

WORKING PAPER

Renewable energy and resilient enterprise development in the Hindu Kush Himalaya

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Executive summary

Mountain enterprises in the HKH region are highly vulnerable to climate shocks. The development of resilient enterprises in the mountains is dependent on access to reliable, affordable, and sustainable energy.

Furthermore, micro, small, and medium enterprises in the Hindu Kush Himalaya (HKH) region do not have the requisite capacity to absorb, adapt, or transform their value proposition in response to external shocks such as climate change or pandemics.

It is integral that we recognize that a climate-centred policy and regulatory environment, and access to finance and infrastructure are necessary factors for enhancing the resilience of small and medium enterprises. There is a need for a systemic shift from the use of inefficient and high-emission sources of energy to improved clean energy sources for resilient enterprise development.

RESILIENT ENTERPRISE DEVELOPMENT

A resilient enterprise can maintain, improve, or fundamentally change its economic value proposition alongside its social and environmental value proposition in response to shocks and opportunities. This ability to absorb, adapt, and transform in response to shocks and opportunities is shaped by an enterprise's entrepreneurial identity and strategic orientation. Entrepreneurial identity, in turn, is shaped by both micro/individual factors (e.g., gender, caste, class, religion, work practices, patterns of business ownership, behaviours, and experiences) and macro/organizational factors (e.g., inflation, interest rate, electricity, fuel, labour, and other operational costs), both of which impact a firm's ability to address climate resilience in its operation.

The strategic orientation of an entrepreneur will determine how an enterprise will set priorities, view customers, and define its operation. Entrepreneurial and market orientation along with management capacity are key domains of strategic orientation, and they determine the extent to which enterprises address climate resilience in their operations.

TOURISM AND ENERGY IN THE HKH REGION

There is a strong case for adopting recovery pathways for strengthening the resilience of the tourism enterprises in HKH countries, given the significant contribution of the tourism sector to job creation and GDP.

Energy is a critical component that spurs the growth and expansion of the tourism industry, and there exists great potential to integrate affordable, reliable, and sufficient energy sources in the running of tourism enterprises in the HKH region. While the mountain regions have an abundance of solar, wind, hydro, biomass, geothermal, and other renewable energy resources, they remain largely unexploited because of issues of affordability, awareness, accessibility, and technical know-how.

A shift to renewable energy options would substantially reduce heavy dependence on imported fuels, cut down carbon emissions, help meet local energy needs, create new 'green' jobs, and enable a long-term sustainable growth of the tourism industry.

RENEWABLE ENERGY AND RESILIENT ENTERPRISE DEVELOPMENT

Access to modern and sustainable energy services varies greatly across the HKH region and is generally found lacking. Broader institutional structures and support mechanisms can play a critical role in enabling new businesses to emerge and thrive.

Mountain communities in the HKH are heavily reliant on traditional fuels for non-electricity needs. Amongst

renewables, biogas and hydro technologies dominate the tourism industry with relatively low use of solar technologies due to lack of access and/or awareness.

Across the HKH region, the impact of government-led renewable energy interventions has been limited; lack of awareness and access remain the key barriers to rural electrification through renewable energy in the HKH region.

Conditions such as management and operational capacity, financial handholding, more information, and partnerships and support networks are key enablers for the uptake of renewable energy technologies.

KEY AREAS FOR ACTION

Renewable energy resources have a significant potential to deliver many opportunities for value creation through cost reduction, employment generation, and sustainable rural economic development.

Green value chain interventions include supporting the creation of an enabling environment through provision of affordable finance and credit lines and skills training in green technologies to rural entrepreneurs.

An enabling policy, and legal and institutional frameworks for the deployment of renewable energy and/or energy efficiency practices can greatly enhance the competitiveness and productivity of enterprises.

Strong partnerships, networks, and alliances are also critical for innovation, business development, and opening of new markets for enterprises.

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SECTION 1

Introduction

Micro-, small- and medium-sized enterprises (MSMEs) contribute significantly to the local and national economy in the Hindu Kush Himalaya (HKH). In Nepal, MSMEs account for 22 per cent of the country's GDP and create over two million jobs (Shrestha 2020). Bhutan's cottage and small industries (CSI), or the MSME sector, accounts for more than 90 per cent of the total industries and has generated almost 100,000 jobs in the country (Royal Government of Bhutan 2019, 2020). Within India, the Himalayan state of Uttarakhand witnessed more than a seven-time jump in MSME employment between 2000–01 and 2018–19 (Government of Uttarakhand 2019).

MSMEs in the HKH region operate largely in the informal sector and make up over 95 per cent of the private sector (SME Finance Forum 2019). Since a large number of mountain enterprises engage in sectors such as agriculture, livestock, forestry, and tourism, they rely significantly on ecosystem services like biodiversity and water for their development and sustenance.

Mountain enterprises are highly exposed to changes in climate and other shocks. While MSMEs contribute significantly to the overall socio-economic progress in rural mountain regions, by developing economies at the local level, they are also more vulnerable to ecosystem decline and climate change. Under the current emission scenarios, the HKH region is expected to see a 5.5°C increase in temperature by the end of this century (ICIMOD 2019). This will result in a two-third loss in glacial volume and cause frequent droughts and floods, thereby impacting the ecosystem services and the enterprises that rely on them. Moreover, the local economies across the region are already in a state of collapse because of the increased frequency and magnitude of climate-induced extreme weather events and changes in weather patterns (Sharma and Schultz 2020). Similarly, as a result of the COVID-19 pandemic

and the lockdown associated with it emerging and developing Asian countries will only grow by 1 per cent or less in 2020 (IMF 2020). The International Labour Organization (ILO) estimates that the workers and enterprises in the informal economy and in key sectors like retail trade, manufacturing, hospitality, and food services, along with remittances, will be the hardest hit (ILO 2020). These sectors also employ the largest share of women and play an essential role in the HKH economy.

MSMEs in the HKH region don't have the requisite capacity to absorb, adapt or transform their value proposition to respond to these shocks. This is because of the limited strategic orientation to address climate resilience in their operations. In addition, a climate-blind policy and regulatory environment as well as a lack of access to finance and infrastructure limit the ability of mountain entrepreneurs to develop resilient enterprises (UNESCAP 2019). As a result, the mountain entrepreneurs often focus on the production end of the value chain whilst value-addition activities like processing, aggregation, and marketing take place in urban areas and in the plains.

A key, and often less understood, ingredient in the development of mountain value chains is access to reliable, affordable, and sustainable energy. Bringing value forward in the supply chain and closer to the mountain communities requires processes that are energy intensive, whether for powering agro-processing equipment or producing dairy products from milk, or improving the services offered by tourist lodges and home stays in the mountains.

Mountain enterprises, however, have limited access to reliable, affordable, and sufficient sources of modern energy and often resort to the use of traditional fuels (like wood and diesel) to meet their energy needs.

But against the backdrop of a projected growth in the MSME sector, there is a need to move away from inefficient and high-emission sources of energy and improve the access to clean energy sources for resilient enterprise development.

Renewable energy can contribute significantly to resilient enterprise development in the HKH region. This energy is available in one form or the other across the HKH and can be deployed at any scale to meet the needs of the mountain communities. Here, it has to be noted that prudent investment in renewable energy will keep global warming below 2°C, increase global GDP by 2.4 per cent, and improve the overall well-being of people by 13.5 per cent by 2050 as compared to the current energy scenario (IRENA 2020). By improving access to energy through distributed renewable energy solutions, the enterprises in the mountain areas will also see higher quality of service provisions and greater income generation, especially across the rural economy as the demand for allied products and services will then increase.

In this paper, we outline how access to renewable energy can help mountain entrepreneurs improve their strategic orientation to absorb, adapt, and transform their value proposition in response to climate shocks and opportunities. We focus on the tourism sector to provide an illustrative case study. We outline the conditions that enable and disable the productive end use of renewable energy.

Our analysis is based on a review of resilience literature in the field of climate change and enterprise development; a review of energy, MSME, and tourism policies in the HKH; and a case study analysis of the tourism sector, which included 50 key informant interviews. We reviewed over 30 papers on resilience in small and medium enterprises, organisational resilience, and mountain entrepreneurship, and also 16 papers which were directly relevant to our research (Annex 3).

SECTION 2

Resilient enterprise development

We define a “resilient enterprise” as one that has the ability to absorb, adapt, and/or transform (AAT) its value proposition in response to climate shocks (Box 1). For instance, when exposed to frequent and/or high-magnitude climate shocks, a resilient tourism enterprise is one that is able to maintain, improve or fundamentally change its economic value proposition alongside its social and environmental value proposition.

We also focus on how an enterprise’s strategic orientation shapes its ability to absorb, adapt, and transform its value proposition in response to climate shocks. An enterprise’s strategic orientation determines how it sets its priorities, views customers, and defines its operations (Miles and Arnold 1991; Jansson et al. 2017) (Figure 1).

Drawing on a systematic review of literature on resilient enterprise development, we focus on three domains of strategic orientation that influence the ability of enterprises to address climate resilience in their operations (Annex 3).

1. **Entrepreneurial orientation** refers to the creation of value that is driven by entrepreneurship. The indicators that shape an entrepreneur’s ability to create a climate-resilient value proposition include the following: knowledge and awareness to anticipate and manage climate shocks and opportunities; ability to learn, change, and innovate the value proposition; and leadership, proactiveness, and risk-taking behaviour to invest in the context of climate-induced uncertainty.

BOX 1

THE ABSORB, ADAPT, AND TRANSFORM (AAT) FRAMEWORK

Building on the work of Béné et al. (2014), long-term resilience to climate change is defined as a characteristic emerging from three critical and interdependent elements:

1. **Absorptive capacity:** A system’s ability to maintain its original structure or functioning by absorbing infrequent and low-magnitude risks, either by anticipating or responding to a shock.
2. **Adaptive capacity:** A system’s ability to make small adjustments to its existing risk management strategies and improving its original structure or functioning in anticipation of future risks.
3. **Transformative capacity:** A system’s ability to fundamentally change its structure or functioning and adopt new strategies to move beyond vulnerability thresholds.

Agrawal et al. (2019) explain the AAT capacity of a resilient system in the following manner: a system is more likely to absorb a low-intensity shock; however, when a stressor exceeds the absorptive capacity, the system will respond by drawing on its adaptive capacity to make incremental adjustments to its core structure or functioning. Eventually, the magnitude of an impact will overwhelm the adaptive capacity, requiring a more drastic change in the system’s structure or functioning. So, the adaptive capacity cannot be strengthened without also enhancing the absorptive capacity. And, if both absorptive and adaptive capacities are in place in a rather strong manner, the capacity to transform will follow suit.

