Implementability Of Municipal Transport Master Plan Of Bandipur Inner Ring Road, Tanahun, Nepal

Anjay Kumar Mishra, Bijaya Rana Magar

Abstract: The overall objective of this study is to assess the implementability of Municipal Transport Master Plan with the assessment of Bandipur Inner Ring Road. Various literatures were reviewed to assess the planning, adopted approaches and implementability related with the transportation master plan. Data were collected through Questionnaire survey, Interviews and Focus Group Discussions. Technical Survey was also conducted for assessing compliance level of technical parameters of ring road. Traffic Count Survey and Household Survey were carried out to analyze the traffic situation of ring road. Possible budget allocation and possible budget requirement for ring road were calculated for five years (FY 2016/17 to FY 2020/21) and determined the possible financial gap. Results were assessed with the indicators of implementability (rational, legitimate, feasible, politically viable and socially acceptable). The result showed that still 2.64km section of ring road is earthen where total length of road is 3.9km. Just 500m lined and 460m dry side drain is constructed throughout the ring road. It complies 70.59% technical parameters of Village Road Standards and only 6.25% of Urban Road Standards but 510 vehicles including motorcycle (567 PCU) run on this road per day from two sides. The road is found overloaded. MTMP report has just prepared in municipality and 93% of total respondents has accepted that MTMP is prepared adopting Participatory and Bottom Up planning Approach. MTMP is implementable by generating internal revenue.

Index Terms: Transport condition, Planning Process, Resource gap

1 INTRODUCTION

1.1 Background

Road sector is one of the most essential and important sectors for the development of physical infrastructures in Nepal [1]. There are two major government bodies working in this sector in Nepal, i.e. Department of Road (DoR), under Ministry of Physical Infrastructure and Transport (MPIT), which works mainly on strategic roads and other is Department of Local Infrastructure Development and Agricultural Road (DoLIDAR), under Ministry of Federal Affairs and Local Development (MoFALD), which works on local rural and semi urban roads. Besides that, local bodies such as District Coordination Committees (DCCs) and municipalities are also constructing district and urban roads annually under their own technical section’s support and technical support provided by MoFALD [2]. Local Self-Governance Act (LSGA,1999) provisions formulation of local development plan according to need-based, bottom-up and participatory approach. Local Bodies prepare Periodic Plans for the development of various areas [2]. Municipal Transport Master Plan (MTMP) is one of the integrated planning tools for road sector planning in municipalities. Around 29,000 km of roads are constructed in different municipalities. Unfortunately, high percentiles of municipal roads are under poor condition and poor operation due to lack of proper planning and investment and partly due to inadequate maintenance [3]. MoFALD initiated to prepare proper guidelines for MTMP and allocated budget to prepare it for 72 new municipalities in 2014. MTMP is prepared for every five years and provides a prioritized list of Municipal Roads. Each year the planned interventions are further detailed in the Annual Work Program of the municipality. The prioritization of the municipal roads are mainly based on the linkage providing service to large settlement areas/population, linkage providing service to areas with high potential for agriculture, horticulture, livestock production, linkage providing service to existing and potential commercial and business center, market sites, tourist areas, health and education centers and offices, linkage providing service to the potential future development site, industrial areas and town, linkage providing service to the areas inhabited by backward and poor ethnic groups, historical and religious sites [3]. MTMP is the outcome of policy analysis stream rather than political policy making stream. It has just prepared but not yet implemented. So, it requires to assess its implementability. There are various indicators to assess the implementability of any policy. Rational, Legitimate, Feasible, Politically Viable and Socially Acceptable are taken as indicators for the implementability assessment of MTMP. These all indicators are compiled and analyzed with the results of research and assessed whether MTMP is implementable or not [4].

