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Mr. Bibek K. Mahato is a Bachelor's in Architecture student of Acme Engineering College, Kathmandu, Nepal. He has a strong interest in design and research, which has driven her to excel in her field. He is also rewarded in the college for different activities. Through these efforts, he has not only enriched his own knowledge but has also contributed to the intellectual and cultural growth of his community.

Revitalization of the historic settlement of Khokana, Lalitpur metropolitan city

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3.1 Introduction

Khokana, one of the fifty-two traditional settlements of the Kathmandu valley, is a tiny Newari settlement situated about 7-8 km south of Kathmandu. It lies at the altitude of 1320-1358 m and covers an area of 2.72 sq.km with the historic core covering around 0.20 sq. km only. Majority of the local inhabitants are of 'maharjan' community with relying on agriculture as their main occupation. It has huge chunk of land around the historic core as agriculture land. Other profession includes the oil pressing, spinning, knitting straw mat, cotton cloths and woolen carpets as subsidiary activities. The traditional morphology of Khokana represents a hierarchy of public, semi-public and private open spaces, which is typical of a Newari settlement. They are defined by built forms of different types and linked together by a hierarchy of network of streets. With increasing population and urbanization, the earlier unique features of the town along with profession of its inhabitants are gradually changing. The social system of living joint family is also transforming to nucleus

family. The earthquake of April 2015 destroyed 812 houses and additional 355 partially damaged in Khokana. In total, approximately 80% of the houses are no longer fit for human habitation. Even after nearly one decade of the earthquake, many individual private houses are yet to be rebuild. Those newly completed houses are quite different from the traditional houses in many aspects. Local people are migrating from the town for job and other economic opportunities. Development pressure in Bhaisepati and surrounding areas are further exerting pressure in this historic town. Its heritage value is gradually deteriorating in many ways. Against such a backdrop, this paper intends to explore its revitalization of the town not only to conserve its heritage values but also to strengthen its local economy. It has three specific objectives of understanding its history and cultural heritage values and finding the reasons of diminishing its cultural heritage; of exploring potential of pedestranization and walkability in the core area of the town and finally of proposing redevelopment of main spaces within the town.

3.2 History and cultural heritage of Khokana

Historically, it was located on one of the trade routes to the South (through the Bagmati Gorge). The word 'Khokana' is derived from the Newari word 'Khona' which means "tell by weeping". In 15th Century A.D., King Amar Malla named this village as "Jitapur"(Sanskrit word). Khokana has basic geometric form of Swastika (map of cosmic representation) with intersecting lines and squares representing the four quarters of a universe (Fig. 3.1). Rudrayanit timple was established at the centre and oil pressing mills at four conrners. The history shows this it was more systemized by king Amar Malla, who also established the Rudrayani temple. The cult figure of the main

deity Rudrayani was placed in the center of the two major streets crossing each other. Its placement is of significance in the religious hierarchy and the place in the town as a whole. Khokana has a dense and compact settlement pattern with a distinct arrangement of courtyards. Khokana was listed on the World Heritage Tentative List in 1996 as 'Khokana, the vernacular village and its mustard oil seed industrial heritage' under criteria (i), (iii), (iv) and (v).



Fig. 3.1 *Swastika shape of Khokana with Rudrayani temple at the centre and Oil mills at four corners*

In Khokana, majority of the population have adopted agriculture as their primary occupation, oil pressing, spinning, knitting straw mat, cotton cloths and woolen carpets as subsidiary activities (Fig. 3.2). In fact, it used to be an industrial-service town of the valley and was famous

for its mustard oil production in a cooperative model, serving to the whole valley and beyond.



Fig. 3.2 Traditional occupations of the inhabitants of Khokana

It also reveals an excellent example of the unique clustered Newari settlement, which is still able to retain its traditional image to some extent. It exhibits outstanding built and open spaces which is typical form of traditional settlement of Malla period (Fig. 3.3). The number of lavishly decorated brick houses with magnificently carved windows of typical Newar craftsmanship, the street paving, urban spaces in the form of squares, courtyards and efficient water collection system, drainage systems are signs of a prosperous past.

Streets and open spaces of irregular shape and size following local topography (constitute around 20-25% of total historic settlement areas) are not only 'path' for movement of pedestrians and goods, but they are more like a 'shared community spaces' having symbolic, ceremonial, social and political roles. As such spaces are equipped with community amenities (well, public tap, etc.) and religious structures (temple, square platform, public rest place, etc.), they have become the stages for interacting different age groups at different period of time and seasons: worshipping place for old people in the early morning; grain drying and cloths washing venue for housewives in the afternoon; playing area for children and watching and conversation place for adults in the evening.