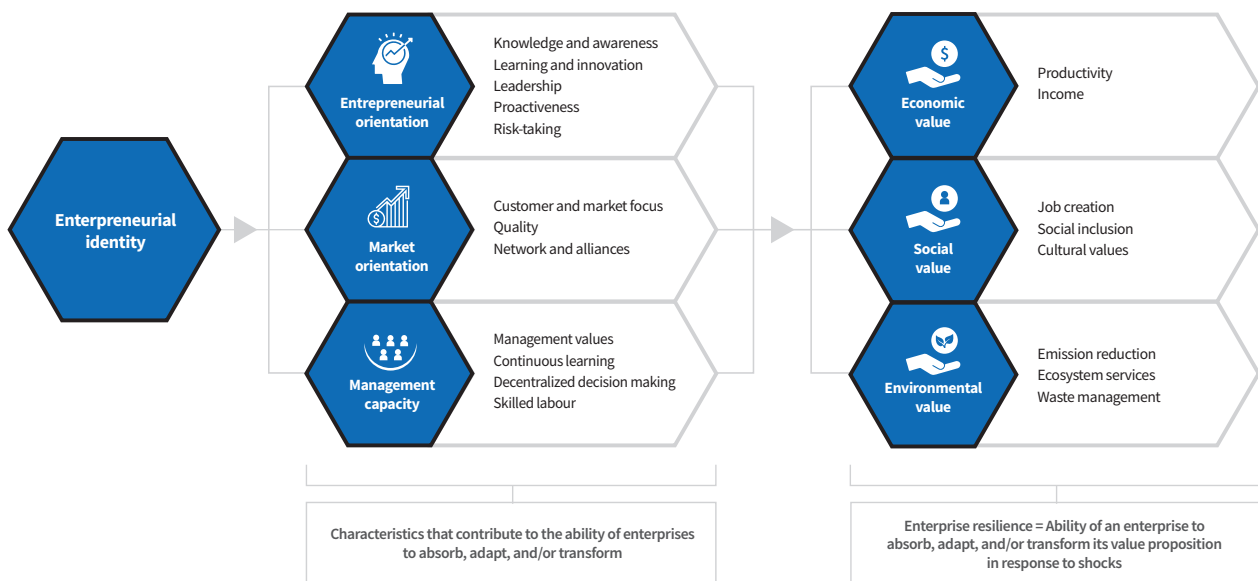
2. **Market orientation** refers to the creation of value in response to market demands. Focus on the customer and the market, along with quality management, enables enterprises to respond to the emerging demand for climate-resilient goods and services. In terms of quality management, an entrepreneur's ability to leverage climate-smart branding and verification systems is evolving as a key to create and occupy new markets. In addition, climate-resilient enterprises rely on strong networks and alliances to ensure diversity and risk transfer, and also to remove redundancy in the value chain.
3. **Management capacity** refers to the management values, capabilities, and the operating structures of an enterprise. Management values relate to the creation of economic value alongside social (in terms of green job creation and inclusion) and environmental values (by way of emission reduction and ecosystem services); these shape the resilience of an enterprise. In terms of capabilities, enterprises that invest in skilled labour and continuous training are better able to create resilient entities. As for operating structures, decentralized and autonomous decision-making structures improve an enterprise's flexibility and responsiveness to climate shocks and opportunities.

Finally, it is the individual or the entrepreneur who drives the strategic orientation of an enterprise. Both micro (individual) and macro (organizational) indicators acknowledge the relationship between

the entrepreneur and their venture (Branicki et al. 2016; Corner et al. 2017). It is at the micro level that issues of gender, caste, class, religion and other intersectionalities shape entrepreneurial identity (Essers and Benschop 2007; Romero and Valdez 2016; Villares-Varela 2018) as well as work practices, patterns of business ownership, and experiences as entrepreneurs (Harvey 2005). Here, a critical point to remember is that the gender and social intersectionalities reflected at the micro level are shaped by and shape the macro-level structures and values. Entrepreneurs are not a homogenous category. The skills, capability, and resourcefulness of entrepreneurs need to be contextualized by acknowledging institutional, temporal, social, cultural, and gendered influences that enable or constrain the entrepreneurial process. The entrepreneur as an agent must negotiate through the institutional and social structures with different settings of power dynamics and it is here that gender and other exclusionary categories influence the agency of the entrepreneur and consequently the resilience of entrepreneurship.

There is currently a big gap in entrepreneurship studies and thus the role of micro factors like intersectionality and positionality highlighted by categories such as gender remain largely invisible. There is a need to conduct more research to understand the experiences, behaviours, and needs of women entrepreneurs and the effect that intersectionality and positionality has on women-led enterprises and their ability to absorb, adapt, and transform in response to shocks.

FIGURE 1 STRATEGIC ORIENTATION FOR RESILIENT ENTERPRISE DEVELOPMENT



SECTION 3

Tourism and energy in the HKH region

In the HKH region, the tourism sector has grown rapidly and has contributed to job creation and economic development (Table 1). It has also been among the hardest hit by the Covid-19 crisis. Faced with economic lockdowns and international travel bans, the livelihoods of millions of people have been affected (ILO 2020). In Nepal, for instance, the cancellation of all mountaineering expeditions, including Everest ascents, has resulted in around 13,000 tour, trekking, and mountain guides losing their jobs (WTO 2020). Besides, the ripple effects of the slowdown in the tourism sector are being felt throughout the economies in the HKH region; so, there is a strong case for adopting recovery pathways that strengthen the resilience of the sector (and its constituting enterprises), especially in dealing with future shocks.

Tourism – as a tertiary/service sector – is closely linked with primary and secondary sectors and has a strong multiplier effect on the broader local, national, and global economy (Pascariu and Ibanescu 2018). The sector has strong backward linkages to the domestic economy through activities involving transportation, accommodation, food and beverage, handicrafts, cultural assets, leisure/excursion, and allied services; so, it contributes to growth and employment across many other sectors (WTO 2013).

The linkages in the tourism supply chain allow service providers to identify how the tourism economy flows within the various nodes of the chain; it also helps them to recognize the dynamic relationships and interactions with different stakeholders at primary (production)

TABLE 1 TOURISM'S CONTRIBUTION TO THE HKH ECONOMIES

Country (2018)	Contribution to GDP	Tourism sector GDP growth	Employment creation (out of total)
Bangladesh	3%	6.8%	2.9% (1.8 million)
Bhutan*	9% (in 2016)	NA	2nd largest (around 30,000 jobs in 2019)
China	11.3%	9.3%	10.3% (79.8 million)
India	6.8%	4.9%	8% (40 million)
Myanmar	4.6%	4.5%	4.8% (1.07 million)
Pakistan	5.9%	4.7%	6.2% (3.9 million)
Nepal	6.7%	7.5%	6.9% (1.03 million)

Source: Bhutan Broadcasting Service, 2019; National Council of Bhutan, 2016; World Travel and Tourism Council, 2020.

*Apart from Bhutan's data, the data for the other countries are of 2018; reliable data on Afghanistan's tourism sector vis-à-vis its national GDP, its sectoral growth, or contribution to employment could not be found

and secondary (manufacturing) levels. Thus, the sustainability of tourism products and services are of vital importance.

Across the value chain, the tourism sector involves a wide diversity of enterprises and units with different capacities and abilities. The management of a tourism enterprise and the resources that are available to it varies greatly from one MSME to another, depending on its organizational structure; they could be family-owned businesses, partnerships, cooperatives, private limited companies or public limited companies.

In the mountain context, due to challenges such as remoteness and accessibility, the tourism value chains are largely localized providing opportunities for several enterprises (including local households and farms) to provide various products and services. It is not uncommon for lodges and homestays to source local agricultural products and rely on local populations (who, for instance, gain work as guides and porters) for the delivery of various services. Therefore, any growth in tourism in the mountain areas translates into local value creation in terms of income, job creation, and support for multiple productive activities.

However, attracting more tourists and catering to their needs can place a significant strain on the local ecosystem. When the demand for water, energy, and food grows (as tourists usually consume these at greater intensity than the local people), it throws up associated problems such as greater use of fossil fuels (for example, for electricity generation). Waste is another major issue that has repercussions for the traditional sustainable practices adopted in the rural areas.

Yet another major issue involves the adverse environmental impacts that accompany the commodification of resources for products and service development. This could be by way of greenhouse gas (GHG) emission and excess consumption of fossil fuels (UNEP and WTO 2012; Bode et al. 2003; Dogan et al. 2015). Indeed, the tourism sector, resource intensive as it is, accounted for 8 per cent of global GHG emission or 4.5 GtCO_{2e} in 2013; this is expected to reach 6.5 GtCO_{2e} by 2025 if the approach is one of business as usual (Lenzen et al., 2018).

As regards energy, it is a critical component that spurs the growth and expansion of the tourism industry; primarily, there are three types of energy demand: transportation which accounts for 94 per cent of energy use; accommodation which accounts for 3.5 per cent; and consumption arising from other activities which accounts for the remaining 2.5 per cent (Eneida and Zayra 2009; Gravouniotis et al. 2012). In such a scenario, there exists a massive potential for renewable energy to serve as an alternative to meet the energy demands of the tourism sector.

Mountain tourism enterprises are constantly in search of affordable, reliable, and sufficient energy sources. In this regard, Nepal's Thame micro-hydro project (developed in the 1990s), for instance, has vastly boosted the prospects of Namche Bazar along the Everest trail. This provision of a reliable energy source has translated into facilities like electric bakeries and cookers, lights, hot water, and improved accommodation services (Pandey 2001). Similarly, along the Annapurna trekking route in Nepal as well as in Ladakh, there are provisions for mobile/battery charging, space and water heating, refrigeration, and laundry services; television too has arrived there. (ICIMOD and IRENA 2020).

Greater use of renewable energy sources in tourism can also reduce the dependence on imported fuels (kerosene, diesel) and address the challenges in animal and food waste management; this can concurrently help meet the energy needs in villages (by way of electrification of households, clinics, and schools, and also by providing clean cooking solutions). A sustainable and eco-friendly approach would also attract a more environmentally responsible category of guests, thereby integrating new environmentally friendly concepts and generating additional employment opportunities in the renewable energy and associated industries (Bohdanowicz et al. 2001).

In the case of the HKH region, a lot of the tourism enterprises are located in a mountain environment – places with an abundance of solar, wind, hydro, biomass, geothermal, and other renewable energy resources. Yet, these resources remain largely unexploited because of issues involving affordability, awareness, accessibility, and technical know-how. Additionally, the benefits from tourism are not equally distributed across the value chain. Given the disparate nature of the sector and the large differences in resource access and benefits, the size and nature of the demand and supply of finances involving the MSMEs will vary. Consequently, in many cases, renewable energy options are not always perceived to be competitive by the stakeholders operating within the value chain. Additionally, restricted access to concessional financing creates barriers to the deployment of renewable energy technologies.

Therefore, for an effective implementation of renewable energy policies, governments and other key stakeholders need to create or reinforce a variety of enabling conditions that would encourage tourism entrepreneurs to adopt renewable energy solutions. This is important because as the next section demonstrates, renewable energy can play a significant role in improving the resilience of the enterprises in the HKH region, thereby bringing benefits for billions of people residing in these areas.

SECTION 4

Renewable energy and resilient enterprise development

Energy access influences the entrepreneurial orientation of an enterprise enabling it to add value or diversify the goods and services that it provides; it also influences the ability of firms to improve their market orientation to attract tourists and use allied services to tap into new green economic opportunities. Access to renewable energy can strengthen the management capacity of MSMEs by helping them adopt green practices.

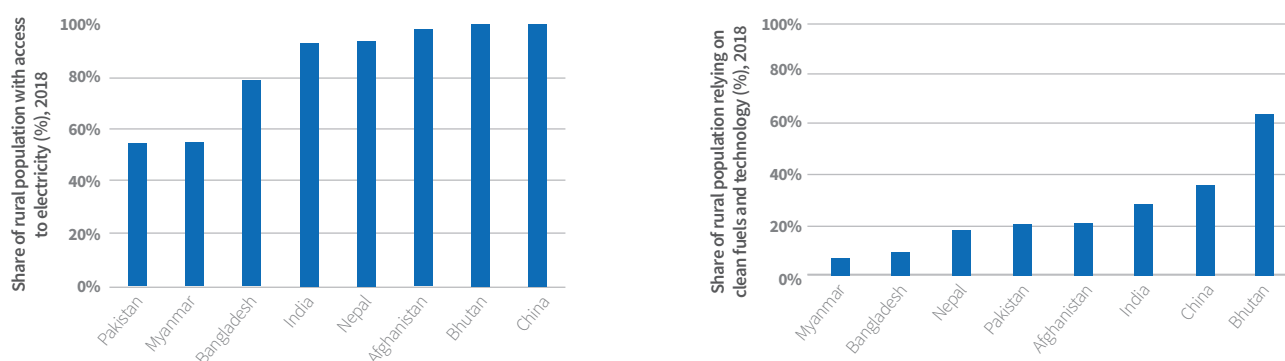
However, while the benefits of energy access for tourism enterprises are increasingly well understood, the effect on resilience to respond to shocks – related to climate or otherwise – have not been covered in great depth. This chapter aims to address this particular knowledge gap. The chapter first briefly discusses the energy access landscape in the HKH countries with a specific focus on the mountain context. Presenting the primary data gathered, the chapter then focuses on the renewable energy options that can help meet the energy needs of the tourism enterprises in the region; it also covers the impacts on resilience, and the specific conditions that enable the uptake of such energy solutions.

