

Factors Affecting Green Area Development And Management for Improving Sustainable Urban Environment in The Case Of Debreberhantown, Ethiopia: Make Town Aesthetic With Greenery

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Abstract: Green area development and management have been used to improve environmental conditions, protect and improve biodiversity, promote outdoor activities and active lifestyles, increase social interaction and exchange, and provide healthy urban conditions for good physical and mental well-being. When designed well, urban green areas can be universally accessible, providing benefits for all members of the urban community. The main objective of this study was to assess factors that affect green area development and management in DebreBerhan town. The study is important to minimize challenges for green area management and development and it would be used as base for the further research and for policy makers. The study employed a cross-sectional mixed method design, which was a procedure for collecting, analyzing and mixing both quantitative and qualitative data at some stage of the research process. The study shows that there were some private associations who had developed their own green areas, though the structural plan of the town did not clearly design green areas compounds government institutions and individuals. There were various factors for the low development of the sector in the town. Lack of finance, lack of awareness, low level of the community participation with municipality in green area development, and lack of professionals were the major challenges for the development of green areas. The paper concluded some basic issues to alleviate the challenges and make the town as competitive and sustainable as other cities in Ethiopia. Professional training, awareness creation through different means and integration with stakeholders to increase participations were some of the recommendations suggested by the paper. Moreover, the paper strongly suggest that, town officials who had a mandate and responsibilities should be equipped with the concept of sustainable town and creating sustainable community through green area development.

Keywords: Green area, green area development, sustainable urban development, urban planning

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I. INTRODUCTION

Urban green spaces, especially parks and forests, are important components of urban environments and provide significant ecosystem services (Bradley, 1995; Lutz and Bastian, 2002). Urban green areas are urban areas which were occurred that, natural or semi natural ecosystems were converted urban spaces by human influence. Urban green spaces provide the connection between urban and nature. In this context, green areas are reflection in the urban spaces of natural or near natural areas surrounding the cities. The green fields are continuation of mostly landscapes around the city. Besides, urban green areas provide lot of ecological benefits which were established especially needs of urban people.

Green area determines general town view and structure. It can cause town space structure, complement composition of buildings architecture, create urban green areas and to improve people's environment (Haq, 2011). But the problems come with not enough greening or their qualities were not good. Sustainable urban planning in growing urban agglomeration encompasses the active development of urban green areas. The loss of urban green does not only threaten the urban climate and ecosystems, but it may also affect a city's image and the residential satisfaction in general (DTLR, 2002). Quantifiable information about green structure, the amount and distribution of green spaces is essential for sustainable planning. Therefore, monitoring tools to outline the differences of urban green spaces are required and it should encompass

more than merely measuring the overall percentage of green based on land parcel which are currently practice. Other information's were required such as quality, density and its linkages to reflect the different aspect of green space's importance in specific environments.

Urbanization is an increasing number of people in urban areas as opposed to rural areas with a high population density relative to the density of the surrounding area. If the area inhabited by more people with much more buildings, there is high concentration of CO₂ and other socio-cultural deteriorations (Byrne, and Sipe, 2010). Therefore, to alleviate these problems and bring other direct and indirect benefits, development and implementation of green area is crucial. To do these, Ebenezer Howard in Miller (1996) promoted the concept of garden cities in Great Britain late in the last century as a response to the excess of the industrial revolution. He proposed that new towns will be built for a population of 30,000 to 50,000 people, and that each town contain industry to support the local population. Those towns to be surrounded by a greenbelt of undeveloped land in the ratio 5 hectares of greenbelt to each hectare of city (Miller, 1996)

As human are the producer, consumer, protector and manager of urban green area development, what they think about green area and how they uses it is important. Therefore, any discussion of city planning and urban design, which does not address environmental issues, has a little meaning at a time of increasing population pressures on a declining natural resource base, wide spread ecological destructions, increasing population, ozone layer depletion and climate change (Kaplan and Moughtine, 2005)

This urges urban spatial pattern to develop a kind of diversity system to relate other spatial shapes and itself can provide city with ecological safety value (Wuqiang et al., 2012). The requirement of green area, one of the main drives of world city system: most of the multinational corporations will choose the areas of headquarter and branches by comparing the urban environment and landscape of many cities. And of course, the favorable urban system that is the embodiment of the urban spatial pattern based on the integrated green area development, can attract more attention of the investors (Baycan-Levent and Nijkamp, 2009; Wuqiang et al., 2012).

