

PRIMARY SCHOOL AND URBAN RESIDENTIAL NEIGHBORHOOD - A STUDY OF KOTESWOR, KATHMANDU

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Abstract

Primary school is an indispensable part of children's daily lives and their parents as well. While educational environment within the school premise is important, the location of primary schools in any neighborhood is of equal importance, since it affects the daily journey of the children to school and the neighborhood environment in general. However, there are so far no such mandatory government policies in Nepal that link residential neighborhoods and location of primary schools, and no researches have been carried out in this respect either. This research explores one of the urban residential neighborhoods, Koteswor, of the Kathmandu Valley from the perspective of location of primary school and its service to the locality. The research makes a field study on the distribution pattern and service radius of primary schools, commuting distance and pedestrian safety of children. The study shows that more than three fourth of the children go to more distant schools than to schools within their residential area, and more than half go to other districts. Likewise, walking distance for half of the children exceeds the limit of Ministry of Education's recommendation for urban areas. Children's safety on their way to school through vehicular road is also a serious concern of the parents. Thus, while there is enough number of schools in the locality, it raises question on their quality, management and their distribution. Furthermore, only one school run by the Ministry of Education in an area of 40,000 population shows the irresponsibility of the government to meet the free basic education for all stated by the constitution.

Keywords: Primary school, Distribution pattern, Service radius, Travel safety, Commuting time

1. Introduction

Perry has advocated the concept of "neighborhood unit" in 1929, giving substantial preference to primary school in determining the population size in neighborhood planning (Perry, 1929). He conceptualized neighborhoods within the walking distance of half mile radius (800 m) centering the primary school. This was further supported by the Radburn idea derived by Clarence S. Stein where he introduced the concept of superblock, and neighborhoods were connected by over and under passes to segregate vehicular and pedestrian traffic which gave emphasis on the safe and sound neighborhood environment (Stein, 1957).

Recently in 2016 A.D. (2073 B.S.) under the School Sector Development Plan, Nepal Government has re classified school education into two main categories. The first one is Basic Education (grade 1-8) for the

age group of 5 to 12 years old, and the next is secondary education (grade 9-12) for the age group of 13 to 16 years old. Before this reform, the education system was categorized into three groups such as Pre-primary education, Primary (Basic) education (grade 1-5) and Secondary education (grade 6-10) (MoE, 2016). Schools which were opened prior to this reform were based on the previous system. Since all the schools in the study area had already been established before the reform, they embraced the previous system of three categories. Therefore, this study has taken the basic education of grade 1-5 as the primary level education, and schools that provide education from grade 1-5 are selected for case studies.

The primary school age children are in their middle childhood phase, generally between 6-10 years old. It is a time when children prepare themselves with the learning of pre-school and grow towards the adolescence. On the other hand, during this phase, children are relatively smaller and weaker than adults, and cannot walk as far or as fast as adults.

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Further, they are more vulnerable to vehicular traffic while going to and fro between their home and school if there is no safe pedestrian environment.

In Kathmandu along with growing urbanization, urban areas are emerging with high priority to vehicular traffic than for pedestrian traffic. Walking is becoming more and more unsafe and unfriendly to pedestrian. The travel to primary school, which is an inevitable part of children's daily life, is also being affected by the environment of neighborhoods they are living in. It is not only because the neighborhoods they belong to have not seriously realized the relationship between primary schools and children, but also because that there are not any planning approach and regulatory mechanism to guide the location and distribution of schools in residential neighborhood districts.

2. Research Methodology

A basic survey of the study area was conducted in 2073 B.S, preparing base map, household survey, locations of educational and commercial services, street network and road width, which was verified with further detail survey on 2074 B.S.¹ Additional survey for the purpose of this research, such as mapping of all the schools within the study area, selection of schools having primary levels, the questionnaire survey in those schools were carried out in 2075 B.S.² for more detailed investigation. The data presented on schools and students in this paper is based on that survey conducted in 2075 B.S. The students from primary level were distributed questionnaire to take home, and their parents were requested to fill the forms. The collected data was tabulated in IBM SPSS Statistics 20 and analyzed accordingly. Service radius of primary schools was traced from the mapping done by respondents. Likewise, on-site mapping and observation were carried out to understand the distribution pattern of schools and the walking environment. Travel safety was observed on site, which was further checked by the opinions received through questionnaire survey. Interviews were also managed either with academic coordinators or principals of schools. Relevant research papers from journals and government policies were also reviewed.

3. Overview on Koteswor Study Area

The study area is located at Koteswor in Kathmandu district as shown in Fig 1. The site has an area of 83 ha. At southeast and east, the site is bounded by Ring Road, at southwest and northwest it borders with Manohara River and Bagmati River as shown in Fig 2. While at north, there is a road running east west which in past was a major link to Sinamangal and further up to Thimi and Bhaktapur. The land by the side of this road at north falls sharply to reach the lower levels of Bagmati River basin, which is now another neighborhood called Subidhanagar.