1.2 Statement of the Problem

Municipalities are facing different problems due to the lack of proper transportation planning. They are getting problems in Right of Way (RoW) and Set Back settings, building and other infrastructure construction drawing approval and expansion of various physical infrastructures such as drain, solar light, water supply system, and footpaths. Social issues are also emerged. People are deprived from getting easy services due to scattered and haphazard physical infrastructure construction. After the destructive earthquake in Nepal in 2015, people realized that many municipal roads are even unable to pass ambulances and firefighting vehicles [5]. People want the integrated facilities where all the required services can be taken easily and effectively. It needs a proper tie up between the other service areas and the road networks. But the existing municipal roads are failed to tie up/integrate the other facility areas. These all problems can be minimized by applying proper transportation planning in municipality. MTMP is one of the best planning tools for it.

1.3 Research Objectives

The overall objective of the study is to assess the Implementability of Municipal Transport Master Plan with the assessment of Bandipur Inner Ring Road (Mohariya-Tudikhel-Tindhara-Bhanu Higher Secondary School Road). Implementability of this road is evaluated by assessing the existing transportation conditions of road and adopted road planning process, the major problems even after
implementation of District Transport Master Plan, existing and potential services, and visions surrounding ring road and major developments after appropriate implementation of Municipal Transport Master Plan.

1.4 Limitation of the Study:
This study was carried out taking only a Class A road of the municipality and the outcomes were assumed to represent the whole municipality. There were no study about detail land use planning and policy. Traffic volume studies were carried out only in Thursday (26th January, 2017) and Saturday (28th January, 2017) from 8AM to 6PM and outcomes were assumed to represent the same results in other normal and vacation days. Other indicators of implementability such as environmental sustainability, economic viability were not taken during research.

2 LITERATURE REVIEW
Literatures were reviewed related with the transportation and other planning and approaches to get the ideas on implementability assessment of MTMP. Some of them are:

2.1 Participatory and Bottom up Planning Approach in Nepal
Local Self Governance Act, 1999 (LSGA) & Local Self Governance Rules, 2000 (LSGR) has made local bodies responsible for local level planning. The local bodies (DCCs and Municipalities) are totally responsible for planning and implementing local level projects. These bodies shall have to formulate a periodic plan for at least five years. Participatory and Bottom Up Approach is adopted for planning process [6]. They prepare Municipal Development Plan (MDP) annually on the basis of periodic plan. The municipalities are also encouraged to prepare a vision plan (Strategic Development Plan) of the concerned municipality in a participatory manner. The strategic development plan basically defines 20 year development goals in different sectors for the district and is essentially a Perspective Plan [7]. Municipalities also follow the 14 steps planning procedure as these steps are widely used in other Central Government Ministries, which are then discussed in the National Planning Commission [7]

2.2 District Transport Master Plan
In District Transport Master Plan preparation guideline 2010, modified in 2012, transport planning process was harmonized in line with national transport policy of bringing the population within 2 hour walking distance in Terai districts, 4 hours in hilly districts and 6 hours in mountainous districts. Rural roads were categorized as District Road Class "A" and District Road Class "B". Later, a common understanding was made that DTMP should include only DRCN. The DRCN is defined as the minimum network of rural roads that provides access to all VDC headquarters (administrative buildings or nearest economic centre) and links them (either directly or indirectly) with the district headquarters and the strategic road network [8]. By bringing the DRCN to a maintainable and all-weather standard, year-round access to all VDCs can be ensured. With the identification of the DRCN, all other roads that do not belong to the DRCN, the strategic road network or the urban road network (except for large urban areas such as Kathmandu, Lalitpur and Bhaktapur), are classified and coded as village roads and fall under the responsibility of the VDCs. Thus, focusing on DRCN, DTMP preparation guideline was modified in 2012 [9].

