

Baseline assessment on access to and use of energy and potential for community-based renewable energy development for Chepang communities in Manahari and Raksirang rural municipalities in Makwanpur district in central Nepal

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1. INTRODUCTION

This baseline assessment is aimed to present the current situation of access to and use of energy (electricity) as well as to determine the potential sources for renewable energy production in Chepang communities in Manahari and Raksirang rural municipalities of Makwanpur district in central Nepal. It has been carried out under the pilot initiative of Community Empowerment and Social Justice Network (CEMSOJ) and Himalayan Human Rights Monitors (HimRights) titled “Empowering indigenous Chepang youth and women for promotion of Community-based Renewable Energy Project (CbREP) in Nepal”.

The initiative was designed after a preliminary assessment that determined that wards 2, 5 and 6 of Manahari rural municipality and 1, 8 and 9 of Raksirang rural municipality of Makwanpur district with significant Chepang population – do not have adequate or any access to electricity. Those wards have significant Chepang population that do not have access to adequate or any electricity. Around 100-150 Chepang families live in each ward that depend on kerosene or mini solar panels for energy. Primary sources of income of most of the Chepangs include farming, daily wage labor in construction and stone crusher. For cooking, they depend on firewood and straw/thatch. The closest market area for the Chepang communities are 4-5 hours away on foot.

This assessment is based on three field visits/missions undertaken by CEMSJO and HimRights representatives, including staff persons and consultants between January and November 2021. Since the first scoping mission in early January till the most recent in mid-November 2021, various obstacles have been encountered for the finalization of this baseline assessment, including the deadly second wave of Covid-19 pandemic in Nepal that caused nation-wide lockdown since April, the following heavy and long monsoon from July to October (unusual from past years) that caused many landslides along the highway and roads to the villages. In the meantime, there have also been changes in local circumstances and needs consultations, such as expansion of national grid to certain target villages and preference to get connected with the national grid than develop another community grid. Accordingly, the assessment has been adapted and updated continuously.

This baseline assessment will be followed by the development of at least one community-based renewable energy project (CbREP) under this pilot initiative in one of the target villages as identified in

the way forward of the assessment (below) to enhance the access to energy of the Chepang villagers there. The CbREP will be developed and operationalized with participation of the concerned communities and their effective ownership and control. Due to the unforeseen changes in the local needs and circumstances and significant delay caused by the Covid-19 pandemic and heavy monsoon – all of which were beyond CEMSOJ/HimRights’ control, this assessment was intentionally delayed to present a specific conclusion or way forward.

2. BACKGROUND

Nepal is the second richest country in the world in terms of inland water resources and hydropower is touted as a means to national prosperity. Significant progress has been made lately in generation of hydropower in rivers across the country and tackle the lack of access to electricity or significant power cuts that affected the people’s lives throughout the country for most part of the recent history. However, the sad reality still exists that there is lack of access to adequate, stable or any electricity nation-wide, particularly during the dry season while the cost of energy is also relatively higher than in other countries. The Government of Nepal has specifically failed to ensure access to adequate or any electricity to the rural and geographically remote areas, which are predominantly populated by indigenous and other marginalized groups.

It may surprise many that even numerous settlements in the Makawanpur district in central Nepal, wherein Hetauda – the provincial capital of Bagmati Province – lies and which is also quite close to the federal capital city of Kathmandu, still do not have access to electricity or any other source of electricity. Most of those villages are homes to indigenous Chepang and other groups such as Tamang. In this background, the pilot initiative of “Empowering indigenous Chepang youth and women for promotion of Community-based Renewable Energy Project (CbREP) in Nepal” was designed with the objective to enhance the access of Chepang communities to renewable energy in the remote rural settlements of Manahari and Raksirang rural municipalities of Makwanpur district. The pilot specifically focuses on the participation and empowerment of youth and women for development of renewable energy and will involve targeted support for socio-economic empowerment of women. It is expected that the initiative will in the overall contribute to support the endangered and marginalized Chepangs in certain settlements achieve their aspiration for sustainable development.

3. HISTORY AND PRESENT OF CHEPANG PEOPLE

The Chepang people is an indigenous group living mainly in the remote hilly areas of Chitwan, Dhading, Makwanpur, Lamjung, Tanahu and Gorkha districts in central Nepal. They are endangered, marginalized and landless people in Nepal – also often vulnerable to food crisis. According to the 2011 census of Nepal, their total population is 68,960. They are one of the last forest dependent nomadic groups in Nepal but now most of them have come into the “mainstream” of modern social life. The development of Chepangs gained momentum after King Birendra launched a Praja Development Program in 2034 BS for their socialization. Currently, the Program has been named as Chepang Development Program since 2062 BS.