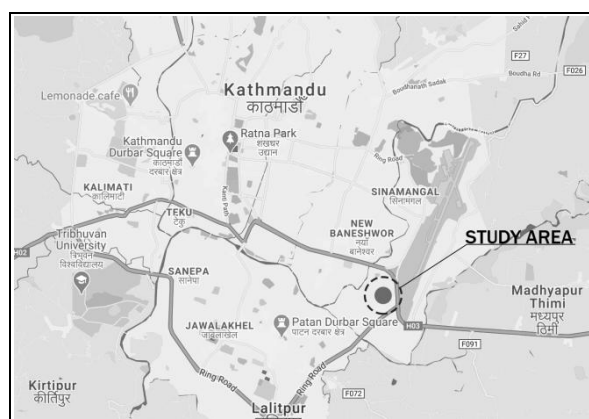


Fig. 1 Study area in Kathmandu district

Source: Google map

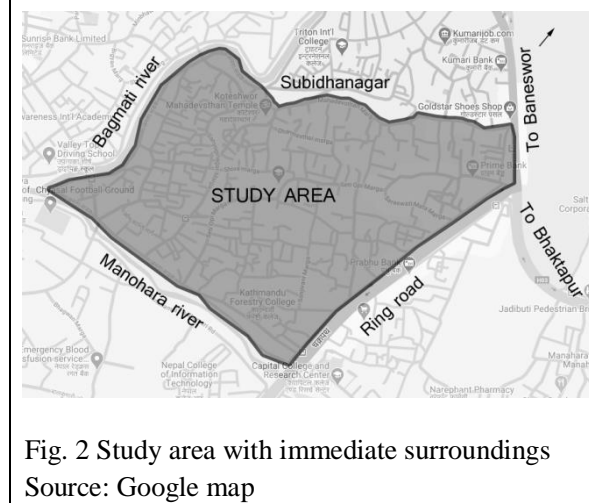


Fig. 2 Study area with immediate surroundings

Source: Google map

Koteswor, the study area, is the representation of those growing urban areas of Kathmandu, which has been developed in a spontaneous manner within the time span of 30-40 years since 2030 B.S as per basic survey conducted in 2073 B.S. It has been transformed from an outlying rural farmland to a densely settled neighborhood with its net density reaching 749 pph and the population around 40000

with gross density of 494 pph as per the survey carried out in 2073 B.S. as shown in Table 1. The survey shows that population of primary level students of 6-10 years age in Koteswor is 6.9% and is close to the Kathmandu's average of 7.76% (CBS, 2011). The age group of the study area is shown in Table 2.

Table 1: Settlement General Index

Site Area	83.256 ha
Total Houses on site	2975
Surveyed Houses	2202
Owner/Rental HH ratio	1:3 found from sample study
Owner HH size	4.16
Rental HH size	3.22
Total Estimated Owner HH	2975(surveyed owner HH units:1382)
Total Estimated Owner population	12376
Total Estimated Rental HH	8925 (Surveyed Rental Units:1047)
Total Estimated Rental population	28738
Total Estimated Population	41114 ~ taken as 40000
Gross density	494pph
Net residential density	749pph

Source: Field Survey 2073 B.S.

Table 2: Distribution of Age group in study area (N: 2429)

Age group (years)	Population (percentage)
0-5	2.9
6-10	6.9
11-17	14.2
18-59	70.3
>60	5.7

Source: Field Survey 2073 B.S. and 2074 B.S.

4. History and Growth Pattern of School Development

The growth pattern of settlement influences growth of school. The development at the beginning only occupied the higher level of Koteswor plateau leaving out lower level river basins at the southwest and west. The first school established in study area was Koteswor Saraswati Secondary school under the Ministry of Education which was established in

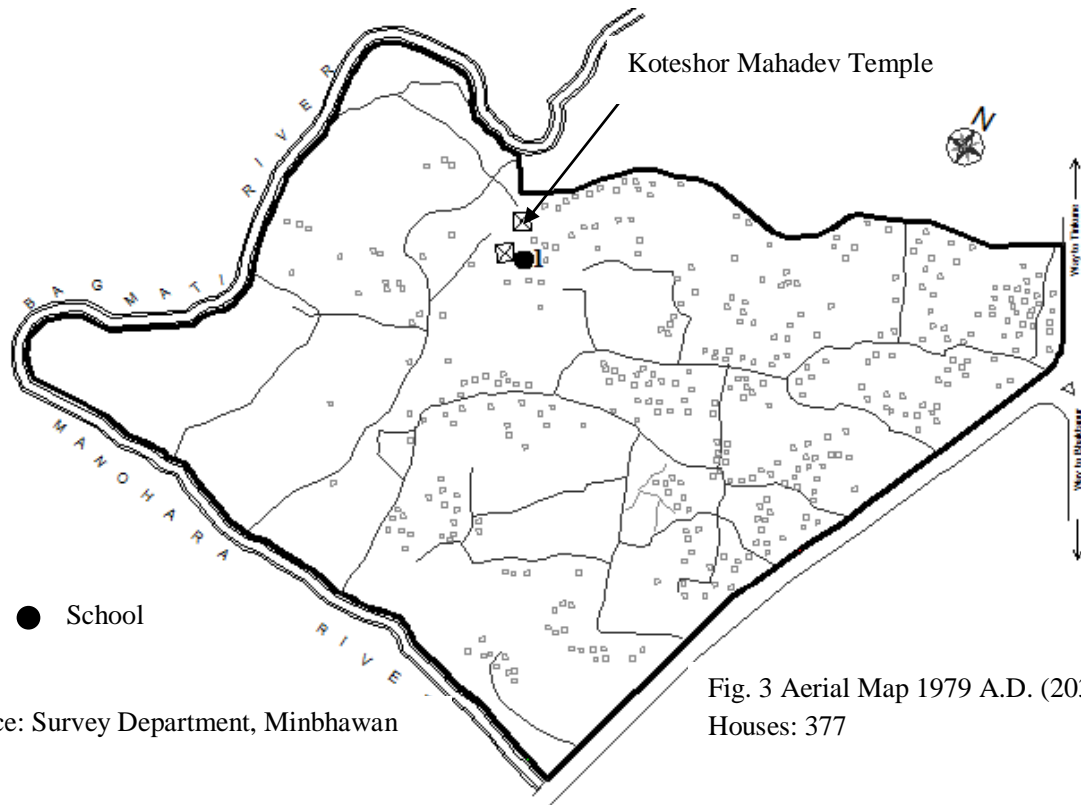
2028 B.S. (1971 A.D.), and is the only government school. In Fig 3 the aerial map of 1979 A.D. (2036 B.S) shows 377 houses, and this was the school serving the population of Koteswor and nearby settlements then.