2.3 Municipal Transport Master Plan
Municipal Transport Master Plan (MTMP) is one of the recently applied transport planning tools in Nepal. The guideline was prepared and approved by MoFALD in 2013 taking other two major guidelines as references and they were DTMP guidelines 2012 and Nepal Urban Road Standard (NURS) 2014. According to MTMP guideline, the master plan of municipal roads should be prepared for action after preparing and analyzing Municipality Inventory Map of Road Network
(MIM), Indicative Development Potential Map (IDPM), and Perspective Plan of transport service, facilities & linkages and Municipal Transport Perspective Plan (MTPP). MTMP is the reflection of existing transport infrastructure situation and future potential in relation with the resources and services available in the municipality. MTMP is prepared for five years and should be updated at every five years. MTMP essentially covers the rural, semi urban and urban transport infrastructures, which are funded, supported and implemented by municipalities. It also tentatively covers the existing and potential areas of market centers, tourism, service centers, agriculture and agro-business areas, town development and land use pattern. MTMP includes priorities of roads as Class A road (Main Collector Road), Class B road (Other Collector Road), Class C road (Main Tole Road) and Class D road (Other Road) having new construction, upgrading and maintenance, along with budget required for them. MTMP preparation strongly advocates meaningful participation of all key stakeholders in the planning process to make MTMP more acceptable and ensure ownership. The preparation process goes through a series of techno-political activities that include consultation workshops and interactive meetings with stakeholders to increase participation of all stakeholders. These activities include municipal level workshop, Municipality Road Coordination Committee (MRCC) meetings and cluster of Ward level workshops for collecting demands of required road, formal/informal meeting, focus group discussions and transit walk. At every stage, careful consideration is given to ensure access and wider participation of representatives from line agencies, major political parties, social leaders, women organizations, Dalit and Janjati coordination committees, differently able people, chamber of commerce, transportation association. The approach is to work towards consensus building [10].

2.4 Municipal Transport Master Plan of Bandipur Municipality

Municipal Transport Master Plan of Bandipur Municipality is prepared in October, 2015 and approved in August, 2016. Municipal roads are classified into four classes in MTMP excluding Strategic roads and District Core Road Networks. According to report, it is found that three major National Highway/Feeder Roads including Prithivi Highway passing through the municipality, 54.48km of roads are constructed and operated by DDC, Tanahun as District Core Road Networks. Besides that, 99.49km of roads are under municipality where 0.8km is metaled, 0.54km is graved and 98.15km is in earthen condition. Bandipur municipality has set and approved the scoring criteria for classifying and prioritizing the roads of municipality but it is found that the scoring criteria is deviated from the ToR of preparation of MTMP. However, there are 5 roads in Class A having total length 54.59km and right of way 16m or more. Likewise, there are 12 roads in Class B having total length 29.5km and right of way 10m, 9 roads in Class C having total length 15.4km and right of way 8m and 15 roads in Class D having right of way 6m. The selected road for the research is in Class A, third rank. It is found that budgeting of municipal road has calculated starting from total cost required for construction and upgrading of interventions to be provided for road classes in the perspective of 20 years. Total budget 30% is allocated for the maintenance of the roads annually and remaining 70% budget is allocated for Class A, B, C and D roads as 40%, 30%, 20% and 10% respectively. The cost is divided into twenty years on the assumption of capacity enhancement of the municipality by 10% each year. It is also found the approximate total budget for the twenty years for the roads of all classes is NRs.1,717,300,000 [11].

2.5 Implementability

Municipal Transport Master Plan guideline is prepared based on DTMP guidelines. Both guidelines are prepared for the development of local road networks in local bodies. All 75 districts have already prepared DTMP and most of the districts have implemented it. Many districts have also revised DTMP guideline. Local institutes faced many problems during preparation and implementation of DTMP. The roads were taken and prioritized from already listed roads in DDCs rather than accumulating demand forms. Prioritization and ranking were carried out mainly based on total population served, market situations corresponding to its total length neglecting other major indicators such as service areas, tourist, cultural and historical aspect, agricultural services and potentialities. In some districts, there were problems of technical manpower scarcity, weak institution and coordination, negative motivation of stakeholders [13].MTMP is an outcome of Policy Analysis Stream rather than Political Policy making Stream. There are many approaches to prepare these types of plan such as Process Approach, Output/Outcome Approach, and Strategic Policy making Approach. System model, Institutional model and Functional process model are the models to carry out the Process Approach. Likewise, Incrementalist model and Rationalist model are the models to carry out Output/Outcome Approach. Furthermore, Entrepreneur model, Adaptive model and Strategic Planning model are the models to carry out Strategic Policy making model [4]. In Policy Analysis Stream, there are assessment of implementability, performance evaluation, impact and effectiveness and strategic evaluation. Though MTMP has just prepared but still not implemented, there should be assessment of implementability. There are several indicators to analyze whether the policy is implementable or not. Rational, Legitimate, Feasible, Politically viable and socially acceptable are taken as indicators for the assessment of implementability of MTMP [4].