The Chepang people used to live by hunting forest products such as *gittha*, *vyakur*, yams, fish, frogs, bats, etc. in the past. They have now started engaging in agriculture, animal husbandry, daily wage work, etc. The literacy rate among Chepang people is only 36 percent. Due to child marriage, lack of awareness, weak economic condition and residence in remote locations, the education level of the Chepangs has not

improved but the inclination towards education seems to be improving among the new generations. Most of the Chepangs are landless – some even stateless, and do not have any legal land ownership documents.

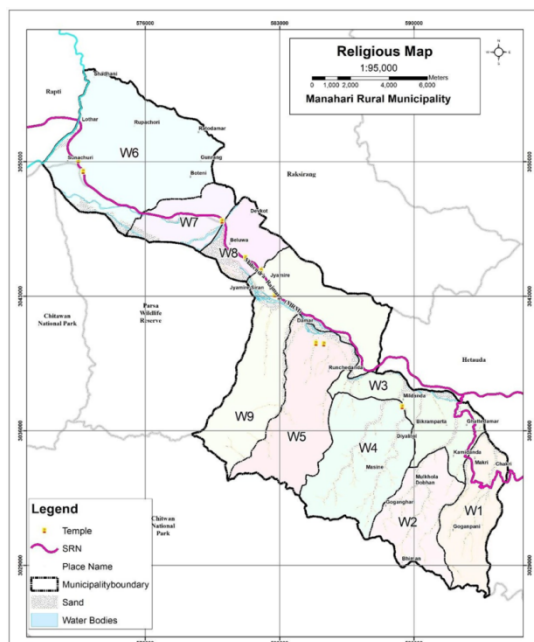
4. PROJECT AREA AND CURRENT STATUS OF ACCESS TO ENERGY

Makwanpur district, wherein lies the capital of Bagmati province, has one sub-metropolis, one municipality and eight rural municipalities. This district is predominantly populated by indigenous Tamang people who make up 47.35% of the population. Other major ethnic/caste groups in the district are Brahmin (14.95%), Chhetri (10.65%), Rai (6.85%), Newar (5.015%) and Magar (3.85%). **Chepangs are seventh largest ethnic group in the district accounting for 2.75% of the population.**



Manahari rural municipality is the largest rural municipality of Makwanpur district. Its area is 199.52 square kilometers. There are 9 wards in this municipality. The total population is 38,399 according to the 2011 census. The largest ethnic group in terms of population is Tamang with 18,043 people (46.15%). They are followed by 5,624 Magars (14.38%) and Brahmins (11.29%). **Chepangs constitute 9.44% of the population in Manahari.**





Ward no. 6 of Manahari rural municipality, wherein lies the target villages of the initiative, is the largest ward of the municipality with an area of 38.95 sq km. Chepangs are the second largest group in the ward with a total population of 1,032.

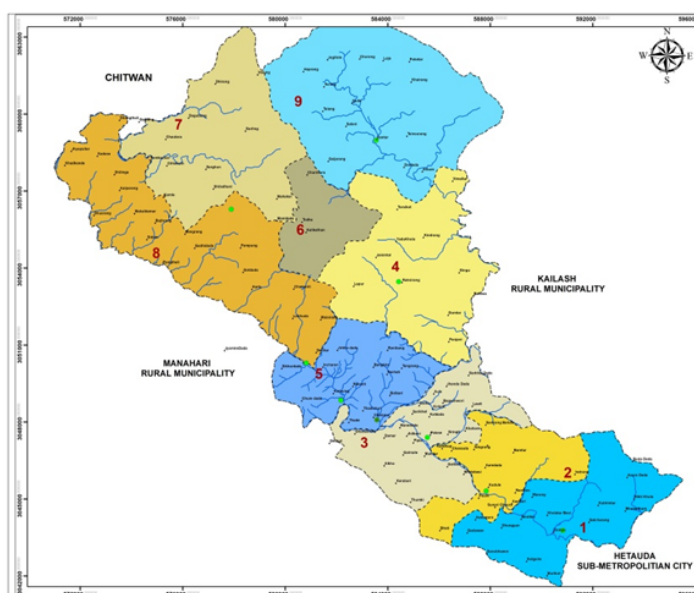
Population details of Ward no. 6, Manahari rural municipality

