Online ISSN: 2249-4626
Print ISSN: 0975-5896

Global Journal

of Science Frontier Research : H

Environment and Earth Science

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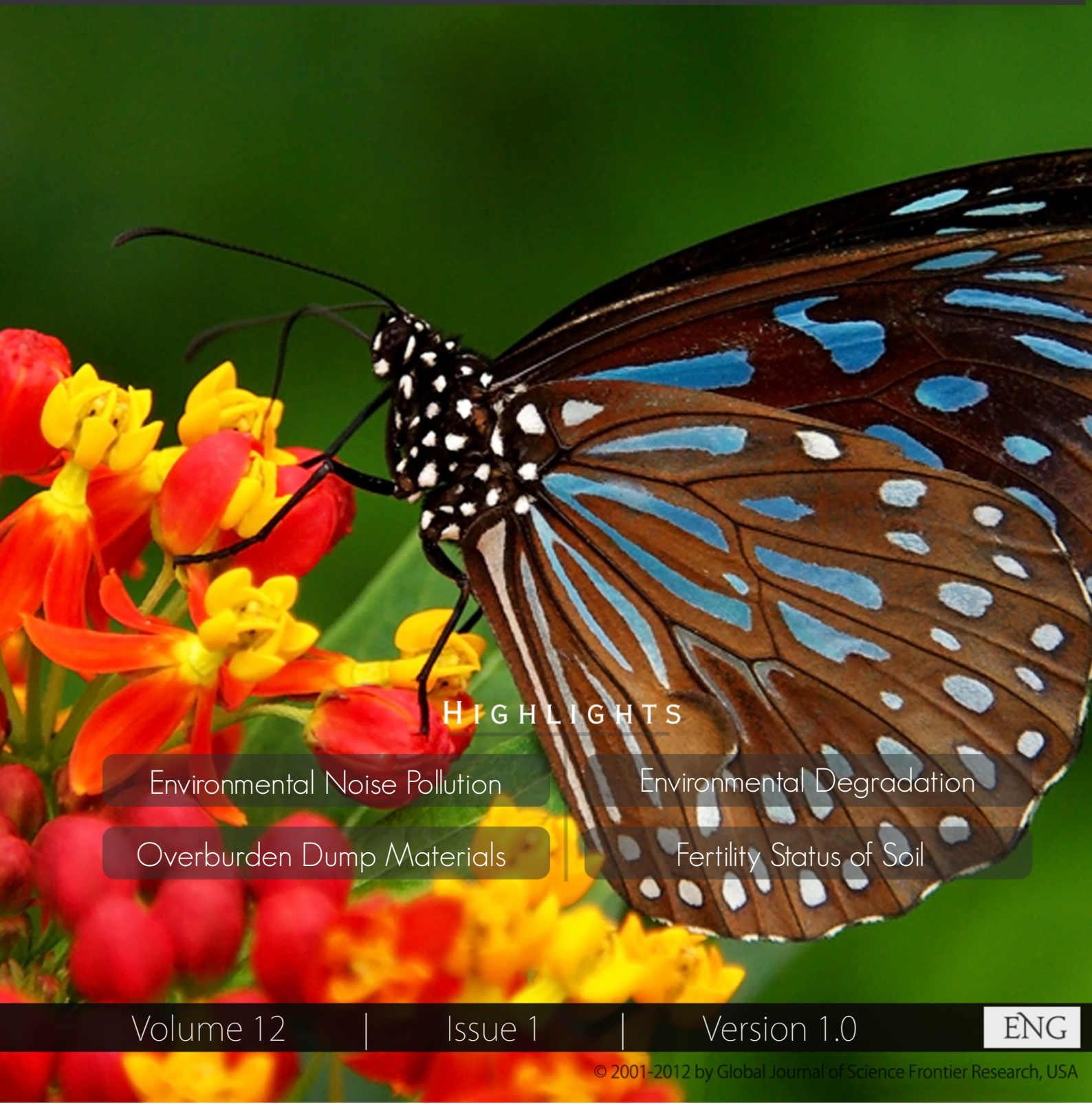

Highlights

- Environmental Noise Pollution
- Environmental Degradation
- Overburden Dump Materials
- Fertility Status of Soil

Volume 12 | Issue 1 | Version 1.0

ENG

Global Journal of Science Frontier Research: H
Enviornment & Earth Sciences

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Volume 12 Issue 1 (Ver. 1.0)

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Publisher's Headquarters office

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Offset Typesetting

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Contents of the Volume

Global Journal of Science Frontier Research
Enviornment & Earth Sciences
Volume 12 Issue 1 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Environmental Noise Pollution in Educational Institutes of Nagaon Town, Assam, India

By Debnath, D. , Nath, S.K & Barthakur, N.K.
Dhing College, Nagaon, Assam

Abstract - Nowadays, along with air pollution and water pollution, noise pollution also hits the public life and creates problems to normal the life. Noise pollution around the educational institutes of Nagaon town of Assam, India produces multi problems to the teaching-learning process and negatively affects the performance of both teachers and students. The noise level should be in the range of 40 dB (A) to 50 dB (A) in and around an educational institute. But it exceeds in all cases. A study of this problem was carried out in some educational institutes of Nagaon town, Assam, India by taking measurement on noise level in dB (A) with the help of Noise Level Meter and by questionnaire supplied to students, teachers and officials. The analyzed result clearly shows that the rate of noise level in all the institutes (in and out) is very high and not suitable for teaching-learning process. Therefore Acts and regulations concerning noise pollution should be strictly adopted.

Keywords : *Nagaon, Noise, Noise pollution, Noise level meter.*

GJSFR-H Classification : *FOR Code: 040199*

Strictly as per the compliance and regulations of :

Environmental Noise Pollution in Educational Institutes of Nagaon Town, Assam, India

Debnath, D. [α], Nath, S.K [σ] & Barthakur, N.K. [ρ]

Abstract - Nowadays, along with air pollution and water pollution, noise pollution also hits the public life and creates problems to normal the life. Noise pollution around the educational institutes of Nagaon town of Assam, India produces multi problems to the teaching-learning process and negatively affects the performance of both teachers and students. The noise level should be in the range of 40 dB (A) to 50 dB (A) in and around an educational institute. But it exceeds in all cases. A study of this problem was carried out in some educational institutes of Nagaon town, Assam, India by taking measurement on noise level in dB (A) with the help of Noise Level Meter and by questionnaire supplied to students, teachers and officials. The analyzed result clearly shows that the rate of noise level in all the institutes (in and out) is very high and not suitable for teaching-learning process. Therefore Acts and regulations concerning noise pollution should be strictly adopted.