3 METHODOLOGY

This chapter discusses the methodology used in this research. Problems were identified and research objectives were set based on problems. Various literatures were reviewed related with the research.

3.1 Study Area and Population

The research was focused in Bandipur Inner Ring Road which passes through ward no. 3, 4 and 6 of Bandipur municipality. Data were collected from Ministry of Federal Affairs and Local Development, Office of Bandipur Municipality, District Technical Office, Tanahun, Former District Development Committee, Tanahun, local political representatives, stakeholders, business persons and beneficiaries of ward no. 3, 4 and 6 of Bandipur municipality.

3.2 Data Collection

Primary data were collected through questionnaire survey, interviews, Focus Group Discussions and Technical survey. Mixed types of questions were used to gather information from the respondents. Both formal and informal interviews were...
taken. FGDs were conducted in four places. Road structures were measured using tape and abney level. Traffic volume survey were carried out in Thursday (26th January, 2017) and Saturday (28th January, 2017) from 8AM to 6PM. Vehicle ownership and trip mode surveys were conducted from 100 households as samples. Sample size was calculated using following formula:

\[
S.E. = \sqrt{\frac{PQ}{n}} \times \sqrt{\frac{N-n}{N-1}}
\]

Where,

- \(S.E.\) = Standard Error=5%
- \(P\) =Population proportion of success = 0.5
- \(Q\) =Population proportion of failure = 0.5
- \(N\) = Population size = 1420 households
- \(n\) =Sample size

Secondary data were collected from MoFALD, Department of roads, MTMP, annual publications, council book and progress reports of Bandipur Municipality and also from DTMP and annual reports of District Coordination Committee of Tanahun.

### 3.3 Data Processing and Analysis

The processing was carried out comprising editing, classifying and tabulation of collected data for easy analysis. The quantitative data from surveys and interviews were entered in Microsoft Excel. Respondents were analyzed in percentage. Qualitative information related with MTMP was analyzed in logical way. Paired t-test was also carried out to test the probable effect of MTMP to the shopkeepers and hotel/lodge owners from the formula.

\[
t = \frac{d'}{(Sd/\sqrt{n})}
\]

Where,

- \(Sd\) = \(\sqrt{\sum (d-d')^2/(n-1)}\)
- \(d'\) = \(\sum d/n\)

### 4 RESULTS AND DISCUSSION

This part consists of results and discussion after processing and analyzing the data which were obtained from primary and secondary sources.

#### 4.1(a) Existing Transportation Conditions

The overall length of the ring road was found 3.9km (800m metalized, 460m graveled and rest earthen) and the width of road was found 4m and 4.2m in some sections. 500m lined side drain was constructed in metalized section and dry unlined (Kachha) drain in graveled section but found unmanaged. There were no side drains in earthen section. There were lacks of retaining structures (retaining walls, gabion walls) in the required places. Some horizontal curves were found sharp. Earthen part of the road was found so dusty and damaged by tractor wheels. 70.59% of technical parameters (17 parameters were taken [14]) of Village Core Road Network (VRCN) were fulfilled in this road which means road was constructed following the standards of Nepal Rural Road Standard 2014 but still couldn't achieve all the parameters of Village Road Core Network. Likewise only 6.25% (16 parameters were taken [15]) of Urban Road were fulfilled. That means, the ring road should be widely upgraded to meet the standard of Urban Road. Traffic volume was found 510 (567 PCU) from both sides including motorcycle where design capacity of VRCN is 100 vehicles per day. Household survey also revealed that 64 households have any kind of personal vehicles where among them 82% have motorcycle. 70% of them use any kind of vehicles as trip mode. The condition of road and its structures, overloaded vehicle movement on the road, transformation of villagers’ behavior into modernization in the context of using transportation modes shows the rational and legitimate of MTMP in municipality.