Regional green area is based on the protection and optimization of natural ecological system and actually refers to continuous suburban green area of large size. It not only improves the whole ecological environment of the city region and its neighbors, and provides important support of urban environmental improvement. Furthermore, introduction of suburban green area into city also acts as the base of ecological balance. In practice, problems of urban woods and citted agriculture should be paid sufficient attention (Wuqiang et al., 2012).

Green area development required improvement of the spatial pattern of urban green area. To identify potential improvements, we compared the predicted development of planned cultivated and natural green areas (Kong et al., 2010). Urban green area development includes protection of existing green spaces, creation of new spatial forms, and restoration and maintenance of connectivity among diverse green areas. To maintain or restore connectivity, planners must identify the best habitat and potential corridors by considering distances and the barriers between habitats (impedance) posed by the landscape and land use (Kong et al., 2010)

From the time of industrial revolution, the thinking of garden city with relation to population pressure and production of industrial waste up to the present sophisticated direct and indirect benefits, development of green area need high quality and big investment both in the urban authorities and private participations. It is not a simply question for leisure or relaxation, but a question of perpetuating the life of healthy human and endangers species of animals and plants. At this time of high rate of rapid urbanization due to natural increase and rural-urban migration, the need of land for housing legally and for squatter illegally need the day to day supervision and protection of green area (Andersson, 2006). This was also required to dedicated administrators and developer of green areas in DebreBerhan town. This is because the purpose of green areas is primarily to preserve the flora and fauna of the city and to provide a basis for attraction of tourism for the city. It also gives citizens pleasant, convenient and healthy surroundings to live in and work.

II. OBJECTIVES

The main objective of the research was to identify key factors that affect green area development and management in DebreBerhan town, North Shewa Zone Amhara Region.

III. DESCRIPTION OF THE STUDY AREA

DebreBerhan town was founded by the Emperor Zara Yaqob as a capital for his empire in 1454 in connection with the appearance of Orthodox Church which was ordered and established by the Emperor in response to a miraculous light that was seen in the sky. During that time its name was DebreEba, which was changed in to the present name DebreBerhan during his reign in association with that light descended on it (near the present DebreBerhan Sellassie Church (DebreBerhan town municipality office, 2019).

According to DebreBerhan town communication office (2019) DebreBerhan is found in North Shewa Zone of Amhara National Regional State. It is astronomically located in an approximate geographical

coordinates between 9°38'00''-09°41' North Latitudes and 39°30'00''-39°32' East Longitudes. In relative terms, it is situated at about 130 km from Addis Ababa (the national capital) and at about 696 km from Bahir Dar the regional capital on the main highway to Dessie and/or to Mekele.

The town is bounded by weredas of North Shewa Zone of Amhara National Regional State which is an indication of good potential. Currently, it is classified with 9 kebeles under municipal status and woreda level and serves as a center for North Shewa Zone. (DebreBerhan town municipality office, 2019)

The total area of DebreBerhan town under the municipal jurisdiction including the surrounding rural areas is estimated to be about 18,000 hectares while the existing built-up area under urban occupation is some about 2200 hectares that, in general, implies the available excessive expansion areas within its jurisdiction. The shape of the town is somewhat linear (elongated) following inlets and/or outlets of major roads which were identified as one of the planning issues in the Structural Plan preparation to maintain compact shape so as to optimize the required infrastructure and service expansion expenses.