Keywords : *Nagaon, Noise, Noise pollution, Noise level meter.*

I. Introduction

The word Noise is conveniently and concisely defined as unwanted sound that creates annoyance and interferes in conversation disturbs sleep and teaching-learning process; reduce work efficiency, causing stress and challenge to public health and it is silent killer problem growing day-by-day. Almost all the educational institutes are located near the busy places such as bus-stand, market area, busy roads etc. of the Nagaon town of Assam. Therefore these educational institutes suffer from noises and hence disturbing in school activities like teaching, learning and discussion session. But in other countries the educational institutes are fully equipped with modern technology to minimize noise from surroundings. Educational institutes are built with sound insulation buildings. The main sources of noise pollution are Traffic noise, Community noise, Industrial noise (Nigam, 2008).

The major source of noise pollution in the educational institutes of Nagaon town is traffic noise because all the institutes are located near the busy roads of the town. Transport sector is major source of traffic noise pollution in the town. With the rapid increase of number of private and public vehicles in the town, the noise pollution also increases gradually because the road characteristics remain same but rate of traffic flow increases rapidly. In connection with this problem we can assessed that the major source of this situation are population growth, rapid urbanization and motorization.

Noise become an unjustifiable interferences and imposition upon human health, comfort and qualitative of human life (Gopalkrishana, 1978; Lakshimipathi, 1978; Gorai and Pal, 2006). Noise may define as unwanted sound, consequently it can be considered as the wrong sound in the wrong place at the wrong time (Kiely, 1997). Noise receives by human depends on some factors related to the man and these are age, sex, and mood of person.

Many studies addressing the problem of noise pollution in educational institutes throughout the world have been conducted. Ikenberry (1974) has analyzed some effects of noise pollution to school students, such as students found difficult to hear the teacher, lectures, classroom discussions, and other activities. Slater (1968) in his research work showed that students can perform better under quite condition than under noisy condition.

II. Study Sites

Nagaon district is one of the largest districts of the state Assam, India. It is located at a distance of 123 kilometer by road from Guwahati. Nagaon district is located between 25^0 45/ to 26^0 45/ north latitudes and 92^0 33 / east and 93^0 20/ east longitude. Average altitude of Nagaon district is 60.6 meters above the sea level. Almost all the educational institutes (Nowgong College, A.D.P. College, Girls College, Govt. Boys H.S.School, Govt. Girls H.S.School, I.T.I. Nagaon, Bengali Boys H.S.School, Bengali Girls H.S.School) are located near the busy places such as bus-stand, market area, busy roads etc. has a high rate of noise pollution of the Nagaon town of Assam. Noise pollution at educational institutes depends on where the institutes are located. All of these institutes are located in high voltage noise pollution zones i.e. near NH-37, busy PWD roads, people by-pass and commercial areas and suffering disturb in all types of institutional activities. Noise pollution in educational environment disturbs during study session. Students cannot concentrate in classroom teaching and they lose interest to study.

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Noise pollution also affects the teachers. They cannot teach effectively during teaching session because of uncomfortable classroom conditions. The main source of noise pollution in these institutes is traffic noise from motorcycles, trucks, buses, autoes, tempos, mini-trucks and all types of vehicles.

III. Materials and Method

Since the objective of the study was very difficult, a complete and comprehensive analysis was only possible if the views and apprehensions of all the parties i.e. students, teachers as well as the Head of the institution were surveyed and studied. For analysis data was collected in two ways- by measuring noise level and with the help of questionnaire. The noise levels are measured with the standard procedure using calibrated sound pressure level meter in decibel unit. The instrument consists of microphone, amplifier, network weighting (A, B, and C) and a digital display to read the noise level. Different sets of questionnaire were prepared for students, teachers & HOD of the institutions to identity the right need. The key findings are presented in the form of tables, graphs, charts. All the findings are then compared with the standard and guidelines that has been used.

A social survey was also conducted by us in different institutions in Nagaon town by supplying a Questionnaire to the students, teachers and Head of the institutions to achieve right goal of the study…….

IV. Results and Discussion

From the measurement of noise level meter in different institutions in Nagaon town shows that noise pollution does exist in all of the institution and it is found that Nowgong College and A.D.P. College are highly noise polluted institutions although all institutions exceeds the tolerance level of noise pollution which clearly indicate that the environment is not suitable for teaching-learning process. The study showed conclusively that road traffic is the predominant source of this problem because all these institutions are located in the heart of the town and surrounded by busy roads like NH-37 and other PWD roads. To meet the demand of urbanization and modernization, noise and traffic have become busy and hence there are always incidence of noise population in urban areas and the increasing of industrialization with transportation also increase the pollution problem again.

In the present work, an attempt was made for comprehensive study of noise problem at ten Educational Institutes at and around Nagaon town. The maximum noise level observed was maximum 80 dB (A) in Nowgong College (Table 1). The major sources of noise pollution were motor vehicular traffic 46% followed by students themselves 40%. The permissible limit of traffic noise is 50dB (A) (Rules & Regulations of the National Pollution Control Commission (1978), Section 78). However, all the institutes cross the noise level permissible limits. From the analysis of data from questionnaire it is clear that all the educational institutes does have noise problem. Noise problem in educational institutes mainly depends on where the institute is located. All the surveyed educational institutes in Nagaon town are located in the heart of town i.e. in the busiest roads and places of town. And thereby educational institutes are suffering from noisy environment creating disturbance in daily work. The findings from the Questionnaire shows about the adverse effect of noise pollution on educational Institutions and the findings is summarized as there is a lot of disturbance in teaching-learning process as 62% agrees with it.

From the study it is also observed that the people strongly supported the action from authorized body, Govt., or committee to reduce noise pollution. Most of them focused on the ban of hydraulic horn, old vehicles. The local administration should take some steps and regulatory measures to be abate such noise pollution (Kumar et al, 2004; Das, 2006; Datta et al, 2006; Garg et al, 2007). In rapid industrialization and urbanization the transport sector is growing rapidly and vehicular number on road also increases which leads to overcrowding and noise pollution (Anonymous, 2000; Krishna Murthy, 2007).