In those years the major development was at the junction of highway and Ring Road along Seti-Opi Marga, the two way vehicular road going through central part of Koteswor. From 2036 B.S. to 2048 B.S., within 12 years of time span total numbers of houses increased to 666, while three more schools were established as shown in Fig 4. Six other schools are found to have been established in the decade of 2050's when the number of houses reached to 1460 in 2003 A.D. (2060 B.S.) as shown in Fig 5. Another aspect is that location of schools is in the quarters bordering the Ring Road in the south eastern part of the site. Till 2060 B.S. there were altogether 10 schools with primary level education. Remaining five schools were found to have been established within 2060-2068 B.S. However, no new schools were found till 2018 A.D. (2075 B.S.). Now there are altogether 15 schools having primary level education as in Fig 6. Present survey included 13 schools among them.

It is also remarkable that among 15 schools only one school is run by government, and remaining all are privately run. Since the establishment of Koteswor Secondary School in 2028 B.S., the houses in Koteswor have increased almost 8 times with rental households added, but no other government school has been established. If government seriously realizes its responsibility ordered by constitution of free basic education, the government has to make sure that sufficient number of government primary schools are built in each neighborhood.

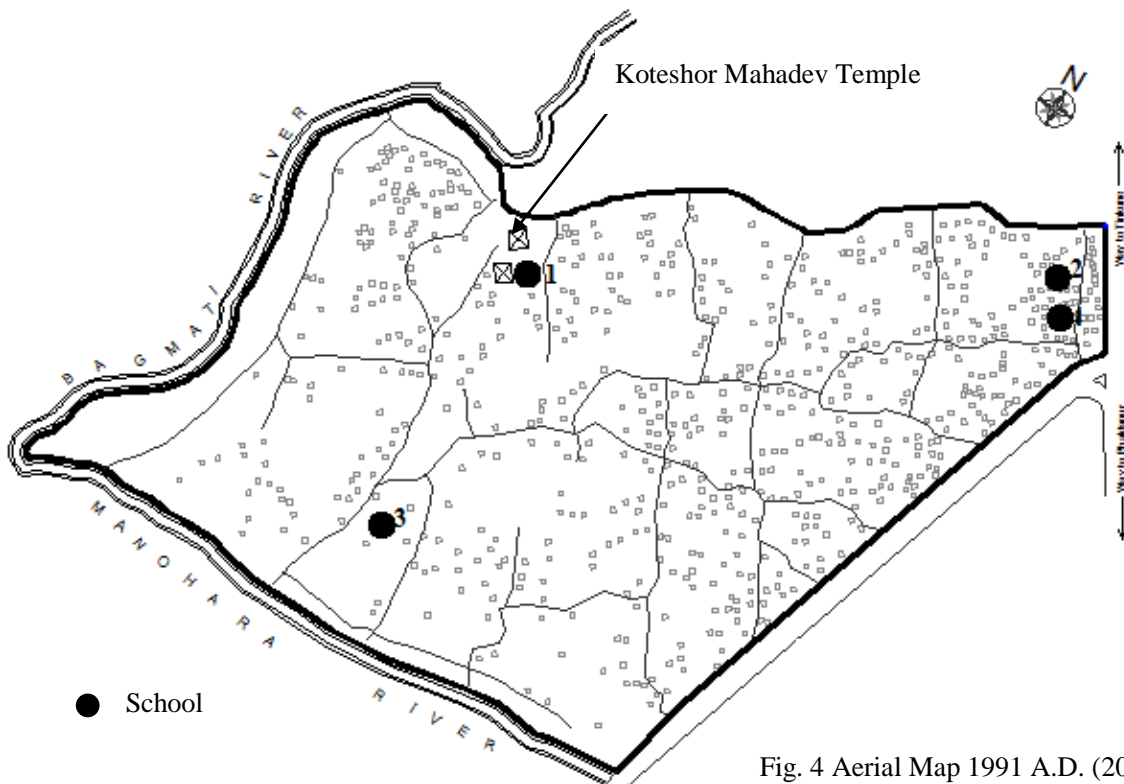
5. Neighborhood Size and Schools

The total primary level students enrolled in those 15 schools are 1782 as per data obtained from respective schools. In the 13 schools surveyed, the total enrolled primary level students are 1592. From Table 3, it is found that 68.56 % of total primary level students surveyed are from the study area of Koteswor, and 27% are from out of the study area.