With an average elevation of 2750 meter above sea level, DebreBerhan is classified under Dega agro-climatic zone with monthly an average maximum temperature of 20.1°C and average minimum 6.5°C. The town got mean annual temperature of 13.3°C. This may be cold for some times (October, November and December), is favorable for human settlement and to undertake any developmental activities. DebreBerhan with mean annual rainfall of 965.25mm has moderate annual rainfall amount that was sufficient to undertake any developmental activities. Helpful to sufficiently recharge the ground and surface water, and made the town the most preferable area with ample water supply coverage attracting different investments where water was one of the inputs for production. Thus, the structure plan preparation should consider such favorable climate and abundant rainfall. (CSA, 2007)

The dominant prevailing wind directions of DebreBerhan were Southeastern and Eastern winds that blow from southeast to southwest and from east to west. Thus, pollutant establishments (industries) that emit any smokes, dusts, sounds, and odor should be allocated against these directions in the southwest and western parts of the town.

DebreBerhan had a good hydrological features as it was found in the area having a good rainfall amount; relative humidity with average mean monthly value 72.95% sunshine, evapo-transpiration and wind speed. (DebreBerhan town municipality office, 2019)

On the basis of production wells drilled for DebreBerhan water supply study, the inter bedded volcanic rocks of its aquifer is being recharged directly by infiltration of rainfall and/or infiltration from porous aquifer developed in quaternary sediments covering plateau area. The formation is drained by perennial and seasonal rivers like Chacha and Beressa. The groundwater flow direction in the study area was mainly controlled by geological structure and partly by geomorphology. Accordingly, the general flow direction of the groundwater is inferred to be northwesterly, aligning to the flow direction of Beressa River.

The main source of recharge to groundwater in DebreBerhan area is mainly from rainfall on the plateau and moderately-gently sloping plains. Although the source of recharge is rainwater for most of the area, recharge to the groundwater was also possible along the surface flow of the perennial river Beressa. As the flow of Dalecha and Derek Wenz streams in the catchment was controlled by structures, localized aquifers along the structural plains would be recharged by the surface water of streams.

Topographically high areas can generally be considered as recharge areas and topographically low areas can be considered as discharge areas. Since groundwater catchment was structurally, lithologically and topographically controlled ground water discharges occur as springs at the highlands and seepages on the valley and escarpments.

Groundwater discharge areas were formed by local moderate depressions in the plateau and steep slopes. Groundwater discharge also occurs due to topographic breaks, most of the elevated areas were recharge areas to groundwater. The Groundwater potential in the study area made on groundwater resources of DebreBerhan area indicates the presence of three potential well field sites, namely Beressa, Dalecha and Derek Wenz streams. Because of these and other reason the town was more suitable for green area development. (DebreBerhan town municipality, 2019)