#### 4.1(b) Adopted Planning Process and People’s Participation

View of the respondents about the approach of MTMP preparation was taken through questionnaire survey between local political leaders and staff of municipality. 93% of the total respondents answered that Participatory and Bottom up Planning Approach was adopted during preparation of MTMP. This result clearly shows that municipality, political representatives, stakeholders and beneficiaries were strongly involved in MTMP preparation. Researcher was also observed the demand forms and meeting minutes. Direct involvements of local political representatives, stakeholders and beneficiaries show that MTMP is politically viable and socially acceptable for implementation.

#### 4.2 Present Transportation Related Problems

Questionnaire survey and interviews were carried out to local political representatives and officials of municipality to find out the present problems in ring road even after the implementation of DTMP. FGDs also gave information about the problems. Overload traffic movement, lack of side drain in entire road, dusty earthen surface, insufficient retaining structures, no footpaths, lay byes and traffic signals, lack of proper bus park, haphazard settlement and development surrounding ring road were found the present major transportation related problems. These presently facing problems show the rational/needed and legitimate of MTMP while assessing its implementability.

#### 4.3 Implementability of Municipal Transport Master Plan

This sub chapter describes about the development of MTMP, the present service areas provided by Ring road, Potentialities and Visions surrounding it and the development sectors after proper implementation of MTMP.

##### 4.3.1 Development of Municipal Transport Master Plan

Data were collected through questionnaire survey and interviews of MoFALD officials. According to them; the concept of MTMP was initiated in MoFALD after proclamation of 72 new municipalities in Nepal in 2014. The major purpose of MTMP was found to integrate/tie up various development areas (health, education, communication, tourism) with the municipal road networks. The other purposes of MTMP was found fixing the existing and potential major zone (service areas, town, agriculture areas, business areas, and religious and tourism areas) of the municipality, finalization of Visionary City Development Plan, preparation of Municipal Road Inventory Map, road demand collection, prioritization and digitization of roads and overall well organized, well managed and well functioned road network development in municipalities. The concept and features of MTMP, set by MoFALD, shows that MTMP is feasible for implementation.
4.3.2 Present Service Areas/Scenarios
From the research, it was seen that this road provides the linkage with various commercial and local markets/business centers of municipality. Tudikhel, Gadhi, Tindhara, Bangrepani were found the existing local markets where Mohariya, Old Bandipur Bazaar, Bhaisekhar were found the major markets. It was also found that several hotels, resorts, guest houses such as Bandipur Resort, Old Inn resort, Hotel GaunGhar, Bandipur Guest House, Chandani tolle homestay are occurred surrounding and inside ring road. It was also found that this road is linked with many service centers and organizations of municipality such as RatnaRajya School, Bhanu Higher Secondary School, Notre Dame School, Dil Primary School, Believers School, City Development Bank, AmaSamuhaBachat, Bandipur Hospital, District Ayurved Health Post, Nepal Telecom, Radio Bandipur, SahidSmarakBatika and Padam Library. Furthermore, it was seen that Thanaimai, Tudikhel, Tindhara, Bangrepani, Koldhara, Bhimsenthan, Raniban, Siddha Gufa, Gadhi, Ganesh Mandir, BindabasinMandir, KhadgaimaiMandir, ChimeshworiDanda, Old Banipur Bazaar, BandipurUkali, Community forests, Silthok, SarangGhat, Muchhuk, Malikia, Bharyang Di, ChhatreDhunga, and Sambil are the major tourist destinations which are served by this road. This road provides services to the ethnic communities of Bandipur such as Newari, Magar, Gurung (Migrant), Brahmin and Dalit communities. This road is linked with Dumre-Bandipur feeder road, Bandipur-Bahunbanjyang-Dharapani-Bagarkhola road and Bandipur-Parche-Dandakhola-Khaharetar road. This direct linkage with other linkages really helps the people of municipality to go from one place to other easily. This road is used to transport agriculture and horticulture products of municipality. Green vegetables, Maize, Wheat, Lintel, Oilseed, Goat, Chicken, and Buffalo are brought from Jhabri, Asphate, Keshabtar, Seratar via this road. Orange, Garlic, Ginger, Kurilo, Tejpatta and Cinnamon are transported from Baralhok, Silthok using this road. This road serves to the Silk farm, Goat farm and Green Vegetables Production areas. These all abovementioned data showed that MTMP is rational, legitimate and socially acceptable to implement in the municipality.

