review* 19(4):437–448.
- FSI [Forest Survey of India].** 2011. Forest Survey of India. In: FSI. *Indian State of Forest Report (ISFR) 2011*. Dehradun, India: Ministry of Environment and Forests, Government of India, pp 214–218.
- IIM Shillong [Indian Institute of Management].** 2009. *Appraisal of NREGA in the states of Meghalaya and Sikkim*. Shillong, Meghalaya, India: IIM.
- IRMA [Institute of Rural Management, Anand].** 2010. *An Impact Assessment Study of the Usefulness and Sustainability of the Assets Created Under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in Sikkim*. Anand, Gujarat: IRMA.
- Jarvis A, Reuter HI, Nelson A, Guevara E.** 2006. Hole-filled SRTM for the globe, version 3, 2006. <http://srtm.csi.cgiar.org>; accessed in March 2012.
- Jodha NS, Bhadra B, Khanal NR, Richter J, editors.** 2004. *Poverty Alleviation in Mountain Areas of China*. Kathmandu, Nepal and Feldafing, Germany: International Centre for Integrated Mountain Development (ICIMOD) and InWent gGmbH (Capacity Building International).
- Karan PP.** 1987. Development issues in Sikkim and Bhutan. *Mountain Research and Development* 7(3):275–278.
- Krishna A.** 2006. Pathways out of and into poverty in 36 villages of Andhra Pradesh, India. *World Development* 34(2):271–288.
- Lama MP.** 2001. *Sikkim: Human Development Report 2001*. Delhi, India: Government of Sikkim, Social Science Press.
- Lobo J, Schelling D.** 2001. *Design and Appraisal of Rural Transport Infrastructure: Ensuring Basic Access for Rural Communities*. World Bank Technical Paper No. 496. Washington DC: World Bank.
- MOSPI [Ministry of Statistics and Program Implementation].** 2011. *Ministry of Statistics and Program Implementation*. Delhi, India: Government of India. <http://pib.nic.in/newsite/erelease.aspx?relid=73929>; accessed in March 2012.
- NBSSLUP [National Bureau of Soil Survey and Land Use Planning].** 2000. *Sikkim soils prepared and published by National Bureau of Soil Survey and Land Use Planning (ICAR)*. Nagpur, Regional Centre, Calcutta, in cooperation with Department of Agriculture, Department of Forest, Government of Sikkim.
- NSS [National Sample Survey].** 2010. *National Sample Survey Report No. 535: Housing condition and amenities in India: July 2008–June 2009*. New Delhi, India: NSS Office, Ministry of Statistics and Program Implementation, Government of India.
- Planning Commission of India.** 2005. *Report of the Inter-Ministerial Task Group on Redressing Growing Regional Imbalances*. New Delhi, India: Planning Commission, Government of India.
- Planning Commission of India.** 2011. *Faster, sustainable and more inclusive growth, an approach paper for the 12th Five Year Plan*. New Delhi, India: Planning Commission, Government of India.
- Planning Commission of India.** 2012. *Press Note on Poverty Estimates 2009–10*. 19 March 2012. New Delhi, India: Planning Commission, Government of India, Press Information Bureau.
- RM&DD [Rural Management and Development Department].** 2011. *Annual report submitted to the state assembly, 2010–11*. Gangtok, Sikkim: RM&DD, Government of Sikkim.
- Schaller GB.** 1977. *Mountain Monarchs: Wild Goat and Sheep of the Himalaya*. Chicago, IL: University of Chicago Press.
- Sharma E, Chettri N, Tse-ring K, Shrestha AB, Jing F, Mool P, Eriksson M.** 2009. *Climate Change Impacts and Vulnerability in the Eastern Himalayas*. Kathmandu, Nepal: International Centre for Integrated Mountain Development (ICIMOD).
- SRS [Sample Registration System].** 2011. *Sample Registration System Bulletin*. New Delhi, India: Registrar General, India. [http://censusindia.gov.in/vital\\_statistics/SRS\\_Bulletins/SRS%20Bulletin%20-%20January%202011.pdf](http://censusindia.gov.in/vital_statistics/SRS_Bulletins/SRS%20Bulletin%20-%20January%202011.pdf); accessed in March 2012.
- Tambe S, Anbalagan S, Arrawatia ML, Dhondup S.** 2010. How accurate is caste as an indicator for measuring economic backwardness? Rural poverty mapping experiences from Sikkim, India. *GIS Development Weekly*, 18 January 2010. <http://www.gisdevelopment.net/application/lis/rural/Rural-poverty-mapping-experiences-from-Sikkim-India.htm>; accessed in March 2012.
- Tambe S, Arrawatia ML, Bhutia NT, Swaroop B.** 2011. Rapid, cost effective and high resolution assessment of climate-related vulnerability of rural communities of Sikkim Himalaya, India. *Current Science* 101(2):165–173.
- Tambe S, Kharel G, Arrawatia ML, Kulkarni H, Mahamuni K, Ganeriwala A.** 2012. Reviving dying springs: Climate change adaptation experiments from the Sikkim Himalaya. *Mountain Research and Development* 32(1):62–72.
- Tambe S, Rawat, GS.** 2009. Ecology, economics and equity of the pastoral systems in the Khangchendzonga National Park, Sikkim Himalaya, India. *AMBIO* 38(2):95–100.
- VDAP [Village Development Action Plan].** 2011. *Village Development Action Plan: Perspective Plans at Gram Panchayat Level*. Gangtok, Sikkim: Rural Management and Development Department, Government of Sikkim.