Source: Survey Department, Minbhawan

Fig. 3 Aerial Map 1979 A.D. (2036 B.S.)
Houses: 377



Source: Survey Department, Minbhawan

Fig. 4 Aerial Map 1991 A.D. (2048 B.S.)
Houses: 666

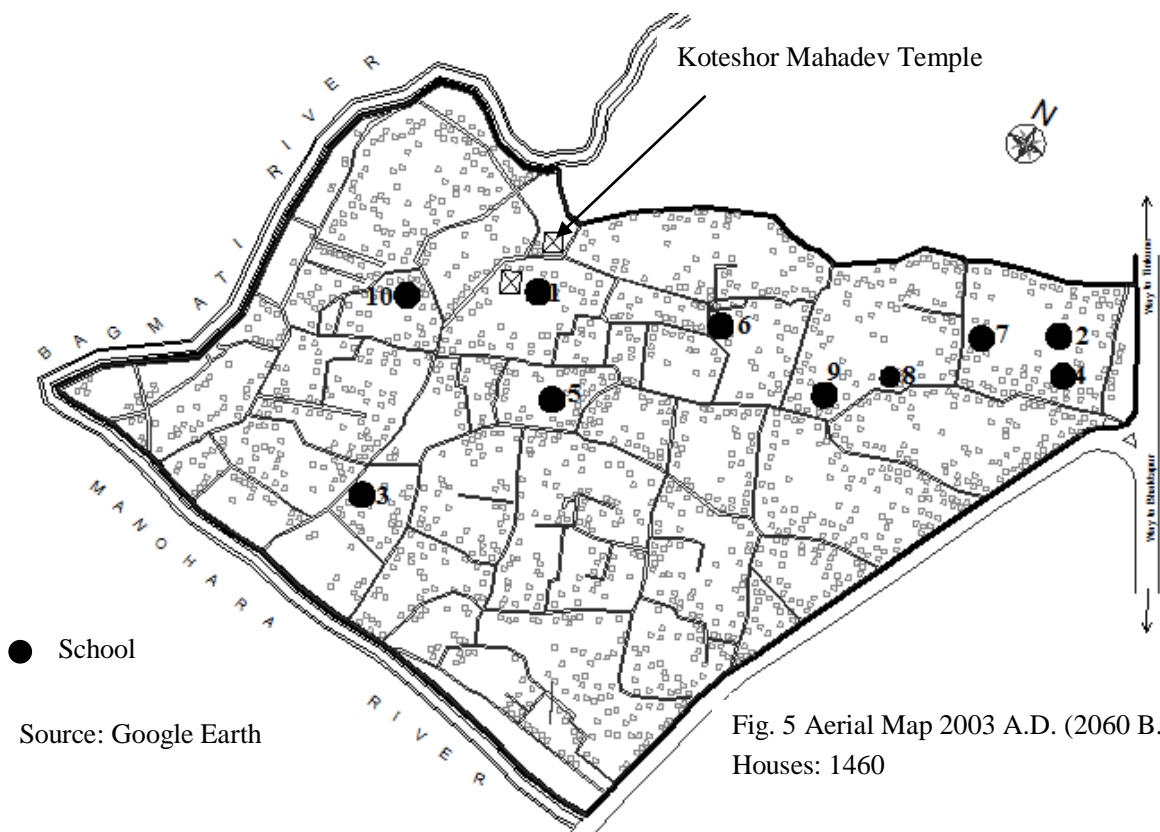


Fig. 5 Aerial Map 2003 A.D. (2060 B.S.)
Houses: 1460

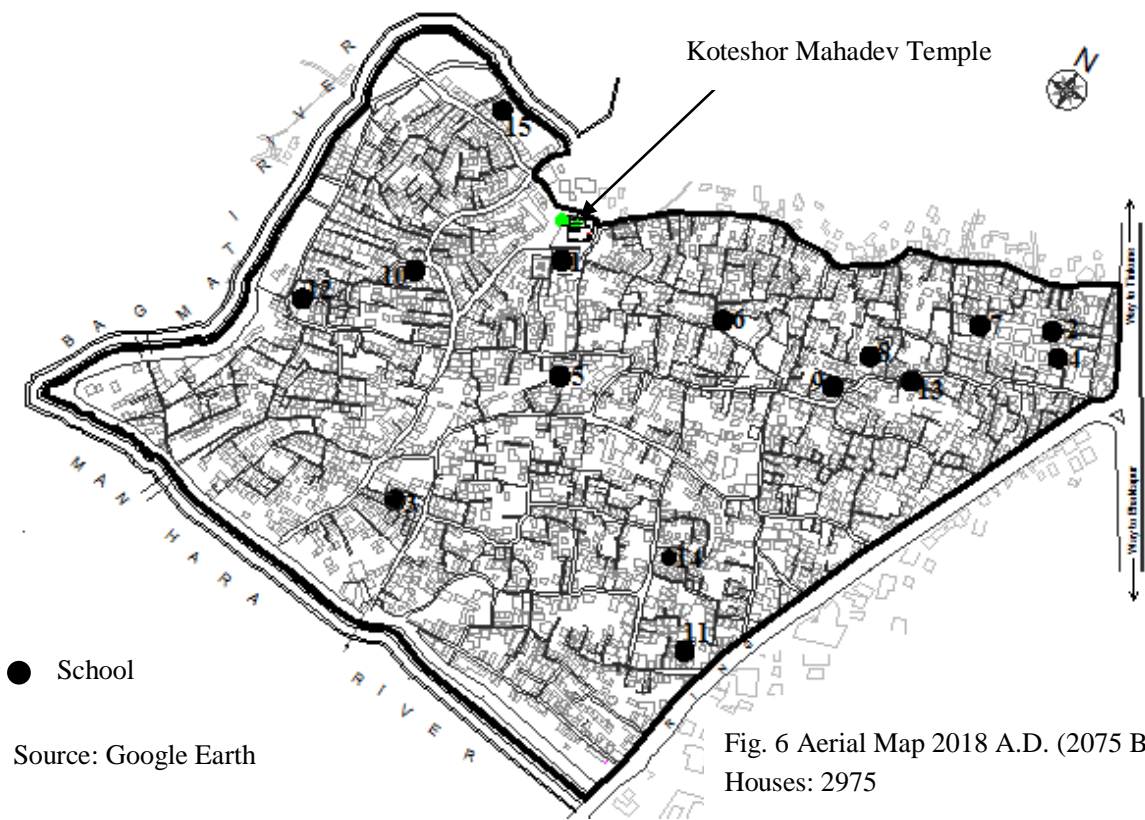
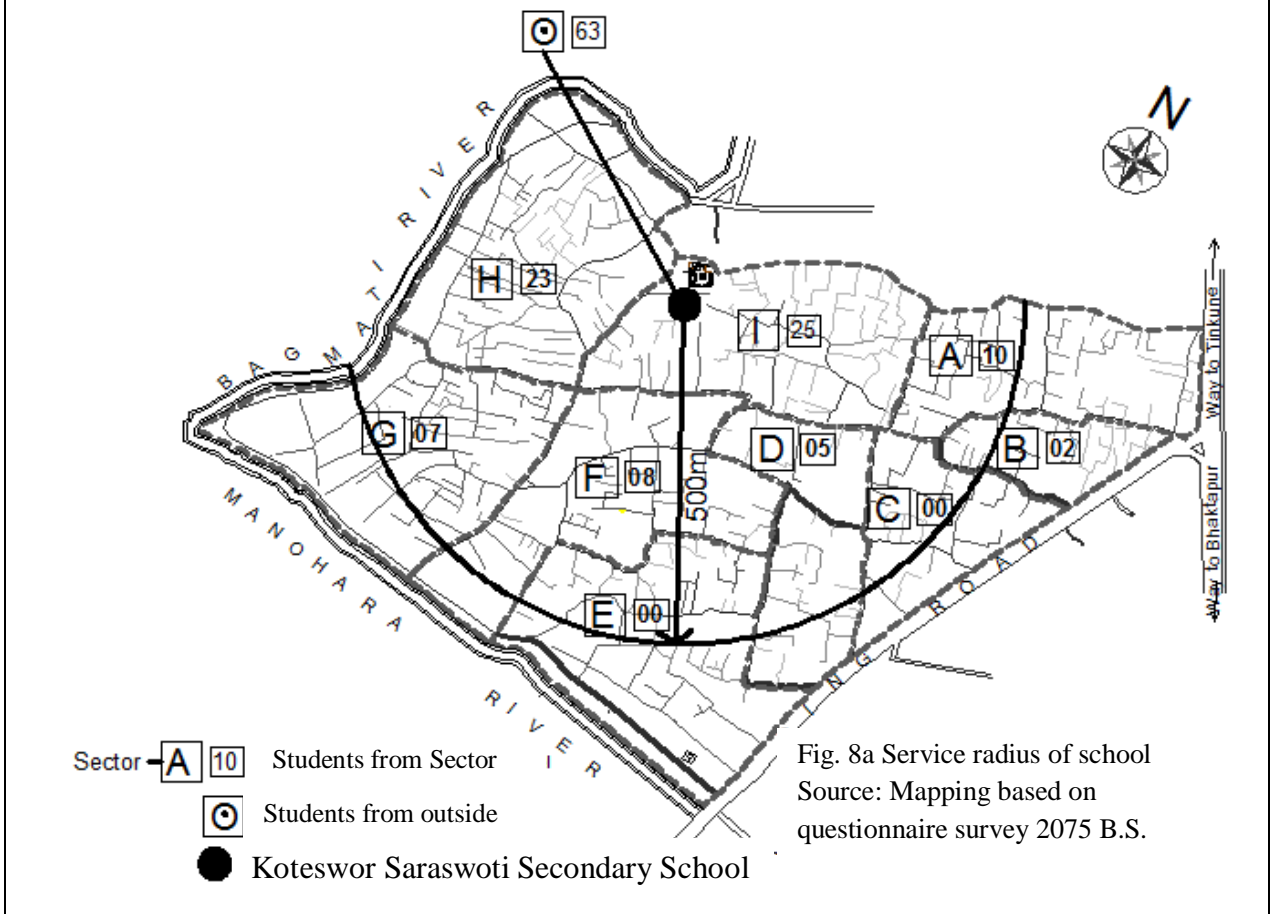
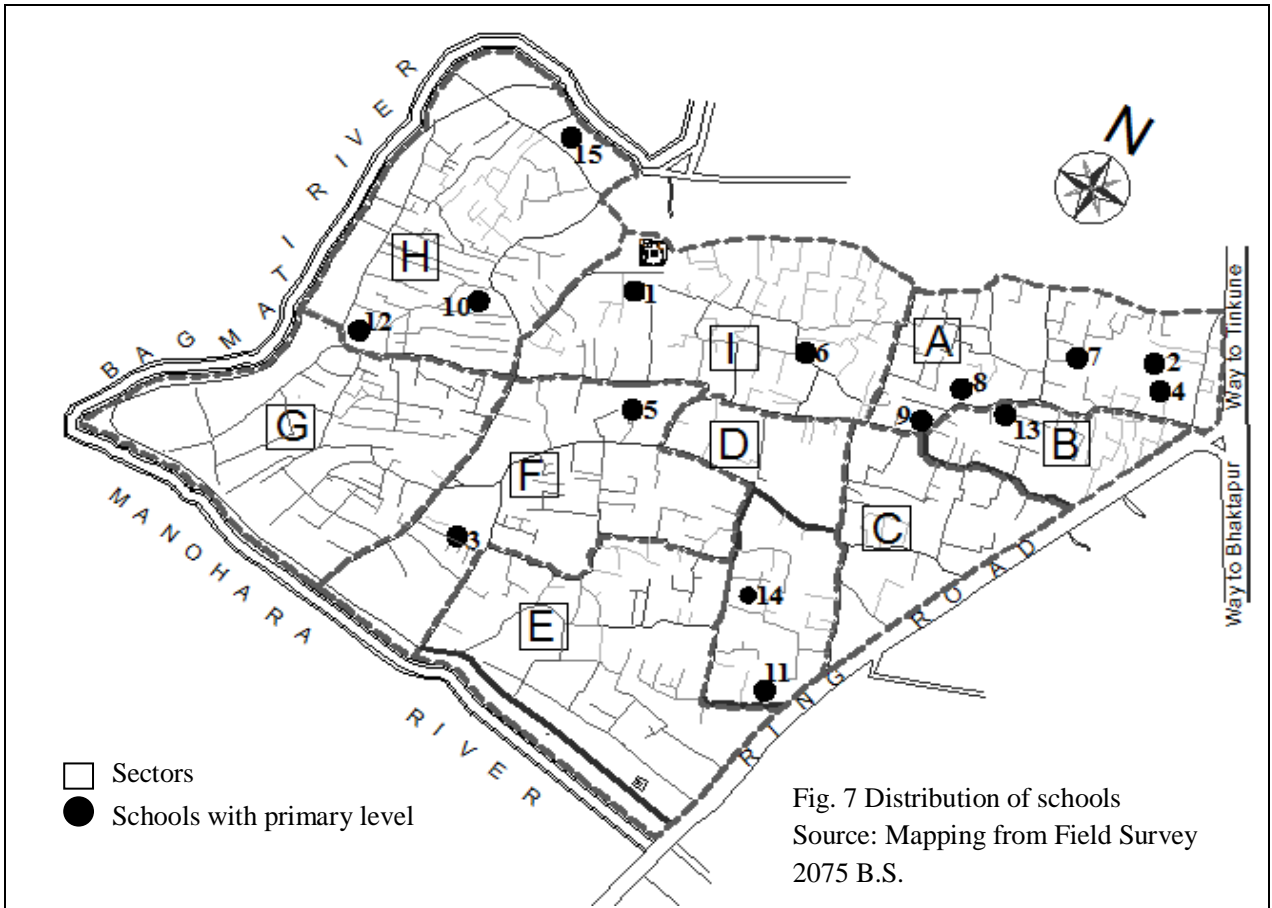