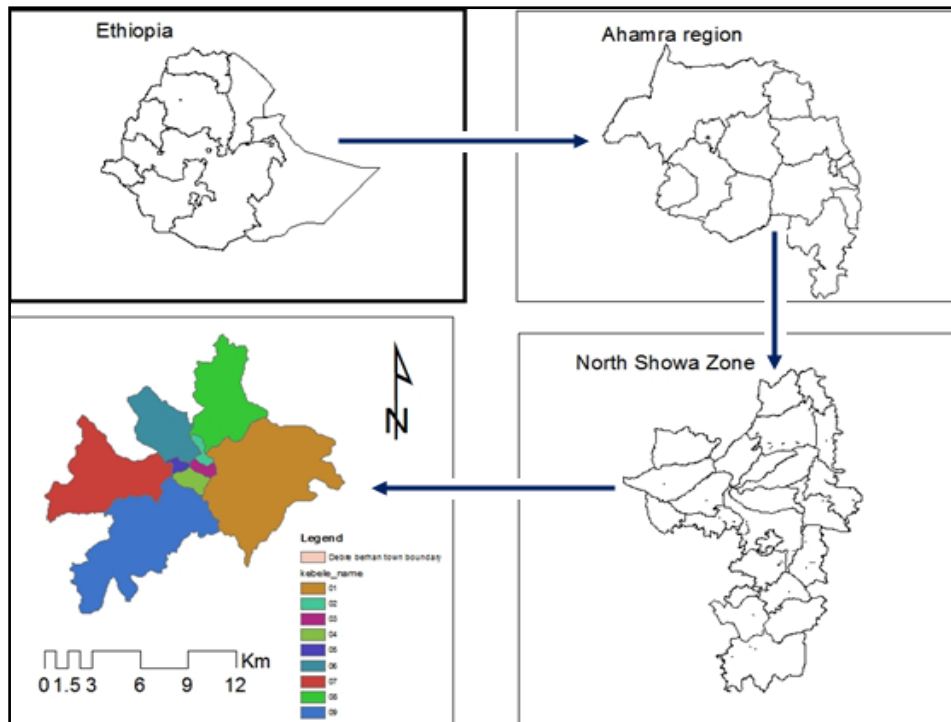


Fig.1: Location map of DebreBerhan town, Ethiopia(Own Source)

According to Central statistics authority report (CSA, 2007) the total population of the town was estimated to be 65231, out of the total population 33563 were females and 31668 were males. The major economic activities of the city people mainly on commerce, daily labor, petty traders, small-scale industries as well as domestic economic activities like, selling local beers and local alcoholic beverage like, “Arekie” (DebreBerhantown communication office,2019).

IV. RESEARCH METHODS

In this study, questionnaire, field observations, focused group discussion and interviews were used as tool for data collection. The data was tabulated, analyzed and presented using tables, maps, figures and pie charts. Both quantitative and qualitative research approach was used, but mostly qualitative approach might great in use (Creswell, 2009 & Kothari,2009). Collecting relevant data for analyzing the factors affecting green space development in DebreBerhan town urges for using or applying site visits, observe and questionnaires which were the best way of methodology for the research.

The study area has nine kebeles. In order to manage the study, the researcher divided these kebeles into three groups by using cluster sampling techniques in which the relative proximity (location) of the kebeles to the center and the settlement patterns (topography) of the town was the criteria to group kebeles into three. Then, three kebeles were selected by purposive sampling technique (Kothari, 2009&Sarantakos, 2005). The unit of observation in the study covers both the institution and the residents accommodated in DebreBerhantown and the institutions were the one which engaged in assessing factors which affects green area development. Thus the observation unit of the study constitutes two institutes (2), nine kebeles(9) and households.

The research was used a purposive sampling technique of households who were living near and around the proposed kebeles, and for those whose home was presented within or near the proposed green areas in kebeles 01, 07, and 08. The target population of the study was those households which were situated 6 green areas. From each green area 10 households were taken as a sample for the study. Therefore, from the 6 green areas 60 households were taken. And the remaining 15 respondents were from DebreBerhan town different institute experts. The total households surrounding the green areas were the sampling frame of the study. Therefore the total respondents were 75.

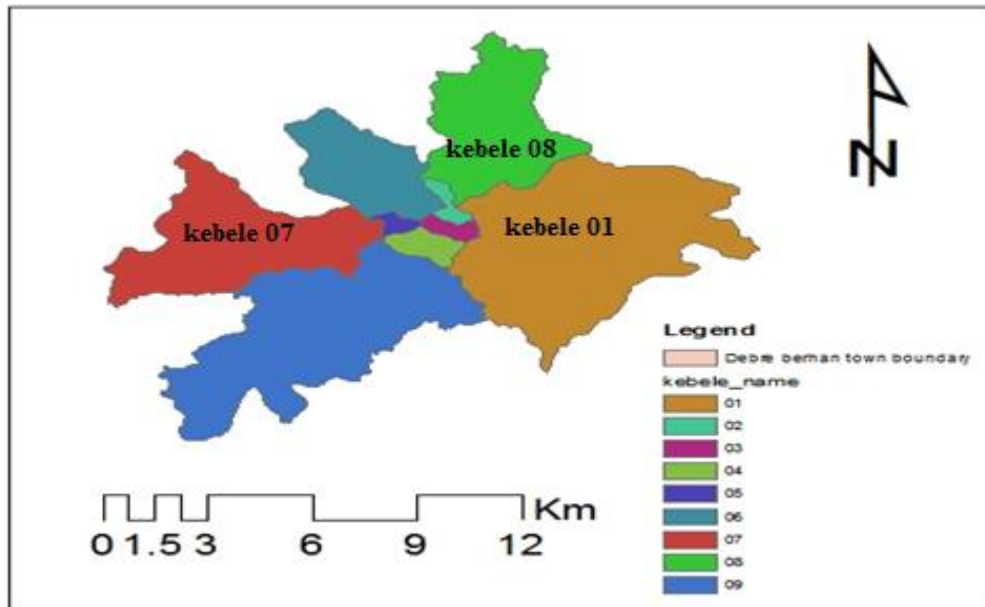


Figure 2: Selected Sample Kebeles (DebreBerhan town, Ethiopia (Own Source)