4.1 The energy access landscape in the HKH countries

Access to modern and sustainable energy services varies greatly across the HKH region and is generally found lacking. The current dominant development model in the HKH countries gives higher priority to large-scale, centralized energy infrastructures for meeting the energy demand of communities; however, the high cost of providing these services in remote, mountainous settlements results in insufficient access to quality and reliable energy for the local communities and entrepreneurs. This adversely affects the operational environment of entrepreneurship and limits the development and competitiveness of the enterprises.

Rural electricity access is reported to be under 60 per cent in Pakistan and Myanmar, to nearly 80 per cent in Bangladesh, over 90 per cent in India, Nepal, and Afghanistan, and near universal access in Bhutan and China (Figure 2). As of 2018, about 165 million

FIGURE 2 ACCESS TO ELECTRICITY, CLEAN COOKING FUELS, AND TECHNOLOGY IN THE HKH COUNTRIES, 2018



Source: World Bank Global Electrification Database; WHO Household Energy Database, 2018

people in the rural areas in the HKH countries lived without electricity access. The rural populations relying primarily on clean cooking fuels and technologies are extremely low in number in the region, ranging from under 10 per cent in Myanmar and Bangladesh to under 40 per cent in most other HKH countries.

The energy access figures presented above hide important micro-level dynamics such as intra-group disparities in access to energy and new technologies. For instance, women are found to be at a higher risk of energy poverty than men due to culturally and socially defined roles, and lack of finance, information, training, and education (Baruah 2015; Cecelski 2004).

The data presented above also fails to represent the disparities between mountain and non-mountain contexts. While the disaggregated data is limited, anecdotal evidence suggests that energy access challenges are further compounded in the mountain context. In the mountain states of India, for instance, the average daily hours of power supply in the rural areas are about 19.5 hours compared to 22 hours for states in the plains (Ministry of Power 2019). In Nepal, even as national rural electrification rates are reported at 93 per cent, remote provinces such as Karnali and Sudur Paschim have electrification rates of under 30 per cent and 60 per cent, respectively (Government of Nepal 2019). In Bhutan, while electricity access is nearly universal, consumption patterns vary widely; rural households account for only about 5 per cent of all the electricity consumed, with industry representing the largest share (78 per cent). Districts such as Haa and Gasa have relatively lower-grid electricity access, while Samtse and Samdrip Jongkhar show higher use of wood for clean cooking (National Statistics Bureau of Bhutan 2017).

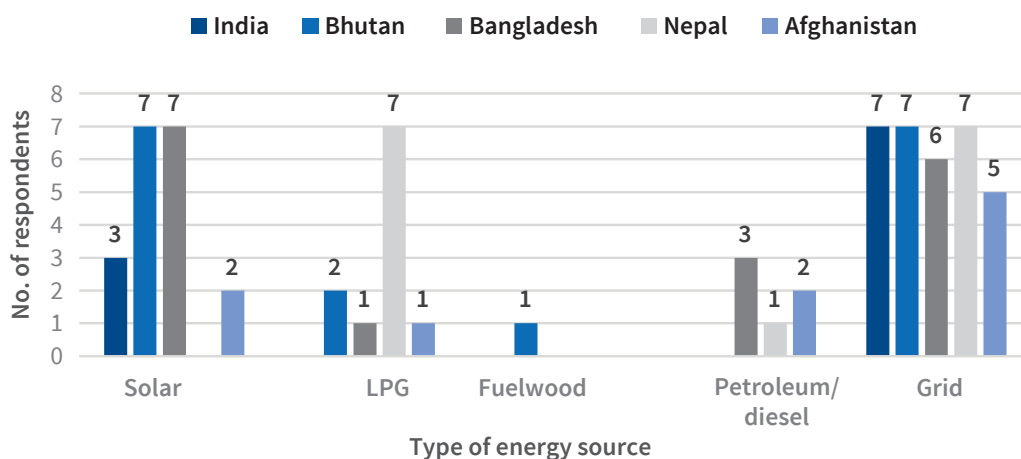
With many rural localities in the mountains being remote, there's a higher cost of service for traditional, centralized energy solutions (e.g., electricity grids, LPG cylinder). The solution lies in the creation of small-scale renewable energy units, locally distributed renewable energy-based technologies, alternative models of energy market, local electricity grids, and increase in energy efficiency which will not only meet a wide range of energy needs for consumptive use but also enable entrepreneurship to flourish.

4.2 Access to renewable energy options in the HKH countries

The HKH countries rely heavily on traditional fuels for meeting non-electricity energy needs, particularly in the rural areas (Dhakal et al. 2019). Past research by IRENA and ICIMOD (2020) found that mountain communities were heavily reliant on biogas and hydro technologies, with limited access to solar technologies for productive use in enterprises. However, this study found that the use of solar technology (63 per cent) was quite widespread amongst the tourism enterprises in the HKH region, second only to grid connectivity, which points to a lack of documentation of a number of solar projects. Hydropower was dominant only in Bhutan (100 per cent). Many tourism stakeholders identified a significant, unexplored potential for growth of renewables to support tourism activities in the mountain context. A more detailed, country-wise analysis of energy usage is given below:

India: As depicted in Figure 3, half of the tourism enterprises (N=3) interviewed for this study relied on renewable energy, mostly solar electricity for lighting and running water heaters. The remaining enterprises were either connected with the grid or used traditional

FIGURE 3 ENERGY USAGE IN TOURISM ENTERPRISES IN INDIA, BHUTAN, BANGLADESH, NEPAL, AND AFGHANISTAN



Source: Primary data analysis, 2020

sources of energy. Several factors influenced the decision of entrepreneurs to adopt solar energy, such as the absence of infrastructure connecting enterprises to the grid, high cost of grid electricity, increased savings from switching to renewable energy, and compatibility with the geographical context. One enterprise reported zero expenditure on water and electricity after the adoption of solar power, and the savings were diverted to manpower training. The entrepreneurs did not report any prior exposure to or information about the use of renewable energy, although there was some awareness regarding the availability of solar technology. Almost all the entrepreneurs (80 per cent) cited the biggest obstacle in adoption of renewable energy as lack of awareness or support in accessing government subsidies without having personal contacts in the government departments. This highlights a significant policy gap in the Indian renewable energy planning framework.

Singh et al. (2020) found that the middle class and rural communities in India were interested in using renewable energy but could not make a switch due to a lack of knowledge about government schemes that support renewable energy use. Therefore, the policy direction on renewable energy deployment in India requires focussed investment in awareness programmes, demonstrations, trainings, workshops, surveys, and assessment studies in order to encourage a larger uptake of renewable energy solutions by households and enterprises.

In addition to policy-related gaps, there were other systemic factors that were found to hinder access to such technologies, such as disparity between male and female entrepreneurs in accessing renewable energy technologies. A primary survey conducted by UN Women of more than 6000 women from marginalized communities in over 100 villages across four Indian states found that the women exercised limited agency in household financial decisions related to renewable energy products (such as solar home systems and lanterns) and did not have control over the type of energy they used. As a result, their knowledge and skill on the installation, use, and maintenance of renewable energy technology was limited (UN Women, 2018).

Nepal: All seven tourism entrepreneurs in Nepal relied on electricity grid (100 per cent) in combination with solar (100 per cent), LPG (100 per cent), and petroleum (14 per cent). The use of fodder or fuelwood was found to have decreased considerably with the availability of grid connection and multiple options for backup energy source. Electricity was mostly used for lighting and cooking; LPG for cooking; petroleum fuel for vehicles; and solar as an energy backup option in the context of frequent power cuts which impacted business productivity. The entrepreneurs found the use of solar energy cheaper as compared to grid electricity

(85 per cent) and were positively influenced by its environmental benefits such as in terms of generation of less pollution and wastage (83 per cent). The entrepreneurs also reported greater safety and ease in using solar energy (42 per cent) while a majority (85 per cent) of them found it more economical due to the lower manpower costs involved.

Much like in other developing countries, the policy initiatives in Nepal have failed to generate adequate awareness regarding renewable energy technologies and energy efficiency systems amongst rural communities, particularly on the use of renewable energy as a business input (Stigka et al. 2014). However, Nepal has taken significant strides in designing policies and schemes on these technologies, such as the Renewable Energy Subsidy Policy 2016, the National Renewable Energy Framework 2017, Biomass Energy Strategy 2017, and the National Energy Efficiency Strategy 2018. Besides, under the Rural Energy Policy of 2006, one of the thrust areas was design of public awareness and promotional programmes on renewable energy and the implementation of a rural electrification strategy with user's participation.

However, the impact of such government-led initiatives has been limited. Lack of awareness and access remain the key barriers to rural electrification through renewable energy in Nepal (Timilsina and Shah 2016). In its National Energy Efficiency Strategy document, the Government of Nepal acknowledges the need for greater publicity about the positive role that an energy efficiency system can play in supplying sustainable, adequate, and reliable energy. The government also recognizes gaps in policy, legal, and institutional frameworks. Energy efficiency, in particular, remains far from being fully integrated in the overall energy system, not only among general consumers but also policymakers.

Our findings reflect the present scenario. The adoption of energy-efficient technologies as well as awareness regarding their potential use and economic benefits, in terms of reduced financial costs and increased energy security for enterprises, was low amongst the respondents. A lack of motivation and interest in the adoption of RE and EE amongst Nepal's enterprises has been documented by other studies too (Nepal Communitere 2020). The present survey also found that the use of renewable energy resources was limited mostly due to financial constraints. Only one enterprise in Nepal indicated the contribution of government subsidies towards reducing solar installation costs. For all the others, it was word of mouth and the "demonstration effect" of seeing other people use solar energy that influenced the decision to adopt solar technology. Besides policy-related hindrances, the limitations of solar energy – in terms of it being mostly suited for lighting purposes; then there's the factor

of intermittent supply since it derives its power only when the sun is shining – were found to be a major disincentive for its uptake.

Broader institutional structures and support mechanisms play a critical role in the processes that enable new businesses to emerge and allow sustainable energy solutions to be available for those who need them the most (Glemarec et al. 2016). A number of energy interventions such as the Biogas Support Programme in Nepal provide dedicated capacity-building opportunities for women as users of renewable technology, trainings on technical, business, and leadership skills, as well as access to credit which strengthens the capacity of women to use these energy sources for livelihood enhancement and income generation (Energia 2015). Such initiatives provide exposure to diverse sources of renewable energy (such as biogas), enhance the use of energy for productive purposes, as well as address poverty, gender, and social inclusion and regional balance issues by improving the ability of entrepreneurs (across different socio-economic and cultural profiles and identities) to absorb, adapt, and transform in response to shocks.

Bangladesh: As shown in Figure 3, all tourism enterprises used at least one kind of renewable energy source for running their business, with the majority choosing solar energy. Most enterprises saw renewable energy as a secondary option, rather than the main source of energy, and used solar for lighting, cooling or heating. The enterprises also relied on grid electricity (85 per cent), diesel generators (42 per cent), and LPG (14 per cent). Most businesses turned to solar energy due to its actual or perceived low cost compared to the alternative energy sources that are available. Besides the high expenditure in the case of grid electricity, frequent load-shedding also served as a major incentive to push entrepreneurs to adopt solar energy.