Fig. 3.3 Major public open spaces and traditional houses vs modern buildings

Before the earthquake, the built form and open spaces were vibrant and lively. The front spaces of houses were being used for various activities: washing, cleaning and sun bathing including watching procession and religious dramas. They were also drying places for agriculture products. The residential buildings on both sides of the streets have unifying elements: brick exposed façade, wooden door and windows and sloped roofs (Fig. 3.4). There was not so much variation in roof lines or building height thereby resulting in the street spaces as 'enclosed outdoor spaces'.



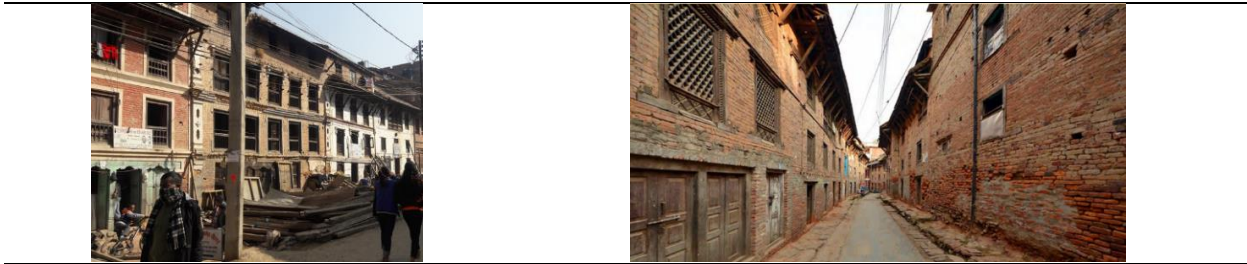


Fig. 3.4 Traditional architectural character of buildings in Khokana

The residents of this ancient settlement of Khokana have still retained the most of the festivals and ceremonies, rituals that have been extinct from many 'Newar' communities in the Kathmandu valley. They celebrate for every occasion and every changing season and some of them associated with dedication to nature and environment. Among thirty-two various festivals and rituals Shikali Jatra, Rudrayani Jatra, Kartik Jatra, Gaijatra, Gunpunhi, Khayasalahu, Bhimshen Puja, Paha-charhey, Sithi Nakha are the major festivals. In addition to that Khokana people also celebrate other festivals on various months (Fig. 3.5 and Table 3.1). They are the major attraction not only for domestic and international tourists, travelers, but also for historians and anthropologists.





Fig. 3.5 Intangible heritage of Khokana in the celebration of various festivals and performance of rituals

Table 3.1 Celebration of various festival on different months in Khokana

<i>Historic towns</i>	<i>Festival</i>	<i>Time of celebration</i>
Khokana	Gathan muga	Mid July – Mid August
	Jhasu nakha	July - August
	Gun Punhi	Full moon of the month of Shrawan
	Dhan Jya nakha	1 st day of waning moon in Sjhrawan
	Babu ko much herne (Father's day)	August
	Gunla paru Bhoay	Bhadra sukla pratipada
	Jugah charhey	August
	Chatha nakha	August
	Yenyapunchi	September
	Shikali jatra	Ashwin sukla pratipada to Nawami (1 st day to the 9 th day of the period of the waxing moon in Ashwin)
	Chibah punhi	October (Kartik Purnima)
	Jatha punchi	November (Kartik sukla Purnima)
	De puja	Januray (Paush Krishna paksha ausi)
	Sree panchami	Magh sukla pakshya panchami
	Sila chare	March (Falgun)

Khaisalhu	1st Baishakh (April)
Bhindyo puja	2nd Bashakh

Water bodies available in different forms are not only community infrastructure but they are also part and partial of cultural heritage. They have both physical and symbolic meanings. Khokana still consists of many ponds: Kha pukhu, Pal pukhu, Ga: pukhu, De: pukhu, Kutu pukhu and Dhokasi pukhu. Kutu pukhu is a pond to wash cloths of the goddess Rudrayanee, the main deity of Khokana after the Shikali jatra (festival). This pond is also used for purifying rites after performance of death. Culturally, De pukhu is the most important pond in Khokana. The famous goat festival is performed during Gaijatra festival. The festival is held with a swimming competition amongst the youths. Similarly, different 'Dafas' (the Newari orchestra bands) chants the hymns in their respective rest houses (patis).