After analyzing the questionnaire it is observed that 89% respondents agree with noise pollution in the institutions and disturbed in teaching-learning process, 6% disagree with this and 5% does feel noise which is shown in fig.1.

With the help of the Questionnaire we want to know the adverse effect of noise pollution on educational Institutions and the result on these questions are summarized as follows and result is shown in fig.3.

a) Disturbance in teaching-learning process - 62%
b) Difficulties in classroom discussion - 18%
c) Health problem and mental stress - 20%

The major sources of noise pollution were motor vehicular traffic 46% followed by students themselves 40 %(from questionnaire)

a) Among themselves (students) - 40%
b) From vehicles - 46%
c) People moving on road - 9%
d) Construction work and others - 5%

V. Conclutions and Recomandations

In rapidly urbanizing Nagaon town, the transportation sector and students themselves lead to overcrowded roads and noise pollution in educational institutes in the town. The following range of measures

may be taken to reduce vehicular noise pollution in educational institutes —

a) The educational institutes have criteria of a good planning for an institutes and it should be located far from main road, busy PWD roads and other noise sources.

b) Educational institutes should have buildings that have sound insulation system and high fence using concrete walls which protect noise from outside.

c) Educational institutes should be aware of plantation of trees and vegetation buffer zone because trees and vegetation can absorb 4dB-6 dB noise intensity depending on their characteristics.

d) Students, Teachers and Public awareness would also helpful in reduction in noise level in educational institutes.

e) A strict law concerning noise pollution in educational institutes should be implemented.

f) Restricting vehicular movement within or nearby the educational institutes.

g) Applying Speed limits for vehicles near the educational institutes.

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Noise Standards in educational institutes (maximum allowable noise) such as an area within 100 meters from educational institute's sites.

Day time(9am-6pm)	Morning time(5am-9am)	Evening time(6pm-10pm)	Night time(10pm-5am)
50 dB(A)	45 dB(A)	45 dB(A)	40 dB(A)

Source : Rules & Regulations of the National Pollution Control Commission (1978), Section 78.

Table 1 : Measured maximum and minimum readings given by slm in different institutions.

Sl.No.	Name of Institutions of the town	Noise Level Range in dB(A)	Maximum noise in dB(A)
1	Nowgong College	61-80	80
2	A.D.P. College	57-78	78
3	Khagarijan College	55-72	72
4	Nowgong Girl's College	54-68	68
5	I.T.I. Nagaon	58-67	67
6	G.N.D.G. Commerce College	60-74	74
7	Govt. Boy's H.S.School	54-66	66
8	Govt. Girl's H.S.School	58-68	68
9	Bengali Boy's H.S.School	57-67	67
10	Bengali Girl's H.S.School	58-66	66

(Permissible noise level: Outdoor-Below 55 dB (A) & Classroom-35-45 dB (A))

Fig 1 : Noise pollution in Educational Institute

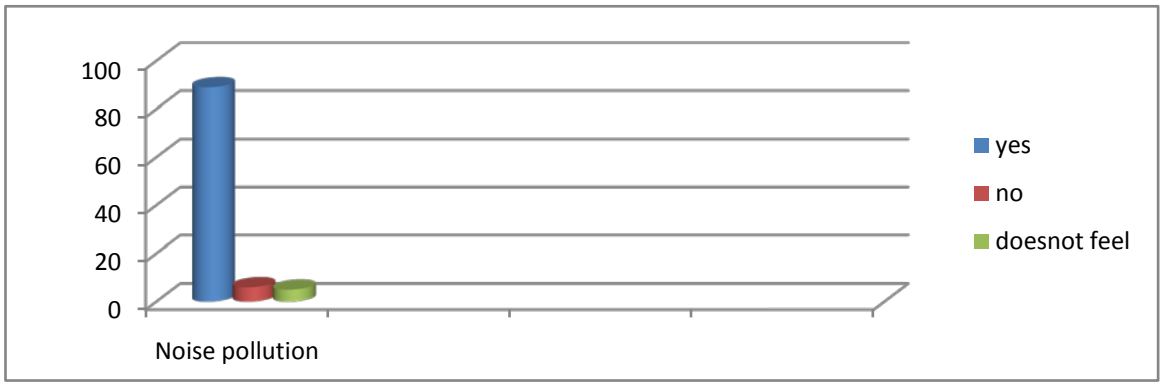


Fig 2 : Shows the sources of noise pollution In the Educational Institutes.

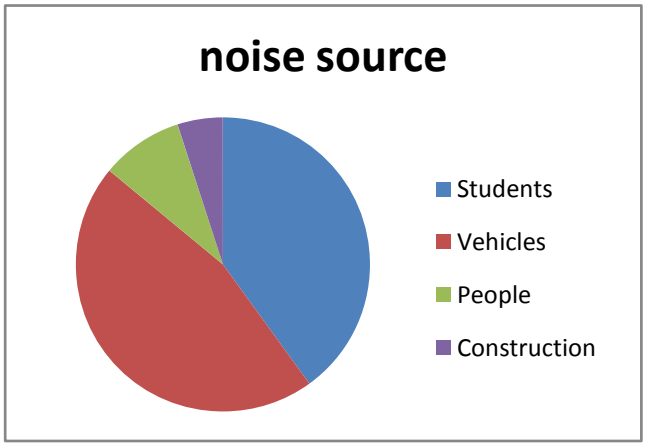
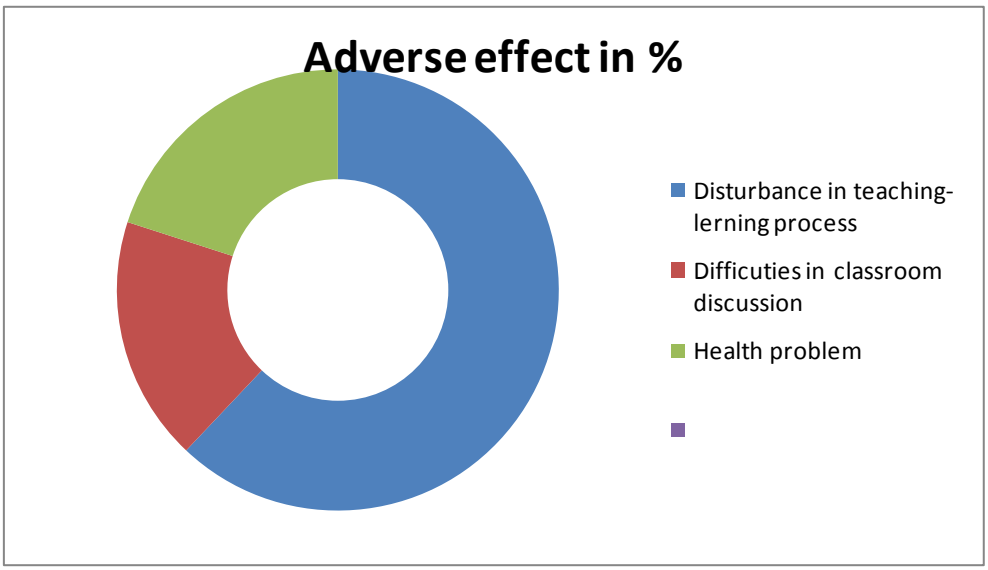