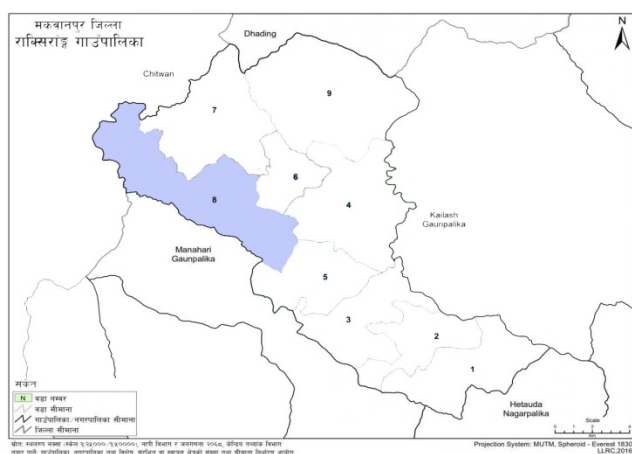
Population		Households
Female	3538	1481
Male	3496	
Total	7034	

Source: Household Survey, 2075 BS

In terms of literacy, this ward seems to be lagging behind. According to a report of the rural municipality, only a total of 389 people have received some form of education. In this ward, 1239 households (83.7%) have access to electricity, 17 households (1.1%) use solar energy and 15.19 % households are still without electricity. 788 households of this ward (53.2%) use wood/timber and only 693 households (46.8%) use Liquefied Petroleum Gas as cooking fuel.

Raksirang municipality is also one of the largest rural municipalities of Makwanpur district. Raksirang rural municipality was formed by the decision of the Government of Nepal in 2073 BS by combining four village development committees of the western and northern part of Makwanpur district, namely Kakada, Raksirang, Sarikhet and Khairang. Its area is 226.70 square kilometers. There are 9 wards in this rural municipality. The total population is 26,192 (according to the 2011 census) and 30,830 (according to the Household Survey 2075 BS). Tamang is the largest ethnic group in Raksirang accounting for 51.8% of the population followed by Chepang (37%), Chhetri (6.1%), Dalit (2.5%), Magar (1.5%), Newar (0.7%) and Brahmin (0.3%) according to the Household Survey (2075 BS). 82% of the people in this rural municipality depend on agriculture for their livelihood. 43% of the people are below the poverty line. Only 2% of the villagers have completed higher education. A survey has shown that many students drop out of school due to distance of the school and financial conditions. As per the data of the rural municipality, 44.8% of the households still do not have electricity and 38.1% also do not have solar energy access.





Chepangs make a majority of population in Wards no. 8 and 9, wherein lies the target villages of the CbREP initiative, of this remote and undeveloped rural municipality. Most of the people in the wards depend on agriculture and wages for their livelihood. Most roads to the wards have been recently constructed and are dirt road that can only be used in dry weather. Manahari bazaar (market) is the closest market for the residents of the wards. Even in Chainpur, where the rural municipality office is located, there are mainly government offices.

Population details of Wards no. 8 and 9, Raksirang rural municipality

Population (Ward no. 8)		Households	Population (Ward no. 9)		Households
Female	1426	459	Female	1743	613
Male	1560		Male	1891	
Total	2986		Total	3634	

Source: Household Survey, 2075 BS

4.1. TARGET VILLAGES

Polaghari, Manahari rural municipality, Ward no. 6



Polaghari is a hilly settlement of Chepang settlement in Ward no. 6 of Manahari rural municipality adjoining Chitwan district in the west. Even though the village is only 4 km away from the main highway of Nepal – the Mahendra Highway, the village can be reached only through the newly opened dirt road due to lack of other roads. From here, you can see the beautiful plains of the Manahari River, the Rapti River and the Chitwan National Park while there is snowy mountain range in the north.

As there is only a thin settlement of Chepangs in the village that means disproportionately high budget to extend the national power grid, the village has not been connected to the grid despite being close to the highway. Most of the 22 households here have installed mini solar panels (around 20 watts for one or two lights) in each house with support of an NGO (MDI Nepal). Due to absence of technical knowledge about maintenance of solar panels, many households have not been able to continue using the solar power.