However, the 25th April 2015 earthquake destroyed most of the houses in Khokana (Fig.3.6). The street and pedestrian lanes in most cases were blocked due to debris of the collapsed houses. One can see the debris consisting of mud, brick and woods around the town. Some houses were completely collapsed and other were partially with lower floors standing. One can see the earthquake victims collecting their household goods. They were in the state of confusion, as they did not know where to go.





Fig. 3.6 Destruction of Khokana in 2015 April earthquake

Many issues and problems have emerged after destruction of traditional houses in Khokana. Haphazard construction of houses in the peripheral agricultural land combined with confusion on rebuilding traditional houses in the historic core area is posing high risk on its cultural heritage values. Such urban sprawl will not only consume agriculture lands but the infrastructure cost will also be high in the scattered settlement. The earthquake victims are selling their agricultural lands in order to rebuild their houses. Some of them are also thinking to sell their houses. As local community is directly linked with the intangible heritages, displacement of those households will definitely affect in continuing festivals, rituals and other religious and cultural activities.

3.3 Potential of pedestranization and walkability

There are different meanings attached with pedestranization. The simple meaning is 'the removal of vehicular traffic from city streets.' It is to restrict vehicle access to a street or area for exclusive use of pedestrian. Walkability is the quality of waling conditions and the degree to which the built environment encourages walking by providing pedestrians a safe, comfortable, convenient and appealing travel corridor. It builds understanding of oneself, of others, and of the encompassing environment. It constructs; it adds; it allows one to take in bits of information and interactions from the environment

around and compose a more complete picture of what the world is, what the world contains, and what your place is within the context of that world. It can be conceptualized as pilgrimage, as a daily routine, as contemplation, as regeneration, and even as a state of well-being and it serves a multiplicity of purposes in how human beings process and engage the world around them. Walking is a healthy means of transportation. It does not only contribute to social life by increasing opportunities for social interaction and learning about urban life, but it also helps to create healthy and livable communities. Walkability is the foundation for the sustainable city; without it, meaningful resource conservation will not be possible. Like bicycling, walking is a 'green' mode of transport that not only reduces congestion, but also has low environmental impact, conserving energy without air and noise pollution. Pedestrian environment on the streets can be improved through four concepts: living streets, pedestrian precincts, shared zones and sharing the main streets. The concept of living street is to balance the needs of residents, businesses, pedestrian and cyclists with cars for better quality of life and a greater range of community and street activities.

Khokana is qualified for pedestranization and walkability by many ways for tourism promotion and hence enhancing local economy as well as for conservation of its cultural heritages. Street in Khokana are of different width and hierarchy (Fig. 3.7). They range from 2 m to 7m wide. At present, vehicular movement is seen on 6m and 7m wide streets and passing through the core area of Khokana via Rudrayani temple. There is a bus park on the eastern periphery of the historic town. Most of these streets are stone paved and some of them especially a narrow one are of brick pavement.