Fig. 6 Aerial Map 2018 A.D. (2075 B.S.)
Houses: 2975



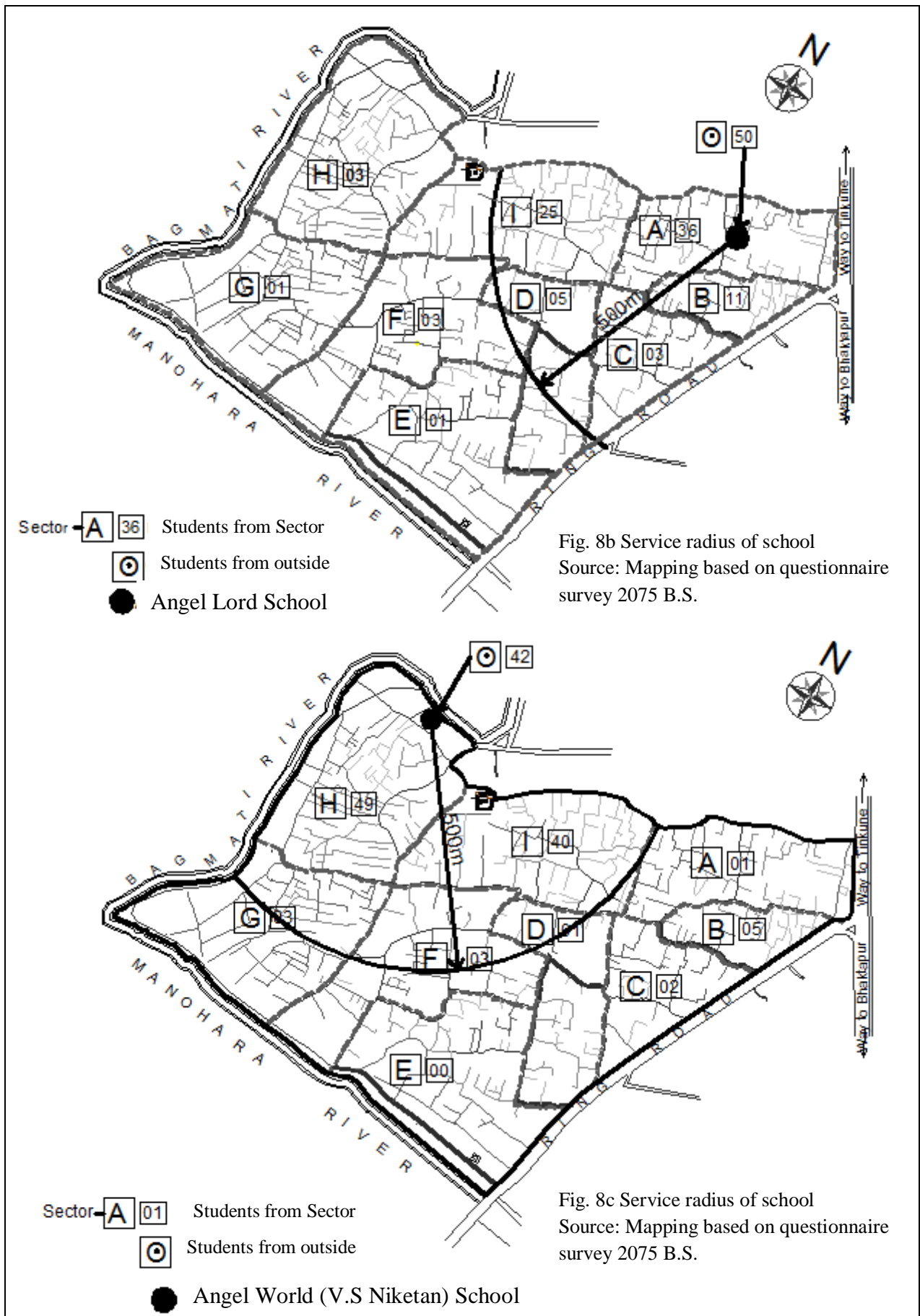


Table 3: Residential location of students surveyed
(N: 1126)

Location	Students
Out of the study area to surveyed school	306 (27.18%)
From study area to surveyed school	771 (68.47%)
Others	49 (4.35 %)
Total	1126

Source: Field Survey 2075 B.S.

With total population of about 40000 and 6.9% of the primary age-group population in the study area, the gross primary school going population would be 2760. The total primary level students enrolled in 15 schools are 1782 as per survey. If we apply the percentage from Table 3, it would be such that only 1220 students out of 1782 would be from the study area. It means total 1540 students out of 2760 i.e. 55.79 % of total primary age group population go to schools out of the study area. It is worth noting that even having sufficient numbers of schools, more than 50% primary age population study, go out from Koteswor for their schooling.

This paper further examines the rationale on the number and distribution of schools providing primary level of education in Koteswor. If two sections in one grade and 30 students in each section are assumed, a primary school with five grades will get 300 students. This gives 9 schools in Koteswor which has 2760 students at present. If we consider one primary school for one neighborhood, we thus get nine neighborhoods in Koteswor. Considering the total site area as 83 ha, a neighborhood then will have an area of about 9 ha. If we assume a block of 300 m x 300 m, School's average service radius if located at the central area, will be 150 m. With the present gross density of around 500 pph, the population will be 4500 then of such a neighborhood.

According to Planning Norms and Standards 2013 from Ministry of Urban Development, Nepal Government has set the criteria for primary school in the urban area. It has set one primary/basic school per 3000 population at a distance of 0.4 – 0.8 km, and an area of school has set to be 0.2 ha (MoUD, 2013). It has somehow defined the required number of schools in terms of resident population. However,

it has not introduced the concept of neighborhood so far. In the context of urban Kathmandu, 400 m to 800 m distance is still questionable in terms of traffic safety which will be explained later.