Fig 3 : Adverse effect of noise pollution



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Global Journal of Science Frontier Research
Enviornment & Earth Sciences
Volume 12 Issue 1 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

A Study of Physico-Chemical Characteristics of Overburden Dump Materials from Selected Coal Mining Areas of Raniganj Coal Fields, Jharkhand, India

By Sayar Yaseen , Amit Pal , Siddharth Singh & Idrees Yousuf Dar
Bundelkahand University Jhansi

Abstract - Most of the coal production in India comes from open cast mines contributing over 81% of the total production. A large number of open cast mines of over 10 million tons per annum capacity are in operation. Mining activities particularly opencast mining in huge forest areas results into loss of biodiversity, loss of nutrient qualities and microbial activities of the soil system. Opencast mining releases huge amount of mining wastes to the upper part of the land surface as overburden dump materials. In this study, the site selected for the experiment was overburden dump at different mining areas under Raniganj coalfields (RCF). The overburden (OB) samples were collected during the months of February and May 2010. Physico chemical characteristics such as Bulk density, Grain size distribution, pH, Electrical conductivity, Organic carbon, Organic matter, Nitrogen and Available phosphorus were determined in the Geoenvironment Division Lab, CIMFR Dhanbad.

Keywords : *Coal, Opencast mines, Overburden materials, Bulk density, Organic carbon.*
GJSFR-H Classification : *FOR Code: 660103p*

Strictly as per the compliance and regulations of :

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Sayar Yaseen [α], Amit Pal [σ], Siddharth Singh [ρ] & Idrees Yousuf Dar [ω]

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Keywords : Coal, Opencast mines, Overburden materials, Bulk density, Organic carbon.

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I. Introduction

Coal is the most abundant fossil fuel resource present in India. Coal mining in India dates back to the 18th century. Coal has a relatively high importance for the economical growth of a country. An estimated 55% of India installed capacity of 124,287 MW of power generation is through coal based thermal power plants. India is the 3 rd largest producer of coal in the world and India has the 4th largest reserves of coal in the world (approx. 197 billion tonnes). There are 44 major coalfields located in the Indian peninsular, in addition to 17 in the north-eastern region. The geological reserves of coal have been estimated at 24 123 Mt of coking coal and 162 914 Mt of noncoking coal, up to a depth of 600 m. The average stripping ratio (overburden to coal) during the last three decades was 1.97m:3 /t (Chaulya *et al.,* 2009). These overburden dumps change the natural land topography, affect the drainage system and prevent natural succession of plant growth (Bradshaw and Chadwick 1980; Wali, 1987) resulting in acute problems of soil erosion and environmental pollution (Singh *et al.,* 1994;Singh *et al.,* 1996). Selection of plant species for revegetation of overburden (OB) dumps depends on various parameters such as physical and chemical properties of dump materials (Singh and Jha, 1992).

In India two types of mining operated as opencast and underground mining. Opencast mining is a developmental activity, which is bound to damage the natural ecosystem by several mining activities. During opencast mining, the overlying soil is removed and the fragmented rock is heaped in the form of overburden dumps (Ghosh, 2002). Dump materials are left over the land in the form of overburden dumps. These occupy large amount of land, which loses its original use and generally gets soil qualities degraded (Barpanda *et al.,* 2001). As the dump materials are generally loose, fine particles from it become highly prone to blowing by wind. These get spread over the surrounding fertile land, plant, disturb their natural quality, and growth of fresh

leaves. It has been found that overburden dump top materials are usually deficient in major nutrients. Hence, most of the overburden dumps do not support plantation. The physico chemical properties of overburden dump materials are site specific and differ from one dump to another dump due to different geological deposit of rocks (Lovesan *et al.,* 1998). The side view of overburden dump materials is shown in figure 1

II. Study Area

The Raniganj Coalfield lies in West Bengal and partly in Jharkhand states at the Eastern most part of the Damodar valley coalfield. Raniganj Coalfield is situated about 185 Km North-West of Kolkata. Asansol is the most important town located in the central part of the Coalfield. Asansol and Raniganj are the major railway station in this region. It is located at 23°37′N-87°08′ E / 23.62°N- 87.13°E. The Raniganj Coalfield is the birth place of coal mining in the India. In the 1850's this coalfield were the major coal producer, constituting over 90% of the total country's coal production. Presently, in this area coal are produce by underground as opencast mining methods by the Eastern Coalfield Ltd. (E.C.L), a subsidiary of Coal India Ltd. In addition, a small part of the coalfield area cover about 1530 Km , spreading over Burdwan, Birbhum and Purulia districts in West Bengal and Dhanbad district in Jharkand. The major part of Raniganj coalfield is in Burdwan district and smaller portion in Birbhum, Purulia, Bankura and Dhanbad district. The Kolkata-Delhi National Highway (NH-2) as Howrah –Delhi railway line of Eastern Railway passes through this coalfield area. A network of roads and railway branch link the surrounding areas.