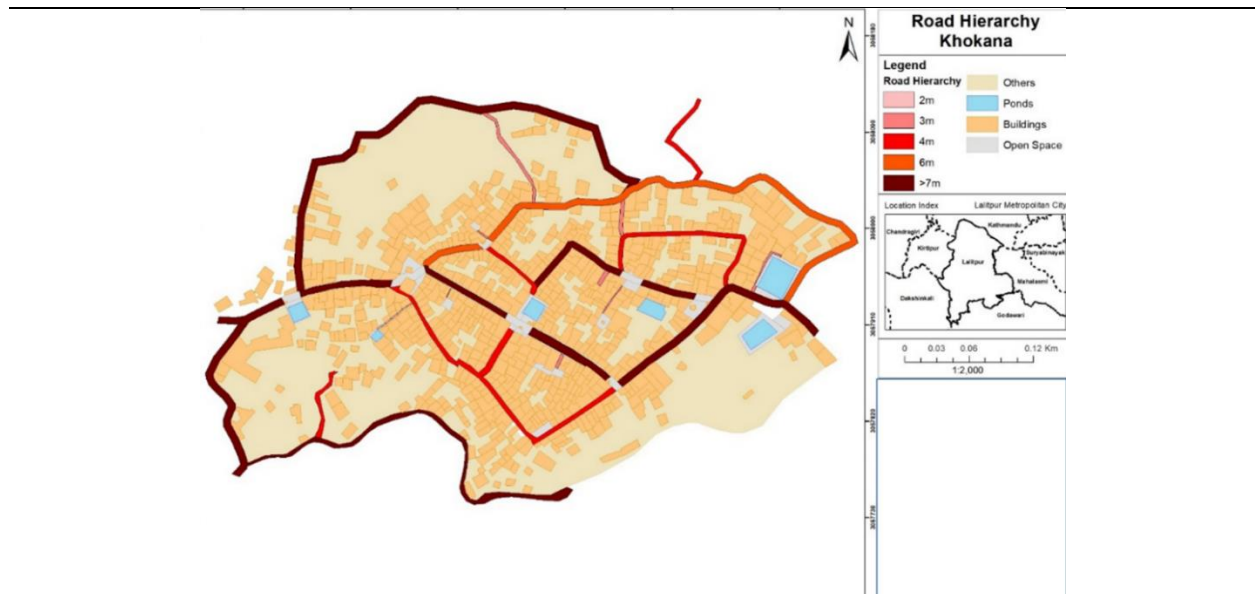


Fig. 3.7 Street hierarchy in Khokana

The main street is wide with provision of footpath on both sides. Other streets are also not narrow compared to other historic towns of the valley. Street width to building ratio within range of 1:2 to 1:3, unifying elements on building architecture – brick exposed façade, vertical oriented wooden windows and sloped roof with little variation on rooflines – have contributed to the formation of 'sense of enclosure' and 'human scale' for pedestrians. Visitors feel mystery, surprise, excitement and anticipation due to sequential spatial event and singular composition. These types of streets are the most suitable for pedestrianization and walkability (Fig. 3.8).





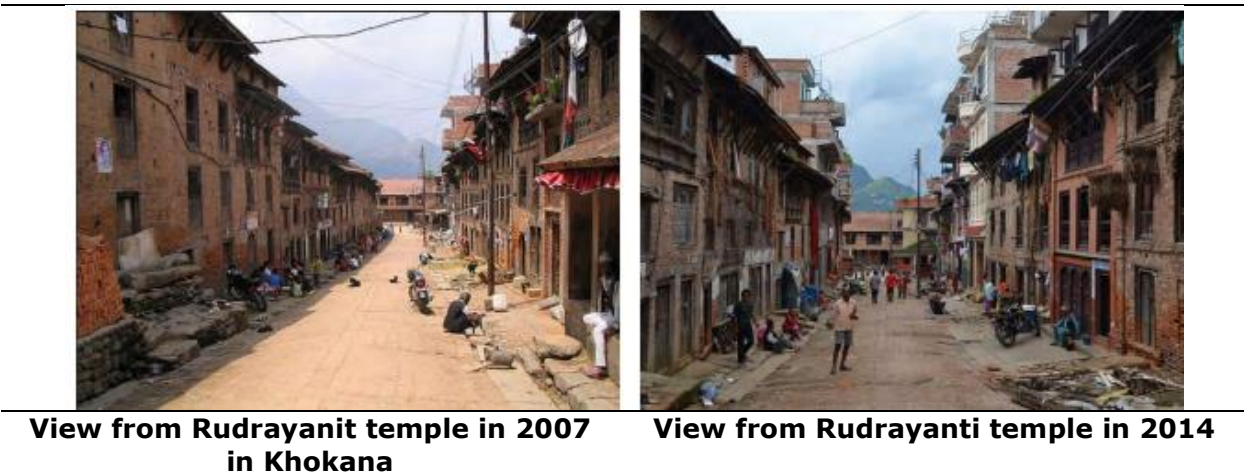
Fig. 3.8 Street types suitable for pedestrianization and walkability

One can find minimum changes on building facades before the April 2015 earthquake. Some of the newly built houses do fit into the surrounding houses in terms of plinth level, building façade and detailing including building height (Fig. 3.9).



Views toward Rudrayani temple in 1990s

View towards Rudrayani temple in 2005



View from Rudrayanit temple in 2007 in Khokana

View from Rudrayanti temple in 2014

Fig. 3.9 Minimum changes on building facades before the earthquake of April 2015

However, newly built houses after the earthquake have caused numerous negative consequences. On the site of the earlier single house, two or three tiny houses were built due to property division among sons. This together with the vertical division of buildings and addition of floor, renovation or new construction on part of the divided houses all have destroyed the earlier unifying characters, scale and proportion and volumetric definition of the streets and open spaces. Division of properties and multiple house construction has significantly reduced the habitable space but increased circulation spaces. As a result, each household has gone vertical extension even against the prevailing building regulations.