Bangladeshi entrepreneurs had greater awareness regarding renewable energy as compared to those in Nepal and India, although it was largely limited to solar technology, with many homeowners installing solar panels on their roofs (57 per cent). In summary, the use of solar energy by tourism entrepreneurs was driven by three factors: lack of reliable energy from the grid; the high price of grid electricity; and prior exposure and knowledge regarding solar energy. Businesses that were unable to switch to alternative renewable energy and depended on fuelwood reported challenges such as lack of easy access to RE&EE technology options at the community level (in some cases, solar technology had to be ordered and transported from another community), the absence of financial subsidy for using renewable energy sources for enterprise, and continued dependence on fuelwood for the high temperature that is needed for the purposes of processing.

Bhutan: All tourism enterprises used some sort of renewable energy, mostly hydropower in the form of electricity provided by the government. The enterprises also used gas (mainly for cooking) and fuelwood (for heating and cooking). Hydroelectricity was a popular option due to the low installation and operational costs (57 per cent) and as it was considered as a primary energy source (100 per cent) although occasional power cuts were disruptive to the flow of service. The entrepreneurs reported higher profitability as a result of using hydroelectricity (100 per cent), while one reported the environmentally friendly nature of renewable energy as an incentive to adopt it. For this reason, some entrepreneurs wanted to expand into other renewable energy sources (such as those based on solar or wind) but were being unable to do so due to limited information on its use and the high expense involved in adopting certain other renewable energy technologies.

As a result of government-led awareness programmes, the Bhutanese entrepreneurs were found to have greater exposure to RE and EE technology (60 per cent), compared to their counterparts in countries like Nepal, India, and Afghanistan. A large number of enterprises depended on LED light technology (60 per cent), and one enterprise used e-vehicles frequently for local movement. These were the only two energy efficiency practices that were reported from the entire HKH region. Similar to Bhutan, Bangladesh has witnessed strong policy and institutional support for public awareness and training on renewable energy which has reaped some positive results. For instance, Bangladesh's solar home system programme which was initiated in 2003 is world-renowned for playing a critical role in creating consumer awareness by including a broad set of activities ranging from face-to-face interactions to media campaigns (including through print media and billboards). To supplement these efforts, the Bangladeshi government has also invested in schooling programmes and holds exhibitions such as the National Renewable Energy Expo and Clean Energy Summit to promote different types of energy efficiency and renewable energy sources and/or technologies for schoolchildren as well as the general public (Marzia et al. 2018). The promotion of renewable energy and other clean energy technologies and the integration of renewable energy development within the overall energy policy and the institutional set-up is a specific objective embedded within the 2008 National Renewable Energy Policy of Bangladesh (Ministry of Power, Energy and Mineral Resources 2008).

However, despite such dedicated government programmes and policy support, there is still much scope for expanding the reach of such initiatives. Some Bangladeshi entrepreneurs continue to perceive alternative renewable energy sources as irrelevant

for enterprises and were also deterred by their high cost. In part, this has also got to do with the easy availability of cheap hydroelectricity through the grid. The entrepreneurs also cited lack of external support to adopt alternative renewable energy as a business resource, lack of financial incentive to adopt and/or use alternative RE, and the gaps in capacity building on climate change, renewable energy, and energy efficiency technologies.

Afghanistan: 100 per cent of the enterprises interviewed relied on electricity from the line and less than 50 per cent included solar energy as a business input (Figure 3). Some enterprises used liquid fuel and LPG. The rural energy schemes in Afghanistan reportedly focus only on commissioning electricity-generating equipment for management by the local communities while overlooking the cooking and heating needs of the rural people, as well as the commercial uses of such energy sources (UNDP 2015). Moreover, despite an abundance of renewable energy sources, including hydro, solar and biomass in rural Afghanistan, the potential for developing and deploying renewable energy technologies for enterprise development is severely restricted. This has impacted the ability of local enterprises to deliver goods and services. In addition to inadequate access to renewable energy technologies, enterprise-level awareness regarding the technological process and the effects of climate change was also minimal. Tourism entrepreneurs with access to solar energy reported its limited use due to the low heat generated and the high investment needed, without any access to subsidy, for purchasing and setting it up.

4.3 Renewable energy contribution to resilient enterprise development: Field findings¹

In this chapter, we analyse how access to renewable energy infrastructure can improve the strategic orientation (EO, MO, and MC) of mountain enterprises and their ability to absorb, adapt, and transform their value proposition in response to climate shocks. We investigated the spread of alternative energy options, including on- and off-grid solutions, amongst the mountain enterprises in the HKH region and drew evidence from the ground on the possible role of renewable energy and energy efficiency solutions in different aspects of enterprise resilience.

4.3.1 IMPACT ON ENTREPRENEURIAL ORIENTATION

Renewable energy solutions provide an opportunity to entrepreneurs to invest more time in innovation and business development (ICIMOD and IRENA 2020). The development and expansion of renewable energy and energy efficiency technologies have had a significantly high impact on innovation, leadership, and risk-taking behaviour of particularly vulnerable groups such as women. The Rural Energy Development Programme (REDP) in Nepal found that access to sustainable energy options (through adoption of biogas plants) reduced women's drudgery and the time spent in collecting fuelwood and provided greater opportunities for them in terms of education, leisure, and self-development; this has also helped in the establishment of micro enterprises and small businesses made possible by lighting (Dutta et al. 2007). The number of small-scale and cottage enterprises which saw the participation of women reportedly increased from 400 enterprises in 1996 to 700 in 2005 during the implementation period of REDP (Ingdel and Holter 2010). Women, who are often disproportionately affected by a lack of energy access, are found to particularly benefit from better access to energy sources; this has ushered in a perceptible change in confidence levels, both inside and outside their households, and has also enhanced their motivation to engage in entrepreneurial activities.

Our primary data found that enterprises in the HKH were also engaging in higher product diversification and/or enhancement of existing services after installation of renewable energy mechanisms. For instance, Bangladeshi entrepreneurs were able to diversify housing facilities by exploring innovative accommodation options such as tree houses, clay houses, and dorms. Others reported production of unique local products for travellers, which was supported by access to such energy forms. This has been made possible either directly through renewable energy use or indirectly through cost savings on renewable energy that has allowed businesses to diversify and invest in other relevant areas.

4.3.2 IMPACT ON MARKET ORIENTATION

New businesses such as mechanical workshops, poultry farms, fruit processing units, metal works, and communication services were established with the support of solar or micro-hydropower (44 per cent cases, as per a 2020 study by ICIMOD and IRENA). Additionally, as a result of access to electricity, existing

¹ We reviewed and synthesized secondary literature on productive energy use in enterprises from across the globe (representing a diverse sample of sectors and geographical contexts) to assess the impact of renewable energy on enterprises through parameters such as improved profitability and benefits to the local economy, and the enhanced capacity of enterprises to better anticipate and plan for change (ICIMOD and IRENA, 2020). A significant number of observations reported in the global systematic review were confirmed by findings from this study that focuses on tourism MSMEs in the HKH.

enterprises expanded to meet diverse consumer needs through purchase of new equipment such as oilseed pressing machines, fruit-juice makers, sewing machines, and egg incubator (13 per cent cases, as per the 2020 study by ICIMOD and IRENA). Tourism enterprises in the HKH similarly reported a positive impact on new enterprise development as a result of access to, and integration of, renewable energy technologies. Indian tourism MSMEs operationalized new accommodation options such as rural homestays and farm retreats in previously zero-electricity areas with the help of solar lighting and solar thermal facilities. Initially established as a homestay managed by the local community, a tourism-based social enterprise expanded into other businesses such as large-scale production of Himalayan produce and is now considering a further expansion into wool products, rustic utensils, and Bhimal handloom products such as yoga mats, foot mats, and bags.

Besides, the adoption of various tools, technologies, and digital platforms has had a strong positive impact on businesses as they are able to acquire new information about markets and customer needs and invest in new market opportunities while also anticipating and managing shocks better (ICIMOD and IRENA 2020). Much of this has been made possible after the installation of renewable energy solutions in areas which previously had no electricity infrastructure. For instance, take the case of use of mobiles; this has accelerated the flow of information in the existing value systems and is helping entrepreneurs establish new networks.

Additionally, tourism enterprises in India also reported new alliances through collaborations with digital networks such as Airbnb, Google My Business, and other bed-and-breakfasts. These helped businesses expand their customer base and market focus by unlocking access to more potential customers in new markets. In addition to word-of-mouth marketing, access to energy sources has enabled this exploration of digital promotions.

4.3.3 IMPACT ON VALUE PROPOSITION: ECONOMIC BENEFITS

Globally, business enterprises have reported an increase in productivity due to more efficient processes and longer working hours, and increased production owing to greater access to sustainable sources of energy (global systematic review by ICIMOD and IRENA in 2020). On similar lines, the tourism enterprises in the HKH have been found to cater to a larger number of tourists and are also providing innovative services due to the adoption of renewable energy technologies. In India, the entrepreneurs (50 per cent) could provide hot water to their customers due to solar heating

facilities. One enterprise reported an enhanced ability to run its homestay in less severe winter months after the deployment of renewable energy technology. Another entrepreneur in Nepal considered setting up a new tourist facility for night-time viewing which was made possible by solar technology. Enterprises across the HKH region found the deployment of renewable energy technologies as an important strategy for risk management in the context of frequent power cuts which affected their business productivity and ability to attract and serve tourists.

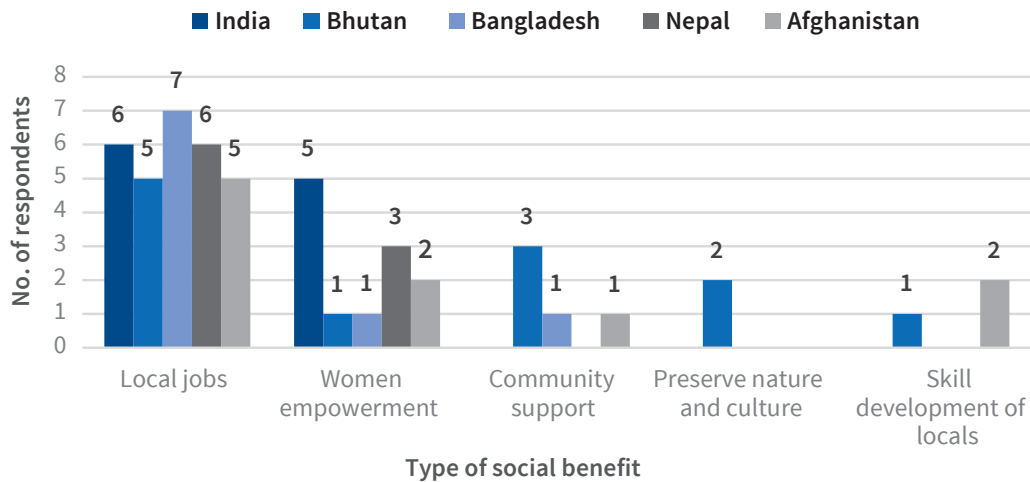
Renewable energy deployment is further linked to increase in household incomes (reported by 50 per cent of enterprises interviewed in the ICIMOD and IRENA 2020 study). For tourism enterprises in the HKH region, energy access has resulted in business expansion possibilities which, in turn, has allowed for a more regular flow of tourists and more income. For instance, a social enterprise in India is running rural “green” homestays (where the dominant energy source is solar power) in areas where the majority of the villagers are engaged primarily in subsistence-level farming or daily wage work. Running homestays has also obviously made possible new sources of income and job opportunities for the local communities, besides being an insurance against weather-dependent agricultural outcomes. In this regard, Bhutanese entrepreneurs reported a growth in profits due to the adoption of distributed renewable energy solutions, which led to positive ripple effects throughout the local economy. Afghanistan entrepreneurs, too, reported greater profits due to being able to cut down on energy costs after switching to solar energy. Finally, in nearly half of the cases (44 per cent), renewable energy has played a critical role in lowering business costs through the substitution of kerosene/diesel (ICIMOD and IRENA 2020).