III. Material and Methods

a) Overburden (OB) sampling

In general, coal is a sedimentary formation, so the overburden materials are include shale, sandstone and other impurities is generally heaped at the mining site, during the time of opencast mining. The overburden samples were collected by a manually operated split tube coring tool (depth 20 cm). The samples were properly packed and brought carefully to Laboratory, CIMFR, Dhanbad for physical and chemical analysis. The overburden samples were air dried, cleaned, crushed in mortar and pestle and passed through 2 mm mesh sieves and then analyzed.

b) Overburden Analysis

Bulk density was determined by gravimetric method. The Grain size distribution was determined by gravimetric method by taking the weight of the fraction passed through the following sieve, 4.75 mm, 2.00 mm, 1mm, 0.425 micron, 0.212 micron, 150 micron, and 75 micron, divided by the total weight of the sample (Ranjan & Rao, 2000). pH and Electrical conductivity was determined in (soil/water1:2.5) suspension with a pH meter and Conductivity meter respectively. Organic Matter of the overburden dump materials was determined by using the Walkley and Blake Method (Nelson and Summers, 1982) after first determining the organic carbon by using a conversion factor of 1.724. Available Nitrogen was determined by the alkaline potassium permagnate Method (Keeney and Bremer, 1966). Available phosphorus content was determined by Olsen's Method (Bray and Kurtz, 1966). The brief details of the sampling sites of overburden samples are given in Table 1.

c) Statistical Analysis

The data collected were subjected to Pearson's correlation matrix to study the significant level at 0.05 and 0.01 (2 tailed) to note the positive and negative correlation among the physico-chemical factors. Similarly, one way analysis of variance was applied to chemical factors to measure the distance or similarity in relation to spatial variations. The SPSS Ver. 16.0 Statistical Program was used for all statistical analysis throughout this research.

IV. Results and Discussions

The results of physico chemical analysis of overburden samples are presented in Table1-3. Bulk density of overburden materials is the mass of the overburden materials per unit volume. Bulk density in all the samples varied from 1.15 gm/cc to1.3 gm/cc. The minimum value (1.15gm/cc) of bulk density was observed at site IV Mandaman Colliery. This may be due to high organic matter content present in the dump samples (Leelavathi *et al.,* 2009). The maximum value (1.3 gm/cc) of bulk density was found in Site II site Gopinathpur Colliery (OCP). The high bulk density values in site are due to the presence of movements of heavy earth moving machineries (HEMMs), big dumpers, water tankers and less amount of grass cover on dump materials. The OB sample having high bulk density value cannot be used as vegetation as well as plantation growth.

Grain size distribution plays an important role in plant establishment of the overburden dump materials. It plays an important role for the maintenance of bulk density of the overburden dump materials. In all the sampling sites percentage of sand fraction was found to be higher. The sand content was found 96% at site I, 73.16 % at SITE II 80.32% at SITE III 84.48 % at, SITE IV, 86.48 % at SITE V indicating poor quality for plant growth. In dump materials sand fraction comes from breakdown of sandstone. Due to higher amount of sand particles in the overburden samples allowing water to move into the dump materials by infiltration process (Ghosh, 2002). Silt is intermediate in size between sand and clay, but silt is easily detached and easily transported. Clay minerals are hydrous aluminosilicates

with other metallic ions. Their particles are very small in size, very flaky in shape and considerable surface area (Ranjan and Rao, 2000). Percentage of silt and clay fraction was found to be in low range. The silt and clay content of overburden samples ranges from 1.56 % at Site V to 5.08 % at Site IV and 6.44 % at Site I to 24.92 % at Site II respectively. The low content of clay and silt was found due to presence of rock forming minerals at the sampling sites. Several researchers are of opinion that lesser amount of clay materials has many microspores through which water passes very slowly into the dump materials. Hu *et al,* (1992) are of opinion that soil with more than 50% stoniness should be rated to be poor quality. The results of grain size distribution of overburden samples are given in Table 2. The pH of soil or more precisely the pH of the soil solution is very important because soil solution carries in it nutrients such as nitrogen, potassium, and phosphorus that plants need in specific amounts to grow, thrive, and fight off diseases. The samples having pH less than 7 were found to be weakly acidic in nature in nature (Brady, 2002). pH of these overburden samples was found to be low, ranging from 6.25 to 6.85 (Figure 5). The slightly acidic natures of all dump materials are due to the geology of the rock composition which will be a problem for plant growth. Brady, 2002, found that a pH range of 6.5 to 7.5 is optimal for plant nutrient availability. If the soil solution is too acidic plants cannot utilize N, P, K and other nutrients they need. In acidic soils, plants are more likely to take up toxic metals and some plants eventually die of toxicity. The results of pH are shown in Figure 5.

Electrical conductivity (EC) is the common measure of dump materials salinity and is indicative of the ability of an aqueous solution to carry an electric current. The rock composition determines the chemistry of the dump materials and ultimately affects electrical conductivity. For example, limestone leads to higher EC because of the dissolution of carbonate minerals in the dump particles. For mine soil, Saxena (1989), proposed that while EC $<$ 4 dS/m may be considered to be good for plant growth. EC values within the range of 7 to 8 dS/m may be accepted as fair and soil/spoil with an EC value 8dS/m should be considered to be of poor quality. During study period, EC was found to be ranged 3.715dSm^{-1} to 4.075 dSm^{-1} in selected areas of Raniganj coalfield. The higher valued were due to upward migration of different salts with partially combustion of coal particles at Site II. The lower valued were due to lower amount of salts present in the dump samples at Site V and Organic carbon is an index of dump materials productivity and the amount of carbon broken down from plants and animals that stored in soil (Dekka *et al.,* 2008). Organic carbon levels greater than 0.8% is rated as good quality of soil or dump and less than 0.4% is rated as low quality of dump (Ghosh *et al.,* 1983).The present study showed percentage of organic carbon ranging from 1.42 % to 8.53% indicating presence of high organic carbon hence medium productive value of the dump samples. Similar observation was made by (Rai *et al.,* 2009) in soils of Jharia Coal Field. The increase in organic carbon at site IV was due to the accumulation of leaf litter and their decomposition to form humus and vice versa.

Organic matter (SOM) is the organic matter component of dump materials. It can be divided into three general pools: living biomass of microorganisms, fresh and partially decomposed residues, and humus, the well decomposed organic matter and highly stable organic material. Surface litter is generally not included as part of soil organic matter (Juma, 1999). As the amount of organic matter present in a soil increase, the number of stable aggregates also increases. These results in increased permeability, increased infiltration, and consequently, decreased runoff and erosion. In brief the present study showed percentage of organic matter ranging from 2.4 % to 14.75 % in all the samples, indicating good accumulation of humus matter in the dump samples.