Most of the vehicles are parked on the footpath and road side, as there is no dedicated parking space. Significant number of shop owners in these settlements do come from outside. As they only rent the commercial spaces and not for vehicle parking, they are forced to leave their rides on the road side.

The economy of Khokana used to base on agriculture, as more than 95% of the total population were engaged in agriculture in the past. They also used to keep poultry but not chicken and eggs because of their typical cultural belief. Animal husbandry is limited to sheep, goat, cow, buffalo, pigs and ducks. Some members have business or shop such as small restaurants, teach shop, retail shop, cloth, cosmetic shop, meat shop etc. However, this trend is changing faster especially after the earthquake. Many of them have shifted to new business, leaving agriculture. Some of them have even rented their ground floor for other. There is a potential of development of cottage

industries and traditional profession for attraction of tourist and visitors in Khokana.

3.4 Revitalization plan with detailing

The proposed revitalization plan comprises of three key elements (Fig. 3.10). First, all the streets and pedestrian lanes are pedestrianized with allowing loading and unloading either at night or in the early morning. The local parking areas are proposed at three different peripheral areas before entering into the historic core area. Moreover, the existing vehicular route passing through the centre of the Khokana is proposed to use the northern side by-pass road which is to be widened and improved for vehicular movement. All the inner courtyards along with linkages are suggested to improve through pavement of stone and bricks so that the visitors and tourist can go around to explore not only the major temple and monument but also the residential neighbourhoods and the daily activities of inhabitants over there. Second, to attract the visitors, those pedestrian streets and courtyards are made liveliness through proposing various traditional activities, which will also enhance the local economy. For instance, straw mat weaving, wool weaving and carpet weaving activities are proposed on the ground floor on houses along the streets and courtyards. Third numerous public open spaces and water bodies are renovated and revitalized considering the vernacular architectural features of Khokana. In addition to protecting public spaces, the detailing of such spaces will also have street furniture, dust bin and above all solar lit lighting with mobile charging facilities to attract the youth and visitors.

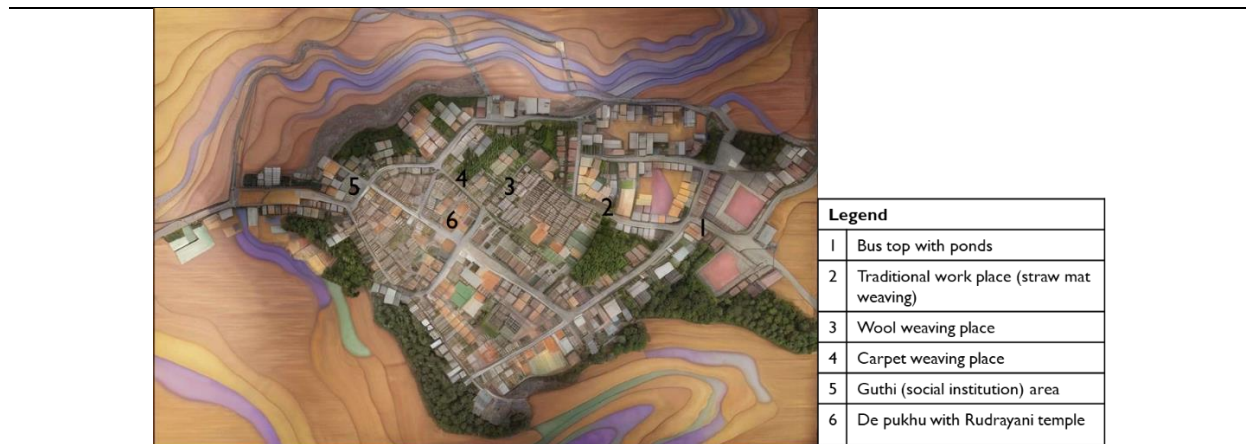


Fig. 3. 10 Proposed redevelopment plan with numerous features for Khokana

Kha pukhu (pond) anad Pala pukhu revitalization plans

Kha Pukhu, also known as the 'main pond, is a significant cultural and historical feature of Khokana. The pond plays a crucial role in the social, cultural, and environmental aspects of the community. Kha Pukhu serves as a central gathering place for the residents of Khokana. The proposed design idea consists of cleaning of pond water, creating community spaces around the ponds and linking them to the ground floor of the surrounding private buildings (Fig. 3.11a). The ground floor of those houses are suggested to dedicate for visitors' amenities such as restaurants and coffee shops, souvenir shops and so on.