6. Distribution Pattern of Schools

To analyze the distribution pattern, the whole study area is divided into 9 sectors, namely Sector A to Sector I, as shown Fig 7. The major spine (Seti-Opi Marga) linking the study area from east to west is the busiest two way vehicular road, and was considered the base to divide the sectors horizontally. Likewise, the prevailing north south vehicular roads are considered the boundary to define the sectors longitudinally. The purpose is to have vehicular roads as boundary of the assumed neighborhoods.

The distribution pattern of schools in study area doesn't show any regularity with respect to service radius, safety and accessibility to the children, which are some of the necessary features to make a good neighborhood. Fig 7 clearly illustrates that most of the schools are concentrated in the eastern half of the settlement. While in this area, school services areas are overlapping, some of the pockets along the Manohara River side do not have a single school. So students from that area need to walk longer distance to school and the distribution of schools does not reflect uniformity as well.

Table 4: Distribution of school sector wise

Sector	Total pop	Primary age pop	Schools required *	School on site
A	4066	281	1.7 ~ 2	5
B	3886	268	1.6 ~ 2	1
C	2419	167	1.01 ~ 1	0
D	4149	286	1.7 ~ 2	2
E	4440	306	1.8 ~ 2	0
F	4564	315	1.9 ~ 2	2
G	4966	343	2.3 ~ 2	0
H	5714	394	2.3~ 2	3
I	5796	400	2.4 ~ 2	2
Total	40000	2760	17	15

Source: Field Survey 2075 B.S.

*Note: 33 students per class and total 165 from class one to five. 33 students is the average set by government for private (institutional) schools

From Table 4, it is found that among 9 sectors, two sectors, namely sectors D and H, have required number of schools, whereas three sectors, namely C, E, G have no school at all. On the other hand, Sector A has more schools than required. From the same Table 4, it can be seen that 17 schools could accommodate all the primary age group population (2760) of the site area whereas the available 15 schools are accommodating 1782 students out of which only 1220 are from the study area. But as discussed above, if the settlement is properly planned with neighborhood concept, 9 schools can service all the students of primary level from the study area. Children do not have to cross the major vehicular road but this is not the situation now in the study area.

7. Service Radius and Concept of School Zone

The 5 min distance to reach the primary school would be the preferred limit if we assume 1/4 mile radius as suggested by Perry. Perry's assumption is in low density suburban situation of 6000 population in 64 ha, giving 1021 pupils. This is a density of 100 pph. In his plan of a higher density situation of 10,000 population in 30 ha area (333 pph), this service radius is reduced to 275 m. One should also take note that Perry's assumption is a safe pedestrian environment to the children. Ministry of Education, Government of Nepal has set 6 min limit in urban areas as the walking distance (CBS, 2011) but has no such pedestrian assumptions. The argument of this paper is that since Koteswor has a density as high as 500 pph, a school within 2 min or 150 m service radius is possible to sustain a primary school of 300 pupils giving 9 schools in total compared to 15 that presently exist at Koteswor. This is further emphasized because the neighborhood environment in present context is not pedestrian friendly and the children have to walk all their way through vehicular roads. In such situations, shorter the distance to school, safer it is to the children.

In the study area, if 6 minute walking distance, i.e. 500 m, is marked from any school as shown in Fig 8a, 8b and 8c, the children need to cross more than two vehicular roads each time while commuting all the way in roads without footpath. It is because, in study area, either the schools are adjacent to the

vehicular road, or there is a vehicular road in every 100 m - 200 m distance from school, which is not safe at all.

As per the norms given for the vehicular service radius of institutional (private) schools by Ministry of Education, 12 km of service radius is allowed for primary level students in Kathmandu valley (MoE, 2012). It means any school within the valley can have students from almost every corner of the valley. It clearly states the absence of the concept of school zone or school districts.

Primary school zone defines an area from which the school accepts its core intake of students. In this concept, schools are located in such a way that they are distributed in a proportional manner to the population of the localities. The pedestrian distance for the children is one of the primary advantages in this concept. Not only this, the concept of school zone enhances the relationship among neighbors creating a lively neighborhood. School itself becomes a mediator to have good community bonding. In most of the countries such as Japan, China, Australia there is the concept of school zone in government schools administered directly by their Ministry of Education. Private schools in these countries do not work in this planning concept.

Table 5: Service radius of schools sector wise

Sector	Enrolled students in schools of sector	Primary age population of sector	Primary student from same sector	% in primary age pop
A	531	281	74	26.33
B	102	268	2	0.75
C	0	167	1	0.00
D	192	286	12	4.20
E	0	306	0	0.00
F	155	315	7	2.22
G	0	343	0	0.00
H	318	394	134	34.01
I	294	400	44	11.00
Total	1592	2760	273	

Source: Field Survey 2075 B.S.

The basic concept of neighborhood is that primary school should serve the immediate neighborhood first. Therefore, the assumption might be such that

the total primary age group population of particular sector should be served by the schools of the same locality. However Table 5 portrays different story. It is found that the schools in the neighborhood even having the capacity are not serving students from the same sector. For example, in Sector A, only 26% of total primary age group population of the sectors is found to study in those schools and remaining study in other sectors or out of the study area. Likewise, it is found that the schools in Sector H are comparatively serving more students of same neighborhood, i.e. 34% of total primary age group population. Some examples of typical school from Sector A, H and I are shown to illustrate the school serving the students from different sectors within the study area and outside the study area in Fig 8a, 8b and 8c.

It is found from the survey that, even among those who have sent children to the school surveyed, 30% did so because the schools were near their house and 44% selected those schools because of the quality of education, whereas only 3% considered physical environment of the schools as merit in making their choice. Even the principal of one of the schools mentioned the lack of proper physical environment in the school as reason why parents send their children outside Koteswor despite the existence of sufficient school close to their home. This scenario makes clear the problem that exists in distribution of schools, service radius, their quality of education and cost. Therefore, one should take note that parents are sending their children to schools far out of their place not without reason.