Table1: Types and numbers of respondents during data collection

No	Types of respondents	Data collection tools			Total	%
		Questionnaires	Focus group discussion	Interview		
1	Households	59	1	--	60	80
2	Municipal experts	2	1	2	5	7
3	Zone Urban Development and Construction experts	3	--	2	5	7
4	Kebele administrators	--	3	2	5	6
	Total	64	5	6	75	100

Both the primary and secondary data were used. The primary data was collected through questionnaires, interviews and focus group discussions; and the secondary data was collected from different documents like books, journals, previous researches, reports, and websites.

The Data was presented and analyzed in simple statistical tools like tables, percentages, and frequencies. Apart from the data analysis and interpretation the data presentation was presented through photographs, maps, figures charts, excel computer programme and simple calculations for tabulation and charts

Since the important to research instrument going to be used in the study was interview. As a result, putting ethical consideration was necessary. That means; time would be respected; respecting social values and give due recognition for the respondents during and after the interview; the research could not affect the physical and social life of the individual respondent; confidentiality would be kept and the result from the observation would be immediately recorded

V. RESULTS AND DISCUSSION

1.1 Factors Affecting Green Area Development and Management

Rapid urbanization accompanied by the marked rise of human population has resulted in the loss of green space, particularly of corridors that connect different patches of green space (McConnachie and Shackleton, 2010). A host of environmental, cultural, customs, ceremonies... impacts urban spaces and their formation. Meanwhile, green areas of DebreBerhan town were those areas which have undergone many changes in the course of history influenced by way of living and new urban approaches.

Most of the urban areas, despite the dedicated costs, were being used less by people due to inappropriate recognition and planning or sometimes mismanagement. Urban green areas were not established for recreational needs. At the same time urban green areas are ecological based requirement (Bilgili, 2009) and (Rafieyan, Mojtaba, Khodaei, and Zahra 2009). Green areas were developed by the municipality in collaboration with other stakeholders, others by the individuals which was developed in their compound; but there was lack of

appropriate plan and budget at the town level for the sectors for the development of green areas because of different factors.

Table 2: Factors that affect green area development and management

No	Factors	No of respondents	Percentage (%)
1	Lack of awareness	16	21
2	Low level of community participation	12	16
3	Lack of finance/budget	25	34
4	Lack of professionals	9	12
5	Existing structural plan	6	8
6	Lack of coordination between community and municipality.	4	5
7	Lack of controlling and monitoring the private developers	3	4

Therefore, according to the responses from the table 2 above, 25(34%) lack of finance, 16(21%) lack of awareness, 12(16%) low level of the community participation with municipality in green area development, and 9(12%) lack of professionals were the major challenges for the development and management of green areas.

1.1.1 Lack of awareness

Green areas need to be uniformly distributed and developed throughout the city area, and the total area occupied by green spaces in the city should be large enough to accommodate the city population needs (Haq, 2011). The community, civil servants, the officials and even professionals were not aware of about the values or simply ignored them. Because of this low awareness, the community has the habit of using green spaces for illegal purposes like for dumping of solid wastes, grazing, crop production, storing and selling construction materials.

As some respondents said during the time of questionnaires distribution, the awareness problem is not only for the people but is also an issue among officials. The municipal authority plants seedlings at the beginning of each summer, but none of the seedlings had developed well because they were not taken care of and maintained regularly. The town administration should provide environmental education and discuss clearly the values of green areas to the general public. The respondents also pointed out that, they want to use the green areas for Edir purposes; dumping solid wastes; storing and selling construction materials; and grazing and crop production rather than the unknown and invisible benefits of green areas.