Nitrogen is a major soil limiting nutrient elements and influence plant productivity. The nitrogen used by plants on dump materials comes from organic matter, fertilizer application and legumes plants (Maiti *et al.,* 2002). Soils fertility exhibits the status of different soils with regard to the amount and availability of nutrients essential for plant growth. It has been observed that nitrogen content was found to be maximum in surface horizons and decreased regularly with depth which is due to decreasing trend of organic carbon with depth and because cultivation of crops is mainly confined to the surface horizon only at regular intervals the depleted nitrogen content is supplemented by the external addition of fertilizers during crop cultivation (Prasuna rani *et al.,* 1992). In the present study, available nitrogen was found to be ranged from 64.44 kg/ha to 89.24 kg/ha in selected areas of Ranigang coalfield. However, available nitrogen content was found to be maximum (89.24 kg/ha), at the Site IV due to higher amount of mineralizable matter present in the samples, and lower values (64.44 kg/ha) was recorded at Site I due to lower rates of mineralization in the dump samples.

Phosphorus of overburden samples was determined in the form of phosphorus pentaoxide. In the present investigtion avaialble phosphorus content of the dump materials was recorded in low amount in the range of 0.765 kg/ha to 9.405kg/ha. The present observation was also agreed with (Tripathy *et al.,* 1998) in soils of Jharia coalfield. The available phosphorus of the overburden samples were recorded in low amount at Site IV. This might be due to slightly acidic nature of samples which restricted the microbial action activities resulting in very poor mineralization and organic decomposition process in the overburden samples. The

available phosphorus of the overburden samples were recorded in high amount at Site III due to higher organic decomposition process in the samples.

V. Conclusions

From the above study, it can be concluded that the overburden samples collected from the coal mining areas are poor in organic carbon, available nitrogen and available phosphorus due to lower amount of microbial activities in the overburden samples. In addition to bulk densities of all the overburden samples are in medium range, which is not suitable for plantation purposes without addition of fertilizers. pH of all the sampling sites is slightly acidic in nature, under these (acidic) conditions of dump materials growth of plants severely affected in various ways. The data reveals that dump materials are deficient in N, P, & K which requires addition of extra fertilizer and manures to make the dump suitable for any purpose. The dump material at all the sampling sites was not found suitable for plant growth.

VI. Acknowledgements

The authors are highly grateful to Director CIMFR, Dhanbad, for providing Labaratory Facilities to carry out the research study. In addition, field assistance rendered by Anil kumar verma is acknowledged with thanks.

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Table 1 : Brief details of sampling sites in RCF

S. No.	Site Description	Sample Code	Mining Area
01.	SITE I	RS3	Chapapur Colliery U/G
02.	SITE II	RS4	Gopinathpur Colliery (OCP)
03.	SITE III	RS8	Lakhimata Colliery GT Road
04.	SITE IV	RS9	Mandman Colliery
05.	SITE V	RS16	Gourandih OCP Abundant Mine

Table 2 : Texture distribution of overburden samples

Site Description	Sample Code	Sand%	Silt%	Clay %	Soil classification
SITE I	RS3	96.08	1.96	6.44	Sand
SITE II	RS4	73.16	1.92	24.92	Sandy Clay Loam
SITE III	RS8	80.32	3.36	16.32	Loamy Sand
SITE IV	RS9	84.48	5.08	10.44	Loamy Sand
SITE V	RS16	86.84	1.56	11.6	Loamy Sand

Table 3 : Variation in Chemical Properties of the Soil Samples of Study Area during the study period.

Sites	pH	EC	Sulphide	Chloride	OC	OM	AVB'P	Ca	Mg	Na	K
		μS/cm	ppm	ppm	%	%	kg/hect	mg/g	mg/g	mg/g	mg/g
RS3	6.3	126.5	20	71	8.03	13.84	0.99	0.038	0.048	0.058	0.036
RS4	6.3	517.0	28	71	2.23	3.84	1.52	0.109	0.102	0.114	0.027
RS8	6.2	263.0	28	36	1.89	3.26	10.30	0.078	0.048	0.079	0.050
RS9	6.3	512.0	16	36	6.11	10.53	0.90	0.047	0.096	0.055	0.041
RS16	6.2	169.4	24	71	8.04	13.86	5.20	0.029	0.043	0.079	0.040

Table 4 : Pearson's correlation coefficients of physical factors of Raniganj coalfields (February and May 2010)

	A	B	C	D	E	F	G
A	+1						
B	+.759	+1					
C	+.837	+.992**	+1				
D	+.790	+.999**	+.997**	1			
E	+.810	+.997**	.999**	.999**	1		
F	+.104	-.515	-.413	-.478	-.451	1	
G	-.582	-.523	-.555	-.536	-.545	.272	1

*** Correlation is significant at the 0.01 level (2-tailed).*

A = Moisture content (%), B = Bulk density, C = Particle density (gm/cm^3), D = Total porosity (%), E = Max. Water holding capacity (%), F = Water in air dry soil (%), G = Volume Expansion

Table 5 : Pearson's correlation coefficients of Chemical factors of Raniganj coalfields (February and May 2010)

	A	B	C	D	E	F
A	+1					
B	+.992**	+1				
C	+.999**	+.997**	+1			
D	+.997**	+.999**	+.999**	+1		
E	-.515	-.413	-.478	-.451	+1	
F	-.523	-.555	-.536	-.545	+.272	+1

**. Correlation is significant at the 0.01 level (2-tailed)

A = pH, B = Conductivity, C = Organic carbon, D = Organic matter, E = Available phosphorus, F = Available nitrogen