4.3.3 Potentialities in Different Areas
After research, it was seen that there is a high possibility to increase the settlement surrounding the ring road. There are high possibilities to develop the business area and other market places surrounding it. Bhaisekhar, Pauwa and Tudikhel were found the potential business centers where Tindhara, Silthok and Baralhok were found the potential market sites. Koldhara, Thinthok and Jhabri were found the potential local market areas. There are possibilities to establish various service centers surrounding this road. Educational hub for neighbor areas (same as Darjeeling), Agro-Based Training Centers, Tourism related training centers; Forestry Training Centers could be established in here. There are high possibilities for Spiritual Centers/ Meditation Centers, Children parks and Children educational centers establishment. It was seen that there are high possibility of Paragliding in Simpani, possible cycling route named Dumre-Gadhi-Mohariya, Jungle hiking in community forests, potential homestay areas in Silthok and Baralhok and possible Gadhi-Siddha Gufa Zip lining to upgrade the tourism sector. There are high potentialities in fish farming, organic vegetable farming, milk and meat production farming in Jhabri, Seratar and Asphate. Commercial Goat and Silk farms could be started in Pauwa where Commercial Orange farm, Herbs farm, Bee Keeping and Mushroom farm could be established in Baralhok and Silthok. Commercial Orchid Production could be done in Raniban and Thanaimai community forest areas. These all abovementioned results show that MTMP is rational and legitimate to implement.

4.3.4 Visions surrounding Inner Ring Road
During research, it was found that municipality has set visions for the development activities. The vision slogan of the municipality is:

“Krishi, ParyatanraPurwadhar
SamriddhaBandipurkoMulAdhar”

That means agriculture, tourism and infrastructure are the main foundations of the prosperity of Bandipur municipality [11].

And the mission of the municipality is:

“Samriddha,Santa,
PrakritikSaundaryaleBharipurnaraNyayapurnaBandipurNagarp alikanaBanaune”

That means there is the mission to make Bandipur municipality full of prosperity, peace, natural beauty and regulation [11]. It was found that they have set goals to develop vehicle free zone inside inner ring road,view tower at Raniban, children park at Tudikhel, cable car (Bimalnagar to GadhiBandipur), stone foot trail (Siddha Gufa-Raniban-Bandipur), upgraded Picnic Spot (Tindhara), artificial pond (Tudikhel), Cultural Museum (Silthok), Sanitary Landfill site (Dhapare) and Water Purifying Center (Baralhok). The visions set by political leaders and stakeholders of municipality show that MTMP is rational, legitimate, politically viable and socially acceptable to implement.

4.3.5 Sectoral Developments in Bandipur Municipality
MTMP is one of the major plans of Comprehensive Town Development Plan and CTDP has described the expected developments in different sectorial ways which are as follows:

Physical Development
After effective implementation of MTMP, the Right of way of this road would be 16m. The road width would be 8m excluding footpath and there would be the provision of footpath of 2m. The side drain would be rectangular, lined and having width 0.5m. Upside of road would be patched and there would be concrete retaining walls or gabion walls to protect it. Road would have strong and sustained carriageway [11]. Other physical development activities would occur inside and surrounding this road such as construction of view tower, museum, Children Park, water purifying system, cable car, and picnic spot either by their own fund or with the support of private and donor agencies.