4.3.4 IMPACT ON VALUE PROPOSITION: SOCIAL BENEFITS

Globally, incorporating renewable energy into businesses has shown enhanced health and safety outcomes (40 per cent) and better living conditions for women due to less drudgery, thereby freeing up time for other activities (28 per cent) (ICIMOD and IRENA 2020). As depicted in Figure 4, renewable energy solutions in the HKH region have provided new job opportunities for the local communities (96 per cent) as tourism enterprises in the rural mountain areas usually prefer to hire local staff. The other social benefits include inclusion through encouragement of participation of local women (40 per cent) which has led to promotion of women-led businesses and enhancement of their skills and knowledge. Meanwhile, the enterprises in Bhutan and Bangladesh have been able to support their community during natural hazards. Since various types of business within the tourism MSME sector are linked to one another

FIGURE 4

SOCIAL BENEFITS GENERATED FROM TOURISM ENTERPRISES IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

by the value chain, some Bhutanese enterprises saw the tourism MSME network as an important support system for the local community where the growth of one enterprise complemented the growth of other businesses by attracting customers. The Bhutanese entrepreneurs also reported greater involvement in creating social consciousness regarding the need to preserve nature, culture, and traditional local food, craft, knowledge, and skills. From Afghanistan, the reported additional benefits of renewable energy deployment include the provision of less costly alternatives (tourism products) and engagement in capacity building of the local people.

4.3.5 IMPACT ON VALUE PROPOSITION: ENVIRONMENTAL BENEFITS

Several environmental benefits related to the renewable energy solutions adopted by enterprises have been recorded (ICIMOD and IRENA 2020), including the reduced use of traditional fuels, reduced deforestation, decline in indoor air pollution, and mitigation of greenhouse gas emissions. In Nepal, rural energy interventions have been found to encourage greater participation of women in social and environmental activities such as trail road construction, water tap maintenance, latrine construction, expansion of village roads, and plantation of trees (Dutta et al. 2007). The tourism enterprises in the HKH region also reported substantial environmental externalities through renewable energy use in their business (Figure 5).

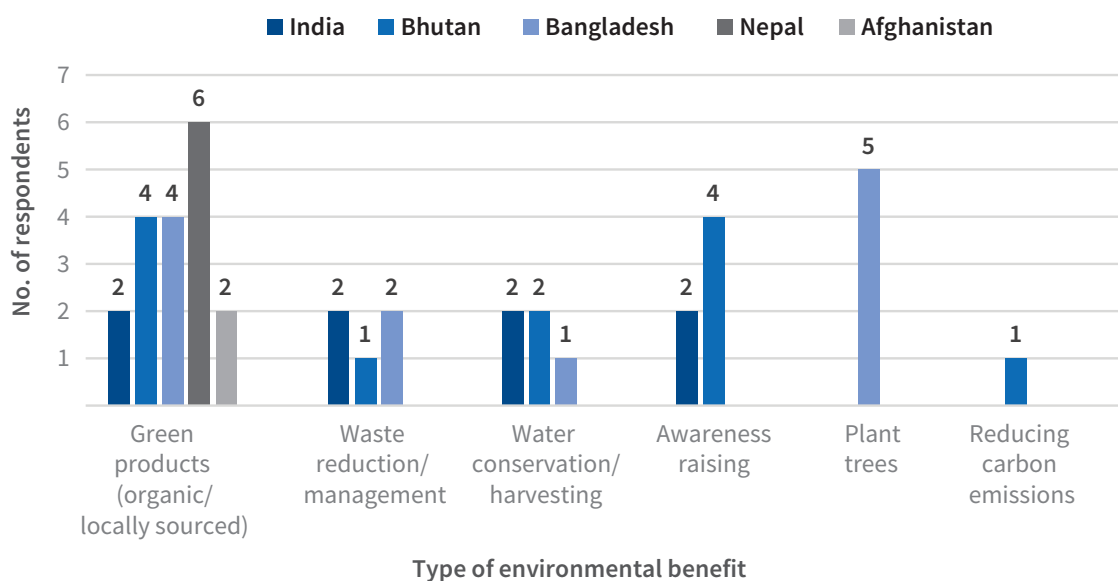
In India, the enterprises reported adoption or promotion of green practices such as cultivation of organic produce, use of local resources, waste management practices, recycling water and rainwater

harvesting, engaging in environmental awareness campaigns, and focusing on nature-based ecotourism activities. In Bangladesh, while there were no official greening initiatives, the majority of the business owners (70 per cent) planted trees as a joint effort to combat climate change. Two business owners reported attempts to decrease waste and one enterprise was engaged in environmentally friendly practices such as setting up eco-friendly accommodation and installing rainwater harvesting system. In Bhutan, the entrepreneurs reported reduced use of firewood, switching to LED technology, and the use of renewables for less energy wastage and less pollution, besides cutting down on waste by recycling and exploring programmes to lower carbon emission. One Bhutanese enterprise also reported supporting waste collection and environmental cleaning campaigns to make the rural community more responsible towards nature.

The knowledge regarding climate changes impacts showed some correlation between the actions taken by individual enterprises (such as adoption of green practices) and the level of perception regarding environmental benefits. The greatest number of efforts in creating environmental value came from enterprises in Bhutan and Bangladesh where the level of awareness on climate change was also quite high. In contrast, the least amount of environmental contribution was noted in the case of Afghanistan where only two businesses reported switching from the use of single-use plastic to recycled material and using LPG instead of coal or wood. Apart from that, there was no community-level action taken towards improving the environment and the majority of the entrepreneurs seemed unaware of climate change and its impacts on their business or the environment.

FIGURE 5

ENVIRONMENTAL BENEFITS GENERATED FROM TOURISM ENTERPRISES IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

4.4 Conditions that enable or hinder the uptake of RE

In addition to the deployment of renewable energy technology, the cases studied from the five selected HKH countries point to the potential supportive role that other factors within the wider ecosystem of the MSME sector can play in building the resilience of mountain enterprises.

4.4.1 LACK OF MANAGEMENT CAPACITY

Management values, capabilities, and vision play a significant role in the performance and growth potential of MSMEs. This includes the ability of businesses to transition to efficient, clean, and cost-effective renewable energy technologies. Management and operational capacity are particularly important in the context of the HKH countries, where enterprises are burdened with poor availability of crucial inputs, including the lack of a strong policy and regulatory environment and institutional support structures in the form of financial or technical assistance. In Bhutan, some initiatives are in place to make energy access possible through the main electricity line (hydropower). Even so, some Bhutanese entrepreneurs expressed a need for alternative renewable options such as solar power. In the other HKH countries, the entrepreneurs cited almost no support from their national governments in switching to greener and more energy-efficient practices or technologies. As a result, the uptake of renewables is largely a self-driven

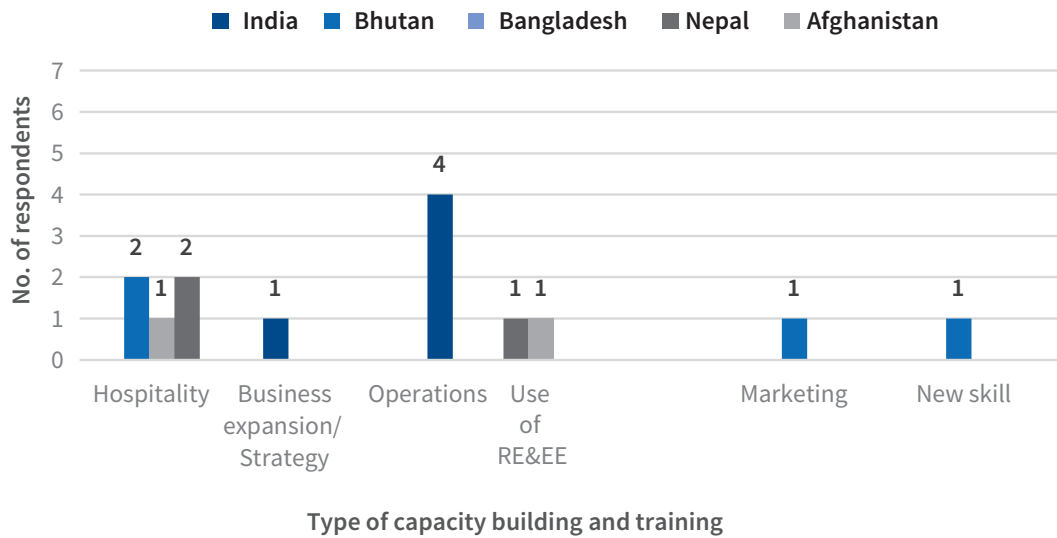
initiative that depends on the entrepreneurship or vision of the founder or management of the enterprise.

Weak management capacity in enterprises also reflects in the level of training and upskilling of employees (Figure 6). The technical and human capacity necessary to instal and manage RE/EE technologies in the tourism facilities is quite limited in the HKH region. In contrast to the global experience where the maximum emphasis is laid by businesses and partners on upgradation of technical skills such as installation, maintenance, and repair of technology (50 per cent), followed by business, administration, accountancy, management, and marketing skills (28 per cent) (ICIMOD and IRENA 2020), the tourism enterprises in the HKH region reported a much higher priority being accorded to hospitality-related skills (such as cooking, cleaning, housekeeping, and hygiene) with almost no skill enhancement for installation, use or maintenance of renewable energy technologies.

Training on business operations is another important area of consideration for tourism entrepreneurs in the HKH, but there has been very low thrust on business strategy, expansion or planning. A major discrepancy was found across countries as well, with enterprises in India and Bhutan having maximum access to capacity-building measures. The training gap was most visible in the case of Afghanistan. Notably, there was no capacity building reported on themes such as climate change, renewable energy technologies, and energy efficiency practices in any of the HKH countries.

FIGURE 6

TRAINING AND CAPACITY BUILDING BY TOURISM ENTERPRISES IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

4.4.2 LACK OF AFFORDABILITY

Tourism entrepreneurs reported an absence of financial incentives or awareness regarding existing schemes, and lack of handholding by the government, private, and scientific institutions as major challenges in integrating RE&EE solutions in their business practices. The decision to adopt and use renewable energy was driven more by affordability, rather than the nature of the energy source that would be used. In other words, while some entrepreneurs recognized the social and environmental benefits of using renewable energy sources in their businesses with possible impacts on the resilience and sustainability of their enterprise in the long run, the decision to adopt renewables was driven mostly by economic considerations such as cost of access and usage (i.e. the price involved in installing, operating and/ or maintaining technology) or saving costs owing to reduced dependence on traditional energy sources.

Most entrepreneurs relied on renewables only as a backup option so that in the event of a power failure from the grid, their business productivity was not adversely impacted, and the enterprises could continue supplying goods and services without disruption. Although the level of awareness regarding renewable energy and its impact on enterprises differed across the HKH countries, the entrepreneurs acted on the decision to integrate renewable energy into their business plan primarily due to two factors: first, the level of financial support available in the form of government subsidies, grants, and cheap loans which reduced the actual cost of installing or operating

renewable energy technology; and second, the level of exposure to or knowledge on renewable energy usage which helped dismiss negative perceptions pertaining to renewables (such as its high cost and technical complexity) by conveying important information to the non-adopters.

4.4.3 LACK OF FOCUS ON EE PRACTICES/TECHNOLOGIES

It was found that awareness amongst the entrepreneurs was higher with regard to the use of RE technologies as compared to their exposure to EE technologies or its potential in the HKH region. Only Bhutanese entrepreneurs cited the adoption of EE technologies, such as incorporating the use of LED lights and electric vehicles into their business plans. It is possible that many entrepreneurs were engaging in some EE practice, but did not recognize them to be so due to lack of knowledge and awareness on what counts as energy efficiency. This highlights a tendency of national governments to lay greater emphasis on addressing energy supply issues (through promotion of renewable energy technologies) rather than intervening in the demand side of the equation (by incentivizing efficiency and conservation). Consequently, policy support through existing financial instruments do not address the needs of enterprises as regards energy-efficient investments (Biswas et al. 2018).