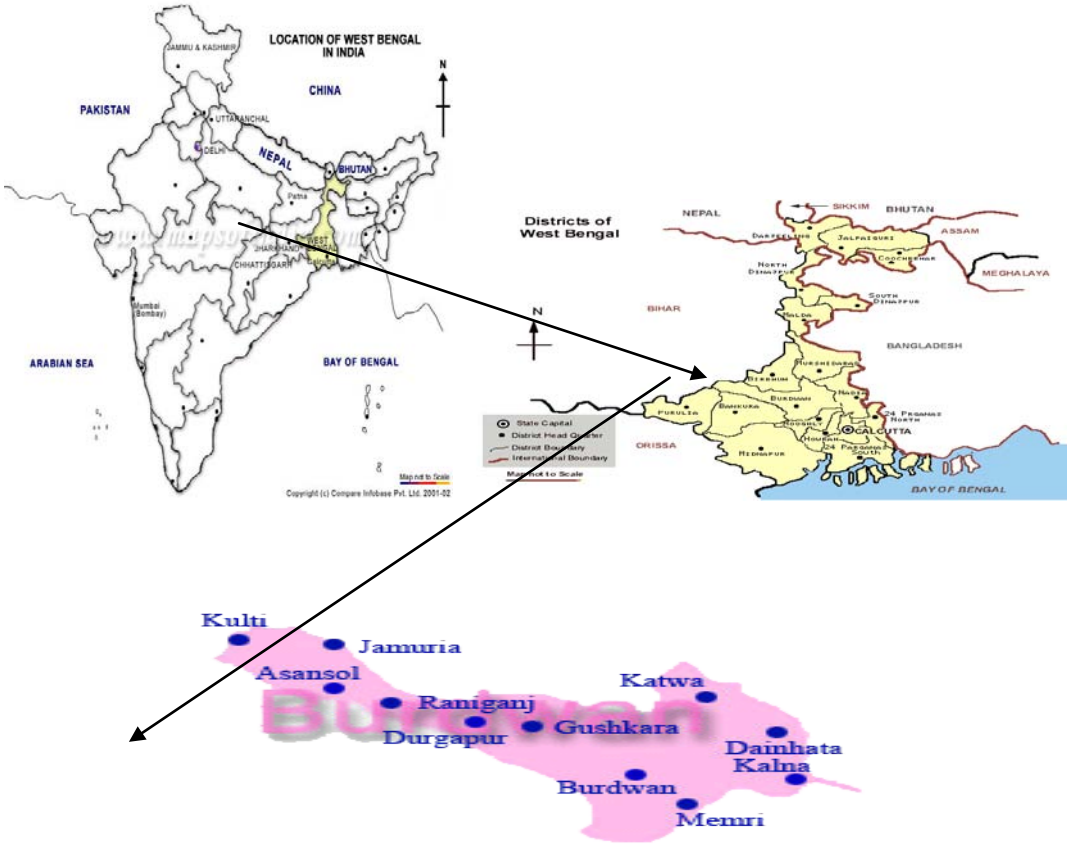

Figure 1 : Map of study area, (not to scale)

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Global Journal of Science Frontier Research
Enviornment & Earth Sciences
Volume 12 Issue 1 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Quantification of the Environmental Degradation due to the Urbanization of Dhaka Narayanganj Demra (DND) Project Area in Bangladesh

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Abstract - The Dhaka-Narayanganj-Demra (DND) project is located in the vicinity of Dhaka City, capital of Bangladesh, in its southeast part, which was a Flood Control Drainage and Irrigation (FCDI) project but instead of agriculture promotion this area is now converted into an urban area. To assess and quantify the impact due to urbanization in DND project area, site assessment visits, socio-economic survey (questionnaire survey), water and air quality analysis and ambient noise level measuring program were carried out. In this analysis, we consider 32 interrelated environmental factors to conduct a qualitative as well as quantitative evaluation on overall environmental quality. Impact due to selected environmental factors are evaluated and quantified based on response of survey questionnaire; water, air and noise level monitoring data and observations from site visit. Our findings in this study revealed that the overall environmental quality in DND area is highly degraded (overall value of environmental quality is found highly negative) due to the unplanned urbanization.

Keywords : *Environment, Impact, Degradation, Urbanization, DND project.*

GJSFR-H Classification : *FOR Code: 050299*

Strictly as per the compliance and regulations of :

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Keywords : Environment, Impact, Degradation, Urbanization, DND project.

I. Introduction

Dhaka-Narayanganj-Demra (DND) Project area is located between the cities of Dhaka and Narayanganj in Bangladesh and bounded by the Buriganga and the Shitalakshya River. It was started in 1964 and completed in 1968 at a cost of Tk 22.9 million. The area is about 56.79 sq. km and about 800,000 people are living here. The project provides flood control for 4,860 ha, irrigation for 6,070 ha, pumped drainage for 4,860 ha and gravity drainage for 2,470 ha of land [1, 3]. But, as the project is located close to Dhaka city, urbanization is taking place rapidly. So the initial objective of boosting agricultural production has been frustrated. A snap of Google map of the DND project area (mentioned as our study area) is shown in Fig 1.

Most of the DND Project area has now become part of the suburban areas of Dhaka City due to land use transformation in its periphery in the last three decades. With the increase in residential houses, commercial enterprises and industrial concerns, there has emerged a necessity of additional roads, water bodies etc [2]. But adequate drainage facilities is yet to be developed to cope with the changing situation of additional surface runoff caused as a result of urbanization with the increasing trend of population within the project area. In recent years the DND project area is facing acute problems of drainage congestion during resulting in severe sufferings to the inhabitants living within the area [2, 3, 8].

Recently, one study conducted by Islam and Haque (2005) [2] revealed that the inadequacy of drainage canals, filling up of drainage canals by solid waste, land use transformation through unplanned and rapid urbanization are the main causes of drainage congestion in the DND area. Besides that, water logging, water pollution (mainly from discharge of untreated industrial waste water particularly from dying industries), decrease in agricultural lands, decrease in pasture lands and fodder were identified major threatening to the environment of the DND area. Whereas the problem identified in health sector were: deficiency in pure drinking water, malnutrition and health hazards of the people especially the children; increase of water borne diseases, mosquitoes and venomous animals and insects for the DND area.

From our recent field visit experience in the DND project area, we observed that the housing companies have acquired cheap land in flood plains and developed residential colonies there, which are very vulnerable to flooding. Due to global warming, intensity and magnitude of different disasters are also increasing.

Here, the environmental degradation of the of DND area is a great concern because of (i) this area is very important as it is very near to the central Dhaka city (ii) Urbanization is progressing rapidly in this area with the increasing population and (iii) Vulnerability of the residents is also increasing rapidly. With considering the

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above concern, we feel that there is a need to have a decision support system for the planners and developers and political decision makers to take initiative for the reversal of the environmental degradation trends of DND area. In this study, we aim to assess and quantify the environmental degradation of the DND project area due to the unplanned urbanization. We hope that our quantification effort might be helpful for the concern decision making personnel for understanding the depth of degradation.