Social Development
Bandipur municipality is rich in social and cultural assets. This was the head quarter of Tanahun district until 1965. A historical settlement, called Bandipur Old Bazar, represents the historical and cultural beauty of this municipality. The proper road, well managed Bus Park, educational centers in right place would really help the students to reach in school in time. Potential educational hubs for peaceful quality education, forestry, agriculture, tourism related training centers would get...
a lot of benefits including name and fame. Children of remote area would also get easy and effective access in education. The urban standard road would help people to reach in hospital in time easily through their own vehicles, ambulances or other medium. Potential health center areas would give facilities for the remote areas i.e. Improvement of health means improvement of society. Potential service centers (government and private centers) would help to enhance their social lives and social activities. The proposed linkages from inner ring road to the villages of the disadvantaged groups would give easy access to the near market and commercial centers.

**Economic Development**
The proper linkage of road with tourist destinations, hotels/lodges would help to enhance their existing income. Proposed new tourist destinations would help them to increase their income. Possible establishment of tourist service centres, hotels/lodges would generate large scale of employment and would help to reduce poverty of the people and enhance prosperity of municipality. The potential agriculture areas would help to improve quantity and quality of agriculture products, i.e. increase in income. The establishment of possible business, market areas and micro/small industries pointed by MTMP would help to increase commercial activities. Well managed urban road would help to decrease transportation cost and time.

**Institutional Development**
Well participation of Ministry, municipality, stakeholders, political leaders and beneficiaries would show the good governance of local government. It would tie up the local government with the people of the municipality. Direction, work methodology and output would be decentralized. People of municipality would feel and take the ownership while constructing these roads. The use of local materials and manpower would help to take responsibility and ownership to make this road workable and sustainable. It would establish a pleasant network between all the involvement parties. Trainings and workshops for implementation of MTMP would help to enhance the capacity of municipality officials.

**Environmental Development**
MTMP has given the provision of buffer zone surrounding the existing and potential forest areas such as Raniban, Thanimai community forest, Silthok and Baralthok community forest where no any industries and hotels could be established. MTMP has proposed a landfill site in Dhapare. MTMP has clear provisions about RoW and set back while constructing any building. The front face of the building should be represented old Newari culture. There is provision of green belt at the side of road lengths and retaining structures to prevent from unnecessary soil toppling and landslide. Research has also revealed different recreational areas. These all things would help to protect the environment and enhance the beauty of Bandipur municipality.

**Probable Effect of MTMP in Financial Development**
Small surveys were carried out between agro based small shopkeepers (10 numbers) and owners of homestay/lodges/small hotels (10 numbers) of Bandipur bazar, Pauwa, Tudikhel, Gadhi and Mohariya. The answers of their existing net monthly income before implementation of MTMP and expected net monthly income after implementation of MTMP were collected and analyzed conducting Paired t-test (two tailed, 10<30). It was found that calculated value of t (8.39) is greater than tabulated value t (3.25), the null hypothesis Ho is rejected. It indicated that the net monthly income of small shopkeepers would be raised after implementation of MTMP. Similar nature result was obtained in the case of hotel/lodges. The calculated value of 't' was found 4.81 where the Critical value was found 3.25. Since, the calculated value of 't' was achieved greater than tabulated value of 't', the null hypothesis Ho was rejected. That means, the net monthly income of owners of homestay/lodges/hotels would be raised after implementation of MTMP.

### Paired t-test for small shopkeepers

<table>
<thead>
<tr>
<th>Shopkeepers</th>
<th>Present and Probable monthly income of Shopkeepers (in thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present monthly net income (Rs)</td>
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<tr>
<td></td>
<td>Probable monthly net income after MTMP (Rs)</td>
</tr>
<tr>
<td>1</td>
<td>8000</td>
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<tr>
<td>2</td>
<td>10000</td>
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Null hypothesis: $H_0: u_x = u_y$ i.e. there is no significance difference between the net monthly income before and after implementation of MTMP.

Alternative hypothesis: $H_1: u_x \neq u_y$ (two tailed test) i.e. there is a significant difference between the net monthly income before and after implementation of MTMP.