While wooden electricity poles have been installed in some places of the village and the lines also connected, the electricity has been unstable. At the same time, new metallic electricity poles has also been erected in few places but the work has not been completed due to lack of budget. According to some locals and ward members, it may take a few more years to complete installation of the electricity poles and connecting the village to the national grid. If an alternative energy project can be implemented in the meantime, it appears that the project can be useful for long-term consumption as well as for reducing economic hardship of the poor villagers.



Pictures of Polaghari

Rupachuri, Manahari rural municipality, Ward no. 6



This settlement also lies in ward no. 6 of Manahari Rural Municipality – a few minutes uphill and north from Polaghari and about 6 to 11 km from Mahendra Highway. The settlement can also be reached from the highway where Lothar Khala Bazaar is located. There are around 400 households of Tamang indigenous group, 100

households of Chepang indigenous group and remaining 100 households of groups in this village with a total of 600 households. One can reach the village on a dirt road. As in Polaghari, there are problems of electricity and drinking water. With the help of NGO MDI Nepal, only 25 houses here have installed solar panels. So, most of the villagers are without electricity. Due to lack of electricity,



most of the people here are facing difficulties in education and communication. There is also limited possibility of home-based industries here as the people cannot use heavy machines that run on electricity. It was informed that the national grid was going to be here in near future as the dirt road was being gradually expanded across the village.

Devitaar, Raksirang rural municipality, Ward no. 8

As mentioned above, Raksirang Rural Municipality is the most remote rural municipality of Makawanpur district. Most settlements of this rural municipality are only accessible through dirt roads, which makes it difficult for people to freely move around.

Devitar, located 6.50 km north from Manhari Bazaar on Mahendra Highway, is a village in Ward no. 8 of Raksirang. The Ward office is also situated in this village. There is an estimated 120 people in this village. 19 out of 22 households here are of Chepang people and the rest are of Tamangs. The people here are mostly dependent on agriculture and daily wage work to get food for 12 months. In this village, out of 22 households, only one house has solar light from a private source while the others are dependent on oil lamps. The electricity poles have also been extended here but the lines are yet to be connected. It was also found that cow dung-based biogas plant was installed in three households of the village with the help of the NGO MDI Nepal but they were not operational they did not have stoves to cook with the gas.



Panbung, Raksirang rural municipality, Ward no. 8

The Panbung settlement, about 16.60 km away from Manahari Bazaar in the Mahendra Highway, has been recently connected by a dirt road. There are about 55 households in the village with a population of over 1000 – around half of them Chepangs and the other Tamangs. Most of the people here depend on agriculture and daily wage or migrant work to get food for 12 months. The households have not been connected with the national electricity and they have been using mini solar panels (20 watts each) installed from private sources as their source of energy. Around 63.64% households here still have to live without any or adequate electricity as solar panels work well only on sunny days. There is a possibility of generating hydro power from a stream nearby by setting up a Peltric set micro-hydropower plant.



Loja, Khairang, Raksirang rural municipality, Ward no. 9

Loja is a settlement in former Khairang Village Development Committee, which is 36 km away from Manahari bazaar in Mahendra Highway. The office of Ward no. 9 also lies in Khairang, where the local residents have run micro-hydro power projects for electricity. Loja is about half an hour drive away from Khairang, which is accessible by a newly constructed dirt road. The road is only usable in dry season and is planned to reach the adjoining



Dhading district. Due to its geographical remoteness and distance from the highway, it is not foreseen that the national grid will be extended to Loja in near future. There are around 30 households in Loja – all of them Chepang. Many of them use mini solar panels (20 Watt) to light up a bulb or two per house. A 3 kW micro-hydro has been operational in the nearby village that has been connected to a few households in Loja but the electricity supply is unstable.

Micro hydropower plant in the local Pankati khola (stream) can be the source of electricity for the households in Loja. According to a local Dal Bahadur Praja, despite a recent survey for a micro-hydropower

plant in Pankati khola, the local government or the villagers have not been able to set up a plant for the village.

4.2. POTENTIAL ENERGY SOURCES IN THE TARGET VILLAGES

Polaghari

Since Polaghari village is close to Manahari Bazaar, it would be the best if the village can be connected with the national grid. If the government can allocate some budget, it seems that electricity can be brought here easily through the national grid. Since many poles have already been installed in many places to the village with even wires connected in some of them, it is very likely that the village will be connected to the national grid soon. That is also the preferred option for the villagers. If electricity can be brought to this region, there is also possibility of tourism here.