Unlike the global scenario (Jaffe et al. 2003), an understanding of the primary drivers affecting the rate of diffusion of energy-efficient technologies is lacking in the case of HKH countries. Indian MSMEs are often characterized by a lack of risk appetite; insufficient

economic returns in the form of energy cost savings which can self-finance EE technologies; government policies that distort electricity prices (stimulating self-generation of electricity using inefficient diesel-powered generators); and limited interest of the MSME operators in public funding schemes due to high levels of bureaucratic red tape and low reimbursement rates which hinder the adoption of EE technologies (Bhattacharya and Cropper 2010; UNIDO 2018). Besides, lack of innovation in government policy and thinking, and absence of strong partnerships with technology providers has led to a singular policy focus on switching to renewable energy sources, rather than identifying energy waste and replacing inefficient technologies that are deployed for productive use.

In addition to the above factors, an important gap is the lack of identification of roles, particularly of women who hold strong social capital within their families and communities and can serve as renewable energy enablers. Women's involvement as agents of change in energy access has not been explored to its fullest potential. In the case of India, some organizations such as Barefoot College and The Energy and Resources Institute (TERI) implement their sustainable electricity programmes with the help of rural women entrepreneurs which enables women's inclusion in the energy access chain (Bhowmick 2011; TERI 2016; Usman 2019); however, women continue to be viewed primarily as energy consumers rather than as active participants in renewable energy provisioning and adoption of RE and EE technologies.

Information barrier in relation to energy efficiency is another factor impacting the decision of MSMEs to integrate EE technologies. The unorganized nature of the MSME sector presents many challenges in influencing entrepreneur preferences due to regulatory measures. Besides, governments have not been proactive in providing information about energy efficiency by requiring that appliances and machinery need to be labelled to show their energy usage and that efficiency claims need to be certified (Bhattacharya and Cropper 2010).

Some drivers of EE technologies amongst the MSMEs include in their agenda access to information on various programmes and schemes, participation in quality energy efficiency training workshops, and the identification of the relative level of energy inefficiency of an enterprise within a cluster, besides other firm-level factors such as the operating age of an enterprise and competition with large enterprises² (Biswas et al. 2018). In this regard, financial incentives alone are

insufficient to encourage enterprises to implement energy conservation measures. Future policies must focus on the realms of information and skills, along with finance, for diffusion of EE technologies.

Overall, there is a lack of mainstreaming of EE/RE technologies into the development plans and policies for MSME development (UNIDO 2018). RE technology is just one piece of the resilience puzzle. There is a much greater need for a holistic approach towards resilience that focuses on building a nourishing ecosystem comprising a combination of several catalysts (including, but not limited to, renewable energy usage) that increase the resilience of the mountain MSMEs.

4.4.4 ACCESS TO FINANCE

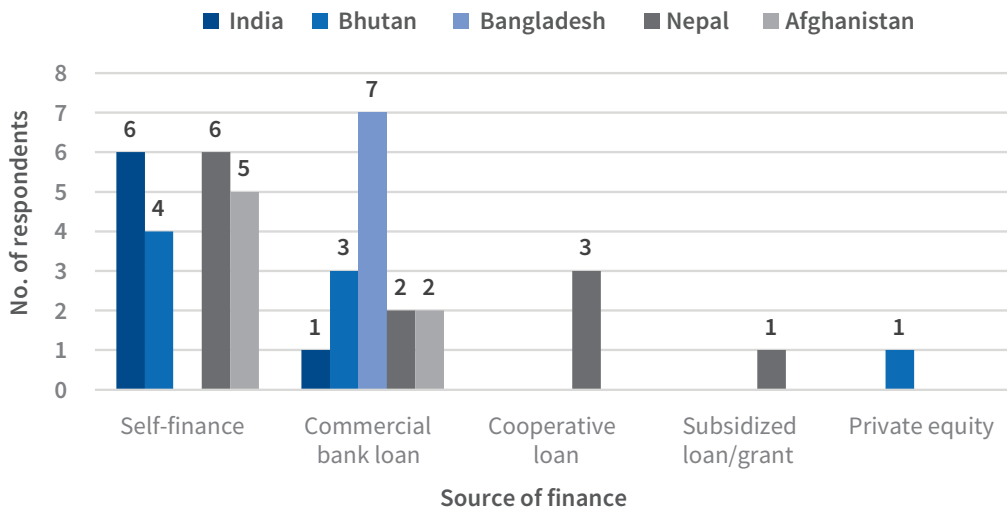
The entrepreneurs involved in the hospitality industry as well as others in the tourism sector have limited access to finance. Wherever enterprises have managed to integrate renewable energy technology such as solar power, the entrepreneurs have found operational costs to be considerably lower than using electricity generated from diesel for the same service. Therefore, a strong economic case for switching to renewables already exists.

MSMEs lack access to bank loans as compared to large firms. Many financial institutions are hesitant to give loans to small businesses if they do not have a robust business plan with financial information and projections which demonstrate the potential of the business to generate enough cash flow for repaying the loan. As a result, small entrepreneurs often have to rely on internal funds or cash from friends and family to launch and initially run their enterprises (The World Bank n.d.). The tourism entrepreneurs in the HKH found financial incentives to be insufficient or absent, the awareness regarding existing subsidies and schemes limited, and the potential of private financial institutions and donors severely underexploited. Many entrepreneurs (70 per cent) had to self-finance their enterprises either through personal savings or sale of assets (Figure 7). Bhutan reported a relatively higher institutional-level support for tourism enterprises in accessing loans (60 per cent) through the Bhutan Development Bank or the Bhutan Tourism Corporation, although some entrepreneurs were also partially self-financed. Besides loans, there were no alternative credit options available in any of the countries. Only one Bhutanese entrepreneur reported taking up equity-based financing by using his parent company as an equity.

² Enterprises with an operating age of more than five years are more likely to conduct energy audits or carry out process modifications; similarly, MSMEs competing with large enterprises are also more likely to conduct energy audits and invest in energy-efficient technologies since a reduction in energy cost per unit of production allows them to be more competitive (Biswas et al. 2018).

FIGURE 7

ACCESS TO FINANCE FOR TOURISM ENTERPRISES IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

In most other cases, the entrepreneurs were aware of financial schemes on loan provision; however, access to credit was a major challenge due to high interest rate, security requirement, and lack of awareness on processes and requirements. The loans taken by enterprises were used primarily for furnishing start-up costs, rather than for business operations or expansion. There were almost no cases where loan was taken for the use or uptake of renewable energy and energy efficiency solutions. None of the entrepreneurs reported using grants or subsidized loans to finance technologies such as solar photovoltaic and solar thermal. While many of the HKH countries design policies for the uptake of renewable energy technologies, a lack of access to financial incentive/subsidy remains a critical barrier in incentivizing the adoption of such technologies. In designing future renewable energy sources and MSME-related schemes, governments must recognize the uniqueness of mountain contexts and facilitate innovative partnerships between MSME entrepreneurs, financial institutions, and technology providers; this will then facilitate the devising of appropriate renewable energy solutions based on a needs assessment.

4.4.5 PARTNERSHIPS AND NETWORKS

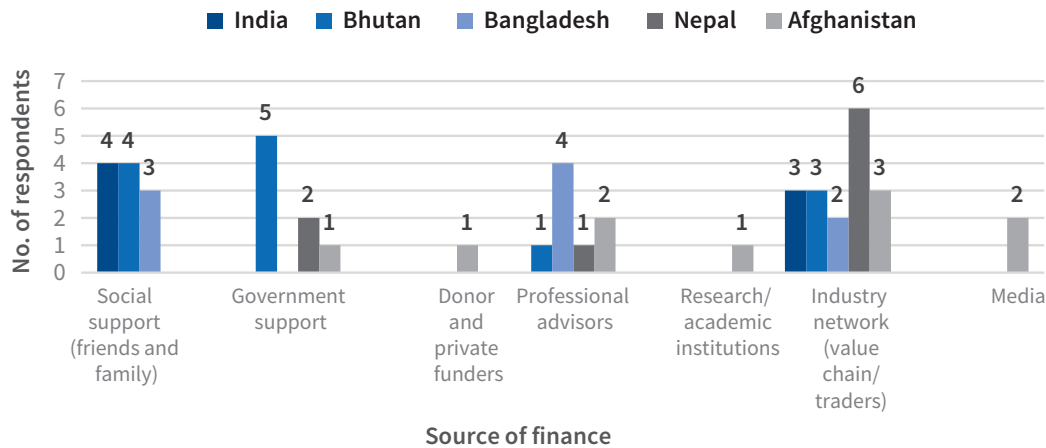
Partnerships and support networks greatly impact the resilience of communities and enterprises. In nearly 60 per cent cases, the government was seen as a key stakeholder in supporting the development of renewables for enterprise development (ICIMOD and IRENA 2020). Other important sources of support are partnerships between service providers, community-

based organizations and NGOs, and donors and private financial institutions. Industry partnerships are particularly relevant for enterprise resilience as they offer greater supply chain diversification which helps businesses become more agile and flexible and enable them to adapt quickly to sudden disruptions or changes in market trends (Bhatia, Lane and Wain 2013).

In the HKH countries, a varied set of partnerships in the MSME sector were found to be instrumental but donors and private players (including research, academic, and financial institutions) were mostly absent (Figure 8). The role of associations and networks was most pronounced in the case of Bhutan where enterprises found linkages with the government as key for accessing cheap electricity from the main line, as well as for forging partnerships with other public and private institutions. The majority of the Bhutanese enterprises indicated involvement with the industry or professional associations such as the Association of Bhutanese Tour Operators, Bhutan Tourism Cooperation, Bhutan Sustainable Tourism Society, and Hotel and Restaurant Association of Bhutan, as well as civil society organizations which filled various gaps in training on establishing new businesses, skill enhancement, accessing grants and loans, and business acceleration programmes. Connection with other enterprises along the value chain such as tour operators was also found to be crucial for small businesses. A Bhutanese entrepreneur reported his dependence on tour operators to be as high as 90 per cent for attracting new customers. The role played by the Bhutanese government through various policies and schemes outweighed the contribution of other

FIGURE 8

PARTNERSHIPS, NETWORKS, AND ALLIANCES FOR TOURISM ENTERPRISES IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

players such as financial institutions, donors or private funders, professional advisors, and education/research institution. Bhutanese entrepreneurs also strongly agreed with the approach adopted by their government in terms of MSMEs and tourism policy.

Tourism entrepreneurs in Afghanistan reported weak linkages with external institutions for support; however, there was a greater diversity of partners that were recognized as catalysts for business growth. The entrepreneurs highlighted the role of the media, professional advisors, donors and private institutions, and research and academic professionals in addition to the government for providing support and assistance to small businesses through capacity training, access to finance, and exploring new opportunities.

Indian tourism entrepreneurs did not report any connection with formal business networks, private funders, professional advisors or academic/research institutions. Links were established based primarily on social connections. One Indian entrepreneur received advisory support from previous employers, social workers, and family due to personal connections. In Nepal, all hotel enterprises that were interviewed reported association with industry bodies, and three entrepreneurs indicated receiving professional advisory support from food and service experts.

However, the majority of the enterprises reported weak linkages and piecemeal support from partners. There was some engagement with the social welfare council/fund which promotes small and medium enterprises, as well as financial institutions providing social protection schemes such as provident fund and insurance services. The government was also seen to be an important player in capacity building and financial support, although there was much scope for deeper involvement and handholding.