Table 3: Respondents' Preference for Using Green Areas

No	Choices of respondents to use green areas	Number of respondents	Percentage (%)
1	For Edir, Burial and Holyday Ceremony	10	13
2	Dumping Solid Wastes	20	27
3	Storing & Selling for Construction Materials	25	34
4	Animal Grazing	13	17
5	Agricultural Production	7	9
	Total	75	100

From the responses given in table 3 above and the figure below one could understand that the awareness of the community about the real and intrinsic benefits was not that much developed in the town concerning green area development and management. There were different implications that were observed from the societies. From this point of view, according to the community, if the urban societies were not use green areas for social gathering or other good purposes lead to weak cultural cohesion but it leads the loss of the eco-system and aggravates environmental degradations. If there was loss of socio-cultural cohesion within the communities, it brought about total loss of the culture of the society due to lack of transitivity from generation to generation and also create unwanted habits in the society, like addiction to chat, cigarette, alcoholic drinks and other nicotine's.



Fig .3: DebreBerhan town partial illegal utilizations of green area(Own Source)

1.1.2 Problems Related with the Structural Plan

Demands for green area should first of all be met in terms of number, size and quality of green areas inside cities and towns (Grahn, &Stigsdotter, 2003).During plan preparation, the professionals or the plan makers should have a clear and precise know-how and understanding about the people’s culture and settlement pattern of the people who were living in the city for which the plan was prepared (VROM, 2000). Their failures to visit the sites to be planned has resulted in the preparations of plans in which certain area have been prepared for green areas development on the plan but in actual fact were already built up areas.

These problems were observed on the existing DebreBerhan town structural plan, which was given a single plot of land for vehicle parking and small scale enterprise in Kebele 08. This was confirmed by the urban planning and land administration team leader of the municipal authority and was also observed from the structural plan. The area that was given for vehicle parking and small scale enterprise was found on the green area that proposed in the structural plan of DebreBerhan town.



Fig.4: DebreBerhan town Partial vehicle parking and small scale enterprise on green area (Own Source)

1.1.3 Financial Problems

Local authorities may lack the financial means to establish new or modify existing green areas, or municipally owned land that can be devoted to public open spaces may be limited. In this situation, it is most important to protect existing urban green spaces and make them accessible to as many residents as possible. Especially in disadvantaged urban areas, further reduction of green areas may result in negative social and health problems (WHO, 2017).

The financial problem for green space development was critical for both developed and developing countries for developing, maintaining and administering green spaces. The problem was not only for running costs but also expenses for salary for high qualified multidisciplinary professionals which required heavy investment. In DebreBerhan town, the problems have two faces, according to the municipality head: lack of budget for physically development of green areas, and lack of attention and negligence when budget was prepared and allocated for green space development.

The officials explained during the time of focus group discussion, that they didn't know about how much was allocated for green space development. The Manager added that, there was no trend of allocating budget for green space implementation in the town. Even if the budget constraint was visible at all, less attention and lack of awareness about the benefits or values of green spaces have affected budget allocation for green spaces. The actual budget constraint and lack of awareness and attention has resulted in the problem of under development of the green spaces in the town.

Table 4: Causes of financial constraints as responded by officials

No	Causes of financial constraints	No of respondents(officials)	Percent (%)
1	Real Lack of budget	23	31
2	Less attention had given	37	49
3	Non inclusion green areas in budget allocations	15	20
	Total	75	100

From the above table 4, over 80 percent of budget constraints emanated from ignorance and negligence of officials about green areas development and management. This also led to low public participation because the administration couldn't take the initiative to inform and educate the public about the importance of green areas. Officials have to gain understanding about what was a livable and competitive town. To develop their awareness, the town authorities had to learn from the experiences of other cities which had better experiences in the green areadevelopment.

1.1.4 Lack of Qualified Professionals

Urban policy-makers and practitioners are advised to consider four practical implications for the planning and design of urban green areas identified from the review of evidence and practice (WHO, 2017).Town that is livable, neat, suitable and attractive for residents, guests and tourists, increases its competitiveness. This attractiveness and competitiveness results from qualified and committed officials, as well as professionals who work day and night for achieving the goals of making the town more competitive and attractive.