As Polaghari village is facing south and not very high up the hills, solar energy could also be an alternative option for potential long-term use of the villagers. As most villagers are below the poverty line, the use of solar energy is also likely to ease the financial burden on them in terms of electricity bills. However, the village leaders did not favor the idea of a centralized solar plant and rather preferred additional solar panels for each household. Also, it was found that centralized solar plant in Nepal costs very high. Thus, the idea has been dismissed.

Rupachuri

Rupachuri is more spread than other villages and consists of a number of small settlements. Due to its close proximity from Polaghari, if national grid is extended up to Polaghari, it can also be expanded to Rupachuri with some additional budget. However, it seems that extending the national grid to all settlements of Rupachuri will still take a few years. A micro-hydropower plant is not financially feasible due to the distance between the settlements.

As Rupachuli is a large village with 600 households, distribution of additional solar panels per household is currently seen as an alternative for increasing the access to energy for the villagers. That will also require significant budget to serve all the households of the village.

Devitar

The office of Raksirang rural municipality, ward no. 8 lies in Devitar, which is 6.50 km away from Manahari bazaar in Mahendra Highway. Due to its proximity to the highway and the location of the ward office in this village, it is likely that Devitar will soon be connected to the national grid. A micro-hydropower plant can also be planned here as an alternative source of energy. It is seen that medium to small scale hydropower plant can be installed in the stream flowing through near the village.

Due to the fact that there are only 22 households in this Devitar village and the settlement is facing south, there is also potential of installing a solar power plant in the village. More preferably, if the biogas plants initiated in the village for three households could be materialized for actual use and even scaled up for all the households, it can significantly help the lives of the women in the village for cooking.

Panbung

There are at least 55 households in the main settlement of Panbung village, where only 20 households have access to solar power through mini solar panels of 20 watt. It is 16.60 km away from the nearest highway and is a remote hilly settlement that is not too spread. The village was considered the best suited among all the target villages for development of micro-hydropower from the nearby stream after the first mission. That was also confirmed by the micro-hydropower consultant commissioned under this pilot initiative. During the second mission to the village, a feasibility survey was conducted together with the villagers for setting up a Peltric Set micro-hydropower plant and it was found that such plant could easily generate up to 25 kW of electricity. However, later the local government representative of Raksirang rural municipality informed that the village was soon going to be connected with the national grid. As a result, the villagers have favored accessing electricity through the national grid rather than developing a community grid with a micro-hydropower plant.

Solar energy is not a preferred alternative option for energy for the village as the village is located at the top of a hill and there are problems of lightning and foggy/cloudy weather.

Loja/Khairang

With around 30 households spread in across a distance of 2 km, the Loja/Khairang settlement, due to its very remote location farthest away from the highway among all the target villages, is best suited for development of a micro-hydropower plant with a stream flowing nearby that runs all year long. However, the stream does not have great height of water flow, thus the capacity of the micro-hydropower plant will be low but sufficient for reliable energy supply to the households. It is unlikely that the village will be connected with the national grid in near future even though there are reported plans to extend the grid to Khairang where the Ward office is located in coming years. That is because even the road to Loja past Khairang is less reliable than up to Khairang although works are ongoing to connect the road to the adjoining district of Dhading albeit in a very slow pace.

Solar energy is not an option as the village is located on the side of a hill and surrounded by taller mountains with foggy/cloudy mornings.

5. BASELINE ASSESSMENT PROCESS AND WAY FORWARD

As mentioned above, this baseline assessment is based on three field visits/missions undertaken by CEMSOJ and HimRights representatives, including staff persons and consultants between January and November 2021. The first scoping mission under the initiative was carried out from 3-5 January to Polaghari and Rupachuri villages in Manahari rural municipality and Devitar and Panbung villages in Raksirang rural municipality. The aim was to further sharpen the project by collecting greater understanding of the target area and communities building on the preliminary assessment. The mission included meetings with local governments' representatives and other stakeholders and semi-structured interviews with leaders and members of the villages – which were also video recorded for future reference – to understand the situation of access to and need for energy in the villages. After the mission and subsequent discussions with micro-hydro and solar power developers, Polaghari and Panbung were selected as tentative sites for further feasibility study for development of renewable energy projects.