8. Walkability and Travel Safety

Commuting to school and back is a daily activity for all the children, so is for their parents. In this regard, traveling between home and school can be seen as a significant exposure to improve children's development through their travel behavior. Another aspect on the rationale of the school location is mode of transportation children use when going to schools. From Table 6, it is found that 87% students go to school on foot, and 10% of the students use school vans.

When most of the students go to school on foot, the walking environment becomes sensitive in terms of distance to school, safety concerns, pedestrian

facilities, and familiar neighborhood for children. Walkability at the same time helps to make neighborhood more vibrant.

Table 6: Means of transportation to school

(N: 1093)

Means of transportation	Number of students	Percentage of students
On foot	948	87
School van/bus	110	10
Public Vehicle	13	1.0
Private vehicle	22	2.0
Total	1093	

Source: Field Survey 2075 B.S.

Table 7 shows parents' response with respect to safe walking environment to school. 52% of respondents marked it as unsafe; 37% remained neutral while only 11% considered safe. Thus, road safety is a serious issue where 87% students walk to school every day and where almost 89% of parents are not satisfied with the walking environment. For those who marked unsafe, 46% gave high vehicular flow as reason behind unsafe walking environment whereas lack of footpath was reason for 26% of respondents. Further, 15% gave crowded environment as reason and 11% marked longer distance as reason of unsafe walking environment.

Table 7: Condition of road while walking (N: 1086)

Response on Safety	Number of students	Percentage of students
Safe	117	11
Neutral	402	37
Unsafe	567	52
Total	1086	

Source: Field Survey 2075 B.S.

It clearly shows absence of child friendly walking environment in neighborhood. Scholars also argued that a city that works for children is said to work better for everyone. Apart from play ground, children need safe, sound and easily accessible neighborhood to have proper growth physically as

well as mentally. It affects their day to day journey to school. It is supported through a remark made by one of the principals during interview. He explained that a group of students left the school after expansion of Ring Road. Their resident area was at southeast direction of study area just across the Ring Road, and foot bridge was quite far, and they felt unsafe when crossing the road.

From the field observation, the street network appears neither child friendly nor pedestrian friendly. The site has no foot path at all on the major vehicular road as shown in Fig. 9a and there are discontinuous sidewalks on some secondary road as shown in Fig 9b. The vehicular road is busy and crowded resulting children feel unsafe to walk.



Fig. 9a Crowded major road without footpath
Source: Field Survey 2075 B.S.



Fig. 9b Lack of foot paths on road
Source: Field Survey 2075 B.S.

9. Commuting Time

Travel distance has a significant impact on the choice of travel mode and is more important for children below 10 years of age. It is because more the distance less will be the commutation on foot, and hence difficult for parents to escort their children.

From the survey it is found that among the primary level students on foot, 9.45% need to walk 1-2 minutes, 42.86% need to walk 3-5 minutes (200 - 400 m) and 28.92% need to walk 6-10 minutes (500- 800 m), 12.56% need to walk 11-15 minutes (1000 m) every day to school as shown in Table 8. It means 47.69% children need to walk more than 500 m to reach school which exceeds the average 6 min given for urban Kathmandu by Nepal government (CBS, 2011). It means children do not go to nearest school and this raises the safety issues of the children. Moreover, this paper argues that even this 6 min distance is not suitable for urban Kathmandu as discussed in section 7. If properly planned, it would have been possible for the children to reach to school within 2-3 minutes of walking distance without crossing the major vehicular road in a high density settlement, such as Koteswor.

Table 8: Commuting time

(N: 868)

Time Range (Minute)	Number of Students	Percentage of students
1-2	82	9.45
3-5	372	42.86
6-10	251	28.92
11-15	109	12.56
16-20	36	4.14
21-25	6	0.69
26-30	12	1.38
31-35	0	0
Total	868	

Source: Field Survey 2075 B.S.

10. Conclusion

Koteswor is one of the spontaneously developed urban areas of Kathmandu within a time span of three to four decades from an outlying rural farmland to densely settled neighborhood. The presence of only one school run by government in a residential area of around 40,000 clearly shows the irresponsible nature of Nepal government although the constitution of Nepal (2048 B.S) has declared free and compulsory basic education up to grade 8, and free education up to grade 12 in the new constitution of 2072 B.S. The situation of Koteswor shows that the Ministry of Education has washed its hand from its duty of providing free basic education to the children. If the government has no capacity to

deliver education to its citizen, and yet if it wishes to fulfill the right of its young citizens stated in the constitution, a modality of cooperation between government and institutional (private) schools has to be devised.

The distribution pattern of 15 primary schools is uneven and shows no consideration of safety issues for the school going children. The study shows that primary schools which need to serve its immediate neighborhood are not doing so since three fourths of the children of the locality go to schools other than theirs, although the school has capacity to cater to the primary school going population of the sector. Furthermore, more than 50% of primary age children are going out of the study area of Koteswor despite having sufficient number of schools within the area.

In Koteswor, most of the schools are adjacent to the vehicular road where the vehicular movement and human flow both are relatively high making children and their parents unsafe when commuting to school. It also questions the service radius of the schools since it has no concept of walking distance, school zone or district. The primary school should be within the walking distance as per the guidelines given by Ministry of Education. However, Ministry of Education's intentions are contradictory and work in service of private school's business, since a vehicular service radius of 12 km is mentioned for primary students which can cover all the cities and towns of the valley.

Thus the location and service radius of a primary school to define the size and scale of neighborhood as one of the fundamental features of neighborhood planning is irrelevant in Koteswor. Being a densely populated urban area, this study finds the issues of Koteswor significant to consider. If the situation of Koteswor can be of any lesson for the growing urban areas of Kathmandu, and if the government realizes its responsibility ordered by the constitution, the government has to study and evaluate the distribution of primary schools and safety of the children in residential neighborhoods of the Valley.

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Endnote

1 Both the surveys of 2073 B.S and 2074 B.S were conducted in Neighborhood Planning Studio project, Department of Architecture, Khwopa Engineering College under the guidance of the authors.

2 The detail survey of 2075 B.S on schools of Koteswor was conducted by the authors.