Overall, in the HKH countries, tourism entrepreneurs (56 per cent) reported strong networks with business and industry associations, which are seen as important sources of new information, and business expansion or income-generation opportunities. Another support system that played a critical role in the welfare of MSMEs was social networks (36 per cent) comprising trusted friends, family, and peers. Trusted social networks are known to positively affect the ability of communities and organizations to withstand shocks and emerge stronger from adversity (Williams et al. 2017). Similar dynamics are at work in the tourism MSME sector. A need to strengthen existing linkages with research and academic institutions as well as donors and private funders was expressed across the region.

SECTION 5

Conclusion: Key areas for action development

Entrepreneurs are often exposed to myriad internal and external shocks which are unpredictable and can destabilize the trajectory of their enterprise. It is, therefore, critical for the MSME sector, with its limited resources and reach, to have business strategies that focus on resilience building through innovative technology, partnerships, funding, and skills. This is especially true for developing countries where the wider supporting infrastructure is weak and the risks much higher.

Several different enabling factors are required to enhance the resilience of enterprises allowing them to deliver economic returns along with social and environmental values. Particularly in the context of green growth and development strategies, the absence of appropriately targeted interventions such as training, education, apprenticeships, financial, technical, and business skills, access to finance, and supportive social policies, may exacerbate existing gender inequities, hinder entrepreneurship development and limit the achievement of poverty alleviation goals. Equally important is the access to affordable, reliable, and sustainable energy services, particularly in the context of mountain areas, since energy is an important input for businesses and can greatly enhance the development of local resources and service-based entrepreneurship.

We propose the following areas of intervention to strengthen the contribution of renewable energy resources for value chain and enterprise development while ensuring the transition to a gender-sensitive, inclusive, green economy:

5.1 Access to finance

Affordable financing and credit lines for the purchase and installation of small-scale RE technologies is necessary for widespread deployment of RE. Providing adequate and timely access to finance through public funds (invested via guarantee funds, subsidies, start-up support, first-loss coverage or insurance support) and public-private blended finance, and capitalizing on the reach of informal moneylenders, as well as exploring collaboration opportunities with financial technology firms focused on MSME lending can go a long way in strengthening the financial support infrastructure for MSMEs (Csaky et al. 2017; IFC 2018). In particular, blended finance (using public-sector funds to leverage private-sector funds) is useful in overcoming the upfront cost barriers for entrepreneurs, lowering their perceived risks, and demonstrating the investment return from new technologies (Csaky, et al. 2017).

While designing and implementing financial inclusion programmes and policies, it is important to account for discriminatory social and cultural norms that put certain groups at a significant disadvantage, affecting their access to, and adoption of, renewable technologies. For instance, women are generally found to have lesser access to finance and energy-related services, as well as to ownership of land and other assets which are needed to serve as loan collateral (Cecelski and Dutta 2011; Kende-Robb 2019). Studies from Africa have shown that women-headed businesses face more impediments than those run by men in accessing grid electricity (Habtezion 2012). Such barriers can adversely impact the effectiveness and sustainability of energy programmes and policies, thereby reducing the opportunities and benefits from the start or growth of enterprises.

In order to deal with such embedded social discrimination, SEWA Bank in India started a microfinance programme that provides specific energy loans to enable its women members to access funding (Baruah 2015). This initiative has greatly enhanced the ability and capacity of rural women to take up entrepreneurial activities as well as enabled them to become end users of renewable energy technologies. Such credit-based energy and development interventions that address deprivation and inequality along intersecting dimensions of gender, caste, and ethnicity can help provide a level-playing field for the most marginalized people within a community.

5.2 Access to partnerships

The second key insight emerging from this study is the role of strong partnerships, networks, and alliances in innovation, coordination of service delivery, and opening up of new markets for enterprises. Alliances are crucial for obtaining wider access to data and new information which can then provide enterprises with new insights into their relative position in the market, about competitors, value propositions, customers and their changing needs and tastes, as well as about policy and financial support extended by supporting institutions.

Alliances can help identify and bridge critical institutional gaps that enable low-income groups to take up entrepreneurial activities. Institutional partnerships, including with NGOs (such as Barefoot College, Self Employed Women's Association (SEWA), and TERI in India, and Practical Action in Nepal), bilateral and multilateral institutions (such as UNDP, ADB, and Norwegian Agency for Development Cooperation (NORAD) and governments (such as the Denmark-Government of Nepal Energy Sector Assistance Programme and the National Rural Renewable Energy Programme funded by the governments of Nepal, Denmark, Norway, Germany, and the United Kingdom and supported by UNDP, SNV, and GIZ) have helped create new economic opportunities for low-income communities in the HKH region.

Institutional partners must support the national governments in the HKH region in undertaking pilots and scaling up projects that build the capacity of local entrepreneurs to utilize energy services for income generation and livelihood strengthening while paying close attention to the diverse socio-economic and cultural identities and positions of the men and women within a community. Through their funding, mobilization, and facilitation processes, partners can help governments design systems and programmes that are gender sensitive and socially inclusive and promote equal opportunity for entrepreneurship at the local level.

5.3 Training and capacity building

Strong capacity-building programmes must be formulated to expose MSME businesses to a wide variety of skills and knowledge base, including by developing a comprehensive business plan that can improve the access of entrepreneurs to bank loans, and gaining the ability to operate, run, and manage RE/EE technologies, along with other aspects of business operations. Effective training programmes should also be implemented through a combination of classroom-style workshops and development of locally appropriate training material complemented with follow-up mentoring and creation of RE/EE champions at the local level to catalyse peer-to-peer learning (Johnstone et al. 2019). Partnerships with training institutes can be useful for extending vocational training on RE/EE applications. Given that there exists a significant gap in promotion of energy efficiency across the HKH region, a strong emphasis must be laid on carrying out different training and awareness generation programmes on energy auditing and energy management, as highlighted in Nepal's National Energy Efficiency Strategy 2018.

A skill gap assessment must be conducted to identify the specific training modules that are required by the entrepreneurs to transition to a low-carbon economy while enhancing business growth and productivity; all this bearing in mind the enabling or restricting contextual factors such as the geographical, social, and cultural aspects. This will help familiarize all the stakeholders with the needs and benefits of RE/EE solutions in the context of MSMEs. Since female entrepreneurs do not start with equal opportunities, they may need external assistance to access training programmes, exposure events, education, and apprenticeship programmes; they also need to know about certifications and also provided with the necessary finance, equipment, and other facilities (Osunmuyiwa and Ahlborg 2019).

Besides imparting trainings that focus on building entrepreneurial and business skills, governments and development institutions must also strategize ways to bring RE & EE technologies closer to the rural mountain communities by paying attention to entrepreneurial possibilities along the entire renewable electricity production chain. One way to do so would be to follow successful models in Bangladesh (Grameen Shakti), India (Barefoot College, TERI, and SEWA), and Nepal (Empower Generation and the Promoting Women-led Enterprises for Energy Access and Local Production programme implemented by the Centre for Rural Technology, Nepal, as well as the National Association of Community Electricity Users-Nepal, and Practical Action Consulting) under which women are trained to set up their own renewable

energy businesses or serve as “energy enablers” or “social engineers”. Identifying such critical points of intervention in policy, planning, design, and operation of electric power systems would go a long way in creating an enabling environment for the adoption of RE&EE technologies amongst households and businesses.

5.4 Policy direction

A well-rounded policy framework is a necessary step towards ensuring the deployment of RE/EE practices to improve competitiveness and productivity of enterprises. The gap is particularly visible in the case of energy efficiency programmes where a lack of adequate policy, legal, and institutional frameworks have resulted in weak implementation and regulation as well as poor monitoring of energy efficiency programmes.

Limited support from institutions, lack of local service providers, low awareness levels among entrepreneurs and workers, the uniqueness of technologies and practices deployed (often decades old) which are low in energy efficiency and high on pollution, and lack of expertise and innovation in policymaking institutions have prevented the promotion of clean, energy-efficient technology in the MSME sector. Adopting a

multipronged approach can help address the current condition of energy poverty in the region; this could be by way of development of national standards for energy efficiency, development of equipment and means for monitoring and measuring energy efficiency, and the cultivation of the necessary human resources and capacity for the production, commercialization, and technology transfer of energy efficiency through regional and global cooperation and collaboration. Research and development efforts must be backed by sufficient investments in awareness-generation programmes and strengthening of existing information systems, stronger regulations (such as labelling of energy-efficient technologies), and subsidized credit for sustaining such technological solutions that are in tune with local conditions and needs.

Many stakeholders stand to gain from the deployment of renewable energy technologies in the MSME sector: the enterprises due to reduced electricity bills, cost savings, and greater profits; the governments due to employment generation, contribution to the GDP, and improved trade balance; and local communities due to lower environmental footprint and improved environmental quality. In order to achieve these benefits, there is a need for coordinated action at all levels, using a collaborative and multi-stakeholder approach.

Annexes

Annex 1: Research methodology

For addressing our first research question, namely, “What is a resilient enterprise?”, we began by conducting a comprehensive review of literature on resilience and resilient enterprise. Academic and grey literature published on the themes of adaptation, ecology, business, and sustainability was vetted to gain a conceptual understanding of terms such as “resilience” and “adaptation” in the context of enterprise development. In line with the usual practice for conducting an extensive systematic literature review, identification of relevant studies was undertaken through keyword searches on Google Scholar, Web of Science, and Scopus – the three most popular search engines used for assessing academic and grey literature. The review provided us with a landscape of key factors or “indicators” that operate within successful MSMEs and are recognized as important catalysts for resilient enterprise development.

For addressing our second and third research questions, namely, “How is RE & EE contributing to making enterprises resilient?” and “What enables/hinders MSMEs to integrate RE & EE into their business?”, we focused on one key portfolio within the MSME sector in the HKH region, namely, niche mountain tourism enterprises.

Key informant interviews were conducted in selected areas of five HKH countries – India (Himachal Pradesh, Uttarakhand, and the North-east states), Nepal (Pnauti and Kathmandu), Bangladesh (Bandarban), Bhutan (Paro and Thimphu), and Afghanistan (Bamyan and Nangarhar). The sites in each of the five HKH countries were selected based on three criteria:

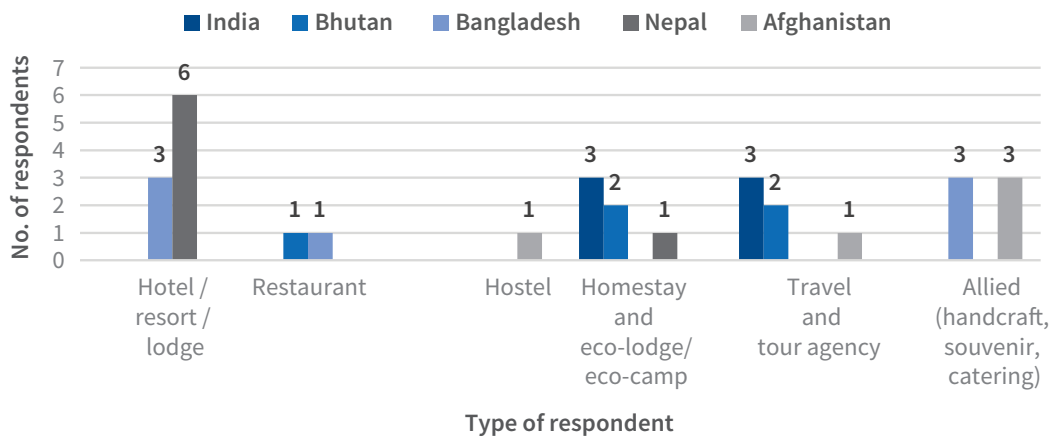
- Geography: the field sites chosen are distributed across the HKH region and are representative of the unique mountain ecosystem and socio-environmental conditions
- Economic profile: the chosen sites experience moderate-to-high levels of mountain tourism activity and are representative of the contemporary landscape of mountain entrepreneurship and economy.
- Accessibility: the fieldwork was conducted during the onset of the COVID-19 pandemic when several countries in South Asia went under a nation-wide or regional lockdown. Therefore, the field sites were chosen based on ease of accessibility by transport and taking into account the safety of the enumerators.