The following mission was thus more specifically aimed towards determining feasibility of micro-hydro or other small-scale renewable energy project in those Chepang villages. Accordingly, the second mission to

Panbung and Polaghari villages was carried out between 2nd and 6th April 2021 with a micro-hydropower expert consultant, particularly to determine the feasibility of a micro-hydropower project in Panbung as well as a central solar grid in Polaghari. However, towards the end of the mission, the Raksirang rural municipality Chair informed CEMSOJ/HimRights that both Panbung and Polaghari villages were soon going to be connected with the national grid under a rural electrification project supported by the Asian Development Bank (ADB). Thus, he advised that Khairang village in ward 9 of Raksirang rural municipality would be more appropriate location for the micro-hydropower project due to its highly remote location and no access of the villagers to adequate or any energy. Thus, a scoping visit was conducted to the village on the final day of the mission.

After the second mission, the third mission was significantly delayed due the second wave of Covid-19 pandemic in Nepal that caused nation-wide lockdown and was followed by heavy and long monsoon in Nepal (unusual from past years) that caused many landslides along the highway and roads to the villages. In the meantime, consultations with the Panbung villagers over the phone confirmed that the village was getting connected with the national grid. However, they sought some financial assistance for transportation of the equipment as the local authorities allegedly require contribution of the local villagers for transportation of the equipment. During the second mission, the Polaghari villagers had also conveyed their preference to get connected with the national grid than develop another community grid for a central solar power plant. As a result, it was decided that the initiative will proceed with developing micro-hydropower plant in Khairang village.

Accordingly, the micro-hydropower consultant drafted a feasibility study, which found the possibility of generating only 3 kW of electricity in the village. However, the draft feasibility study (annexed) was revised in consultation with Khairang village representative over the phone to accommodate their aspiration for a 5 kW micro-hydropower plant in the village, which was conditional that the necessary project features could be ascertained during a site visit. The third mission was only possible between 14th and 18th November. During the mission undertaken together with the micro-hydropower consultant and a supporting electrical works advisor, the draft study submitted on 10 July 2021 for 5 kW micro-hydropower plant in Khairang village was discussed with the village representatives. However, upon in-person inspection of the revised measurements provided by the villagers over the phone, the micro-hydropower consultant determined that the necessary head (height) for the water was not possible. Hence, **the final decision, also in consultation with the Raksirang rural municipality Chair, has been to jointly develop a 4 kW micro-hydropower plant in the village with co-financing under this pilot initiative as well as from the municipality and from the villagers in the form of labor and local materials.** Necessary procedures have been initiated to set up a users' committee that will represent the villagers and receive the financing at the time of finalization of this baseline assessment.

Further, discussions are ongoing with representatives of Panbung and Polaghari villages for designing sub-projects that can be supported under this pilot initiative aimed for socio-economic empowerment of specifically Chepang women in the villages with the use of newly gained access to energy.

6. CONCLUSION

Despite significant recent progress by Nepal's government in generation of hydropower in the country and expansion the national electricity grid to the villages for rural electrification, many rural areas, predominantly populated by indigenous communities, in the country still remain without any, adequate or reliable access to energy. That is evident in the situation of the target villages as described above in this

assessment, whereby the villagers are facing challenges in their lives and not able to achieve their utmost potential despite efforts by the government and non-governmental bodies to increase their access to energy even through alternative sources such as solar power and biogas. The expansion of national grid to all the Chepang and other settlements in those villages is still going to take years if not decades with current budgetary allocation and speed of work.

Local governments are making efforts to expand the national grid and promote solar panels for increasing access of Chepang communities to electricity, however the access to energy for all Chepangs still remain a challenge. At the same time, the weak financial status of the villagers might mean that they will not be able to afford the electricity provided through the national grid. Thus, development of renewable energy plants at the community levels will remain important at least in the near future although many villages seem to favour getting connected to the national grid at the earliest possible. While micro-hydropower has been highly preferred in at least one of the target villages for immediate electrification of the village, development of micro-hydropower plants in other villages could also be an option for local enterprises. That is however conditional upon further discussions with the concerned communities. Similarly, solar energy and biogas could also be the best alternatives for all the target villages for cooking and other purposes even though the villages are connected to the national grid as most of them are dependent on firewood for cooking. Biogas plants could be used for cooking fuel with support provided also for cow-rearing.

With the implementation of a micro-hydropower plant in one of the target villages under this pilot initiative and support for socio-economic empowerment of women in one or two other target villages through the use of newly gained access to national electric grid, there can be further scaling up of this initiative in consultations with the communities and as per their needs identified along the process.

7. ANNEX

1. *Pictures of the missions in the Google drive*
2. *Draft feasibility study for a 5 kW micro-hydropower plant in Loja, Khairang, Raksirang rural municipality*