#### Calculation Sheet for Shopkeepers

<table>
<thead>
<tr>
<th>Shopkeepers</th>
<th>Present Monthly Net Income (Rs)</th>
<th>Probable Monthly Net Income after MTMP (Rs)</th>
<th>$d = y - x$</th>
<th>$d' = d/\bar{d}$</th>
<th>$(d' - d)^2$</th>
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<tr>
<td>10</td>
<td>10000</td>
<td>12000</td>
<td>200</td>
<td>-800</td>
<td>640000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28000</strong></td>
<td><strong>1560000</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We have,

$$d' = \sum d/\bar{d}$$

$$= 28000/10$$

$$= 2800$$

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The tabulated value of t at 1% level of significance for two tailed test and for 9 d.f. is 3.25

**Decision:** Since calculated value of t is greater than tabulated value t, the null hypothesis Ho is rejected. It indicated that the net monthly income of small shopkeepers would be raised after implementation of MTMP.

4.4 **Financial Resource Planning and Resource Gap**

From the research, it was found that there are several funding sources in Bandipur municipality for development and other works which are Government of Nepal (non-conditioned and conditional central grant), Internal Revenue of municipality, Municipal sectorial Infrastructure Development Program, Local Governance Community Development Program (LGCDP), Environment Friendly Local Governance Program, Road Board Nepal, DoLIDAR (for DRCN only), Various NGOs and INGOs and People Contribution. From the research, the municipality’s probable budget allocation for inner ring road was 57.42 million rupees for the five year period (FY: 2016/17 to FY: 2020/21) where probable budget requirements were found NRs. 72.37 million and there could be deficit of NRs. 14.95 million in five years. It was seen that municipality should give the financial pressure to MoFALD to allocate the deficit budget. Besides that, municipality also should raise internal revenue and use their Supplementary Fund to achieve the goal.

5 **CONCLUSIONS AND RECOMMENDATIONS**

This chapter includes the conclusions and recommendations after assessing the implementability of Municipal Transport Master Plan.

5.1 **Conclusions:**

Still more than two third parts was found dusty earthen surface, insufficient road structures and high numbers of vehicles are running in the road. Peoples’ participation and Bottom up Planning Approach was adopted in the planning process during preparation of DTMP and MTMP. The major problems in the road section was found dusty earthen surface, no required side drain and footpath, no required retaining structures, sharp bends and no traffic sign and signals. Municipality is also facing about problems of Bus Park, Right of Way and Setback issues. MoFALD initiated the concept of MTMP. The major purpose of MTMP is to integrate/tie up the various sectors in well managed municipal road networks. MIM, IDPM, VCDP, MTPP are the major features of MTMP. This road provides various services to the people and has high potentials. Municipality has set visions surrounding it. Various sectorial developments can be achieved after proper implementation of MTMP. It was found that MTMP is rational due to overloaded traffic vehicles and high potentials surrounding ring road. The responses and expected developments made MTMP legitimate. Proposed road and its structure, adopted planning process and participation of stakeholder made it feasible. Participation of political persons and beneficiaries in preparation of MTMP and their responses showed politically viable and socially acceptable while assessing implementability of MTMP. It was found that various Central agencies, Local agencies, NGOs and INGOs are the funding sources to implement MTMP. But financial situation was found deficit to implement MTMP in ring road.

5.2 **Recommendations:**

Based on this study, following recommendations are made:

- **Municipality should focus on regular and periodic maintenance of road and its structures.** Municipality also should focus on upgrade of road as per MTMP.
- **Due to incremental traffic flow in ring road, municipality should provide traffic sign for safety.** Temporary passing zone should be made in the road.
- **Municipality should focus about increasing internal revenue and also about getting more budgets from center for smooth implementation.** Detail Project Report (DPR) should be made of ring road to determine the exact requirements of road.
- **MTMP is one of the most effective transportation planning tools for municipality.** It has many opportunities. Hence, municipality should give MTMP in high priority.
- **MTMP report of Bandipur should focus precisely in development of roads with its probable budget scenario for five years based on MTPP in detail.**

For the further study, it is recommended that the present research has been focused on implementability of MTMP in Bandipur Municipality. There are still several areas which the study did not cover. Benefits taken by tourism sector due to MTMP could be again analyzed in depth. After implementation, the challenges and opportunities of MTMP could be studied. Ward level Transportation Master Plan could be also researched.

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