The nature of green areas is multifunctional which requires multidisciplinary professionals for well green area development. Without qualified and committed professionals, better awareness, and sufficient budget or modern and best plan cannot be achieved. Therefore, professionals were irreplaceable for green space development in the study area.

According to the DebreBerhanmunicipality, there are about 12 employees under the SBPD department of the municipality office in DebreBerhan town. It was true that urban services like that of green area development needs proportionate number of service providers. However, the number of workers of the SBPD department involved in the green area development in DebreBerhan town was extremely low. Assuming that the total population of DebreBerhan town in 2007 is about 65231 and the total number of the SBPD department workers is 12, who are fully involved in green area development and related works, then on average there is only one worker per about 5436 populations. From this, one can infer that the department was not staffed with the necessary manpower size or the number of workers to perform such a huge task was not related to the task. Level of Education and qualification (including knowledge and experience of green areas) were the two most important interrelated factors affecting green area development.

Moreover, lack of concern to the problems forsmall scale enterprise such as payment on time and bureaucratic processes from the town municipality as well as lack of due respect from the community, particularly to street cleaner and container waste dumper workers, were also affecting the moral of the workers of SBPD department of the town. Consequently, this influences the service delivery process.

The other problems of the structure or positions were focused more on solid waste department than greening and protecting the area. Even the employee in the department, who work on the horse driven carts to pick solid wastes, used green areas for storing the collected solid wastes until they took off and dump in the sites. Thus, the employee of the municipal authority themselves were not aware about the values and benefits of green areas as was observed during the field observation.

1.1.5 Lack of Participatory Planning

Urban green area is an important investment that local authorities can make on behalf of citizens and their well-being. Urban green area interventions improve the quality of life for the whole city, and a wide range of community groups and stakeholders need to be involved in their planning. Such interventions provide opportunities specifically to support disadvantaged or underserved areas and to reach out to individual population groups (WHO, 2017). Participatory planning was a reflection of democratic administration which should accept and respect the interest of the people ruled. For this, there must be consultation, participation, evaluation and monitoring of any development plan by all stakeholders, and had taken the priority according to the need and interest of the stakeholders. Priorities must set to solve the existing problem and brought prosperity. As the level of participation of the people increases, the level of contribution for implementation and sense of ownership increases. In the town of DeberBerhan, there were many community organizations like Edir, Equb, Youth Association, Teachers Association and many others which had opportunity for participation in consultations, monitoring and evaluation for the development and management activities of green area.

According to some residents during the time of questionnaires, if one institution took the initiative for green area planning, developing and managing, no one will oppose participating in planting and keeping plantations in each villages. They added that, especially the schools and government institutions have opportunities to take this responsibility due to their access to different professionals and experiences of their staffs. Therefore, there will be one responsible institution taking the initiatives and responsibilities for planning, developing and managing public and private green areas.

VI. CONCLUSION

The awareness of the population towards planting and using green areas for the intended values are very poor. They prefer using the areas intended for green areas for illegal activities like, for storing and selling construction materials, dumping for solid wastes, animal grazing, agricultural production and so on than getting intensive values of green areas. Due to lack of participatory planning, during the preparation of the structural plan of the city in 2007, there were contradictions on the implementation of the plan.

Underdevelopments of green areas were a result of the absence of the required professionals with experience and sufficient budget. The municipal authority human resource had lack of urban planner and professional personnel for related fields for developing the sector. This implies no attention was given for the sector's development, but environmental degradation and raise of temperature from year to year was the main characteristics of the town.

There were various factors which contribute to the low level of awareness of the people about the benefits gained from the well developed and managed green areas. Low attention given to the sector by the population and officials on the town, the type of economic activities engaged in most residents like cattle rearing and local beer production on the residents' side and the level of education and discipline studied by the officials affect their awareness towards green areas development and management. They believed that green areas were simply open spaces used for mainly for storing and selling construction materials, dumping of solid waste, grazing animals and celebration of cultural festivals.

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