Virtual data collection methods such as telephonic interviews and surveys were used wherever necessary and possible so as to supplement face-to-face semi-structured interviews. The respondents comprised entrepreneurs across the tourism value chain and included travel agents and tour operators; owners/operators of farm retreats, homestays, hotels, guest houses, hostels; owners/operators of allied services such as travel and transportation, food and beverage outlets (restaurants and catering companies), entertainment and recreational activities, tourism information services, and handicraft and souvenir businesses operating within the MSME sector (Figure 9). A high preference was given to selecting enterprises which had either adopted renewable energy technologies or were practising EE. A total of 30 key informant interviews were carried out along with three in-depth interviews.

Semi-structured interviews (n=20) were also carried out with institutional-level actors who are termed as “enablers” (Figure 10). This category included social enterprises and NGOs supporting tourism MSMEs, members of industry/business associations, and officials in government departments such as the Ministry of Tourism, Ministry of MSMEs, Ministry of Energy, Ministry of New and Renewable Energy, and

FIGURE 9

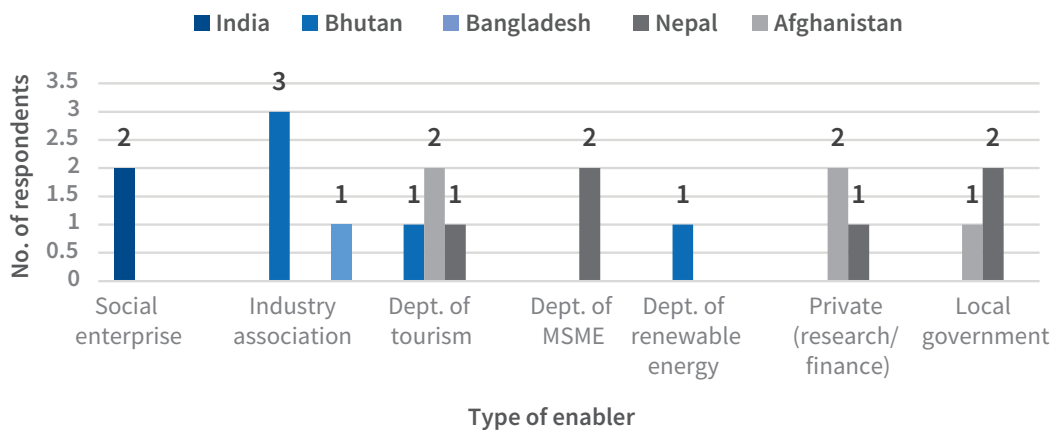
TOURISM ENTERPRISES INTERVIEWED IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

FIGURE 10

TOURISM ENABLERS INTERVIEWED IN INDIA, NEPAL, BHUTAN, BANGLADESH, AND AFGHANISTAN



Source: Primary data analysis, 2020

Ministry of Industry which manage the key decision-making processes in relation to the growth and regulation of the MSME sector, and/or promote green growth, green businesses, and renewable technologies. The views of the enablers are embedded within the analysis in this paper.

The analysis of the qualitative data relied on clustering and coding of raw data into categories using key words and associated attributes such as synonyms and related

words or phrases. This way, data was organized into specific themes or ideas which helps in identifying patterns in the relations among the codes. The responses were transcribed into Word documents, and the coding and the interpretation of the coded data was performed manually. In order to ensure robustness of the data analysis, two researchers independently reviewed the transcripts and identified the key concepts associated with the participants' responses.

Annex 2: Definition of MSMEs in the HKH region

The definition of MSMEs across the world differs from country to country and is usually based on the number of employees, the value of assets (such as plant and machinery), the value of enterprise and/or volume of sales. A tabular representation with different definitions and cut-off criteria for the MSME sectors in India, Nepal, Bangladesh, Bhutan, and Afghanistan is given below.

COUNTRY	MICRO ENTERPRISE	SMALL ENTERPRISE	MEDIUM ENTERPRISE
India	Any firm with investment up to INR 1 crore and turnover under INR 5 crore.	Any firm with investment up to INR 10 crore and turnover up to INR 50 crore.	Any firm with investment up to INR 20 crore and turnover under IR 100 crore.
Nepal	Enterprise with fixed capital not exceeding NPR 200,000 working at the local level utilizing local raw materials; total employees not exceeding 9 persons, and electrical power consumption utilizing less than 10 KW.	Authorized capital size (fixed assets) not exceeding NPR 50 million but not the cottage industries.	Enterprises with a fixed asset between NPR 30 million and 100 million.
Bhutan	Businesses with investments of less than BTN 1 million.	Businesses with investments between BTN 1 and BTN 5 million.	Businesses with investments between BTN 5 and BTN 15 million.
Bangladesh	Manufacturing: Value ³ of enterprise is between BDT 10 lakh and BDT 75 lakh, employing 16–30 workers. Service: Value is less than BDT 10 lakh, employing 15 or less people.	Manufacturing: Value of enterprise is between BDT 75 lakh And BDT 15 crore, employing 31–120 workers. Service: Value of enterprise is between BDT 10 lakh and BDT 2 crore, employing 16–50 workers.	Manufacturing: Value of enterprise is between BDT 15 crore and BDT 50 crore, employing 121–300 workers (in the case of garment enterprises, a minimum of 1000 employees). Service: Value of services is between BDT 2 crore and BDT 30 crore, employing 51–120 workers.
Afghanistan	Total investment of AFN 2.5 million in manufacturing and AFN 1 million in the service sector, employing up to 5 persons.	Total investment of AFN 2.5–5 million in manufacturing and AFN 1–2 million in services, employing between 5–19 persons.	Total investment of AFN 5–10 million in manufacturing and AFN 2–5 million in services, employing between 20–99 persons.

Source: FNCSI n.d; ADB 2013; Ministry of Micro, Small and Medium Enterprises n.d.; Raihan, Khondker, Quoreshi, and Rahim 2016; The Daily Star 2017; Afghan Ministry of Commerce and Industries 2012

³ Value means the value (replacement cost) of fixed assets excluding land and building.

Annex 3: Frameworks for measuring resilience based on secondary literature

SOURCE	RESILIENCE INDICATORS
Gunasekaran, A., Rai, B.K., and Griffin, M. (2011). Resilience and competitiveness of small and medium size enterprises: An empirical research. <i>International Journal of Production Research</i> , 49(18): 5489–5509	Organizational structure; managerial characteristics (innovation, previous training and education, emphasis on learning); quality management; use of technology; financial support; knowledge and awareness; access to suitable logistical resources; strategic alliances; and marketing
Linnenluecke, M., and Griffiths, A. (2010). Beyond Adaptation: Resilience for business in light of climate change and weather extremes. <i>Business & Society</i> , 49(3): 477–511.	Physical dispersion of assets; decentralized workforce; backup facilities; diversified suppliers of input; financial resources; capacity building and learning
Wedawatta, G, Ingirige, B., and Amaratunga, D. (2010). Building up resilience of construction sector SMEs and their supply chains to extreme weather events. <i>International Journal of Strategic Property Management</i> , 14(4).	Improved decision-making; vulnerability of supply chains; knowledge and awareness; managerial abilities; supporting infrastructure (such as transportation, access to roads, and closeness to the market)
McManus, S., Seville, E., Brunsdon, D., and Vargo, J. (2007). Resilience management: A framework for assessing and improving the resilience of organisations. Resilient Organisations Research Report 2007/01. Resilient Organisations, New Zealand.	Knowledge and awareness; risk identification and planning strategy; capability and capacity of internal and external resources; partnerships; strategic vision; leadership; and management and governance structure
Paton, D. (2007). Measuring and monitoring resilience in Auckland. GNS Science Report 2007/18. Institute of Geological and Nuclear Sciences Limited.	Critical awareness (attitudes and beliefs to change); self-efficacy; sense of community; outcome expectancy; and resources Community – Collective efficacy, participation, commitment, information exchange, social support, decision-making, and resources Institutional – Empowerment, trust, resources, mechanisms for assisting community, and problem-solving
Palzkill, A., and Augenstein, K. (2017). Business model resilience – understanding the role of companies in societal transformation processes. <i>uwf</i> 25, 61–70.	Value proposition (awareness regarding the enterprise’s contribution); use of efficient technologies and processes; risk assessment; ability to learn and implement new strategies; and partnerships and dependencies
Buliga, O., Scheiner, C.W., and Voigt, K. (2016). Business model innovation and organizational resilience: Towards an integrated conceptual framework. <i>Journal of Business Economics</i> , 86, 647–670.	Continuous learning; Innovation, capturing new opportunities from the changing environment; partnerships; and exploiting new opportunities
Aylin, A., and Umit, S.B. (2011) Change process: A key enabler for building resilient SMEs. <i>International Journal of Production Research</i> , 49:18, 5601–5618.	Planning; external orientation (towards customers and services); customer relationship and partnerships; management skills; and cultural and organizational aspects.
Seville E., Brunsdon, D., Dantas, A., Le Masurier, J., Wilkinson, S., and Vargo, J. (2006). Building organisational resilience: A summary of key research findings. Resilient Organisations Programme, New Zealand.	Dealing with softer, less tangible aspects of an organization such as people; partnerships; organizational culture; developing new behaviours and changing attitudes through knowledge and training; and building coalitions
Demmer, V., Vickery, S.K., and Calantone, R. (2011). Engendering resilience in small- and medium-sized enterprises (SMEs): a case study of Demmer Corporation. <i>International Journal of Production Research</i> , 49(18).	Innovation; knowledge networks; organizational structure; robust strategic planning process; quality of human resources; identifying new options and opportunities; Alliances and partnerships; and ability to adopt new ideas and experiment
Asikhia, O.U., and Van Rensburg, M.V. (2015). SMEs wealth creation model: A conceptual framework. <i>African Journal of Hospitality, Tourism and Leisure</i> , 4(1).	Human resources (staff skills, knowledge, abilities, experience, and initiatives); technology; innovation and creativity; industry networks and partnerships; organizational infrastructure; and strategy

Wishart, M. (2018) Business resilience in an SME context: A literature review. Enterprise Research Centre.	Strategic and operational flexibility; strategic planning process; ability to mobilize and integrate external resources; change management capabilities; access to finance; strong material assets; networking; innovation; recruitment and training; internationalizing the business; and strategic decision-making
Sullivan-Taylor, B., and Branicki, L. (2011). Creating resilient SMEs: Why one size might not fit all. <i>International Journal of Production Research</i> , 49(18), 5565–5579.	Managerial capacity; organizational system/culture; decision-making and planning; and speed of recovery
Gray, D., and Jones, K.F. (2016). Using organisational development and learning methods to develop resilience for sustainable futures with SMEs and micro businesses: The case of the “business alliance”. <i>Journal of Small Business and Enterprise Development</i> , 23(2): 474–494.	Organisational development and learning Collaboration; Training; Business alliances and network of support; Innovation; Knowledge and awareness
Hamel, G., and Välikangas, L. (2003). The quest for resilience. <i>Harvard Business Review</i> , 81(9), 52–63.	Decision-making and planning; quality of human resources; strategy; communication; access to capital and talent; diversification of products and services; and innovation
Al-Tit, A., Omri, A., and Euch, J. (2019). Critical success factors of small and medium-sized enterprises in Saudi Arabia: Insights from sustainability perspective. <i>Administrative Sciences</i> , 9(32).	Business support; entrepreneurial characteristics; capital availability (human, social, and financial); management factors; financial support; and training

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