Pala Pukhu (lotus pond) is another significant water body in Khokana, playing an important role in the town's cultural, social, and environmental life. At present, this pond is hardly used by local people and visitors. The proposed design solution includes landscaping around the pond, creating public spaces and street furniture (Fig. 3.11b). Lightening provision is also proposed so that it can be used during night too. Development of stepping not only creates spaces for sitting but it also acts as a smooth transition space between the water

body and surrounding public spaces. It also ensures full view of water bodies.



(a) Redvitalization of Kha pukhu near bus stop in Khokana



(b) Redevelopment of Pala pukhu in Khokana

Fig. 3.11 Proposed pond redevelopment plans

Workshop locations

Still some local people have been engaged in traditional professions. Among them, some household especially women living around the 'Gabbu' streets, the main streets of Khokana are being engaged in wool weaving activities. They work at their homes, where a part of the living space is dedicated for weaving. Such activities carried out at old houses without adequate light and ventilation is not productive. Hence, weaving activities are proposed along and round Gabbu streets by remodeling the façade of the existing houses and rebuilding the earthquake damaged buildings (Fig. 3.12a).

Even ground floor of the buildings around the courtyard is encouraged for workshop of wool weaving either by remodeling the building or through new construction of damaged houses (Fig. 3.12b). The courtyard will be improved with street furniture and pavement so that the local residents and visitors can take rest and watch the wool weaving activities.



(a) Proposed workshop activities at and around Gabbu street



(b) Proposed weaving activities on the ground floor of houses around the courtyard



(c) Proposed mat (sukul) weaving activities along and around Ta:shya street



(d) Carpet weaving facility along and around 'Nhyabu tancha' street

Fig. 3.12 Weaving activities along different streets and around them in Khokana

'Ta:shya' is second main street of traditional workplace which is famous for the mat (sukul) weaving. Most of the building on both sides of **'Ta:shya'** street are mixed use with ground floor dedicated for shops and upper floor for residential uses. One of the building which serves as mat weaving activity before the April 2015 earthquake is still in dilapidated condition. It is proposed to have mat weaving workshop on the building along and around this street. Mat weaving activities are proposed on houses along and around Ta:shy street (Fig. 3.12c). Carpet weaving facilities are proposed on houses along and around **'Nhyabu tancha'** street (Fig. 3.12d). Most of the houses along

this street are of modern type with reinforced cement concrete (RCC) frame structure.

Kwela-chche courtyard redevelopment

Kwelachche is one of the important courtyards in Khokana. At present, there are some modern houses around the courtyard, which do not fit with traditional architectural character. Also, the pavement of the courtyard and access path is not uniform. It has been proposed to pave the access street with brick and the whole courtyard with stone (Fig. 3.13). Moreover, the modern houses around the courtyard will be remodeled especially the façade one. The building on the ground floor of these houses will have new public related activities such as art gallery. Also, the courtyard space is proposed for public activities associated with present day needs such as weekly or monthly local vegetable market, cultural performance, social gathering on awareness program and so on.





Fig. 3.13 Proposed redevelopment of Kwelachche courtyard

Rudrayani area remodeling

The famous Rudrayani temple and public rest house (pati) in front of the temple were renovated and rebuilt recently, as both of them were damaged by April 2015 earthquake. However, public spaces around them and surrounding private houses are yet to be remodeled. Hence, it is proposed to have stone pavement along with treatment of the facades of the private houses to make them compatible with the local context as well as traditional architectural character of Khokana (Fig, 3.14).



Fig. 3.14 Remodeling of Rudrayani temple area

Nayojho street redevelopment plan

Nayojho street in Khokana is the most important ceremonial street as it connects the Rudrayani temple to the key public square with community buildings. Numerous religious and ritual take place on this square during different festivals. At present, some buildings on both sides of the streets were already rebuilt with incompatible form and detailing. Those buildings especially the façade treatment needs remodeling; the street needs stone pavement with pedestrian footpath on both sides (Fig. 3.15). New solar lighting is also proposed. The ground floor of houses on both sides should be active and for commercial or public uses so that the visitors and passerby can enjoy while walking on the streets. Urban design and architectural guidelines and appropriate level of incentive packages have become urgent for ensuring new construction, following the traditional norms and characters.





(c) Proposed façade treatment

Fig. 3.15 Nayojho street redevelopment plan