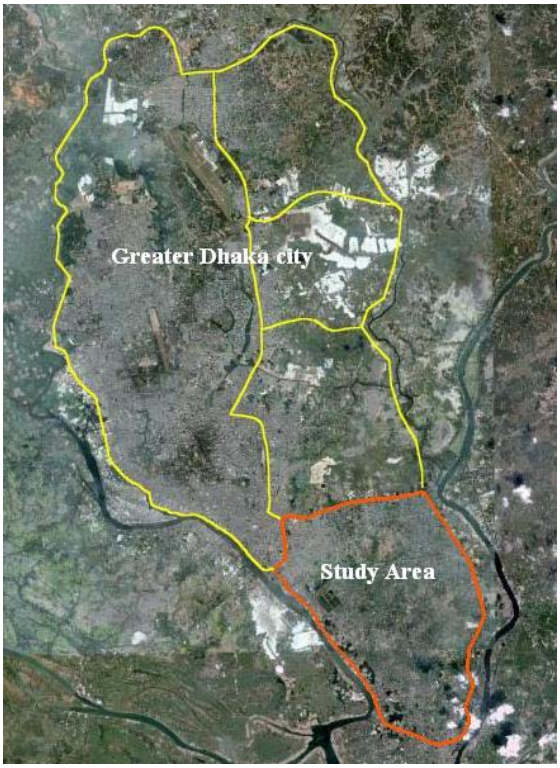


Figure 1 : Map showing the study area

II. Methodologies

a) Site visits

DND project area is located in the southeast suburb of Dhaka Metropolitan city and is stretched over Demra and Shampur Thana of Dhaka district and Shiddirganj and Fatullah Thanass of Narayangonj district. In the beginning of this study, we made frequent site assessment visits in between January to March, 2009 at different locations of DND project area as a part of reconnaissance study. From our site assessment visit, we tried to get an overall idea about the different important physical and environmental aspects of this area and we identified the important activities related to environmental degradation, selected point of water-air and noise quality sampling point. Regarding the sampling point selection, we tried to select a point which can give a quasi representative data to depict the overall scenario of this area. We also collected some secondary data from various organization regarding the population, topography, climate, administrative division and public utilities (water supply, gas supply, electricity, sewerage coverage) in this area.

b) Socioeconomic survey

To assess the impact due to urbanization in DND project area, a socioeconomic survey was carried out in the DND area. It was a questionnaire survey, where about 2250 people of DND area were participated. The survey cohort included approximately 65 % male and 35% female, population from different professions and different ages. Survey area included Matuial union, Fatulla, Demra, Pagla, Kutubpur union, Jatrabari and Konapara. The questionnaire had four main parts including (i) general information regarding respondent and survey area, (ii) asking opinion about some ecological impact of urbanization (iii) asking opinion about some physio-chemical aspects of urbanization and (iv) human interest related impact of urbanization. Responses of questionnaire survey regarding some important environmental parameters are presented in Fig 3 by bar graph or pie chart. Represented value in first four bar graphs or pie chart indicates the percent (%) of people responded in each option.

c) Water, air and noise quality analysis

Surface and ground water samples collected from various places in between Sept. to Oct.'2009 and subsequently laboratory test program was undertaken to check the important water quality parameters. Water samples were analyzed for pH (USEPA 150.1; SM 4500-H+ B), color (USEPA 110.2; SM 2120 C), turbidity USEPA 180.1 Rev 2; SM 2130 B), Iron (USEPA 200.9 ; SM 3111 B), DO (USEPA 360.3, 360.2; SM 4500- O B,G), BOD_5 (USEPA 405.1; SM 5210 B; SM 5210 D) and COD (USEPA 410.4; SM 5220 D) in the Environmental Engineering Laboratory of the Dept. of Civil Engineering, BUET. Here, method of analysis is mentioned in the parenthesis beside the parameters mentioned above. Standard water quality analysis protocol as per as "Standard method (SM) or USEPA methods" were followed. Water quality analysis results are shown in the Table 1. Air quality parameters and ambient noise level were also measured at the different location of DND area and measured data pertaining to air quality and noise level are presented in Table 2 to 4. Noise levels were measured at different location using a calibrated TES 1350A sound level meter. The high volume sampler, Envirotech APM 460NL has been used to collect particulate matters in the air. In order to capture the gaseous matters in air Wolfpack Area Monitor has been used.

d) Quantification of environmental degradation

Considering urban point of view the environmental parameters are consider. List of environmental parameters are shown in the Fig. 2. Impacts due to each parameter are evaluated based on response of questionnaire survey; water, air and noise level monitoring data and from observation during site visits. To quantify the environmental degradation due to the urbanization, Environmental Evaluation System (EES) guided by Local Government Engineering Department (LGED), Bangladesh was followed [5]. The details calculations of quantifying assessment are shown in the Table 5.

III. Results and Discussion

a) Environmental factors considered for assessing environmental degradation of DND Area

i. *Physico-chemical Parameters*

In the last few decades, DND area has been greatly changed with rapid urbanization and industrialization, especially through manufacturing industries, establishment of small and large-scale business enterprises, increase of multinational business and trade firms etc. Unfortunately, this rapid urbanization process has not taken place in a formal and planned manner. This unplanned approach of development has made this area "a land of unhealthy lifestyle".

Surface water pollution: The Rivers Buriganga, Balu, and Shitalakshya together receive huge amount of untreated sewage and industrial liquid waste as well as municipal waste regularly through the three major canal systems and direct disposal. Water of the surrounding rivers and stagnant surface water body has already exceeded the standard limits of many water quality parameters, for example, DO, BOD_5, COD, color, turbidity and so on. The input of high strength organic waste and inorganic solutions of metals in a reduced state of oxidation into a water course depleted the oxygen content of the water and ultimately will result in extinction of all oxygen dependent life.

Air, noise and odor pollution: Air quality data around the project site is not available, as there is no provision for monitoring air quality in the area. But during site visit it was observed that the ambient air quality in regards to SPM of the area is very dusty near the industrial and road side locations. We measured the level of different particulate and gaseous air quality parameters at different locations of DND area, which are presented in Table 2. Noise pollution is not very serious problem in DND zone but this problem is increasing day by day due to the rapid urbanization. Our measured ambient noise data at different location of DND area is presented in Table 3. Odor pollution is very serious problem in the DND area. Objectionable odors are coming out from the Matuail dumping site (a sanitary land fill site to dump the solid waste and the places where garbage are damped in open space.

Ground water depletion: In the DND area ground water table has become lower day by day in a very high rate. It is mainly due to extraction of huge amount of water for industrial use like dying factory.

Regional hydrology and flooding: The project area is affected by internal and external flood. External floods are caused in the low area by over flow of surrounding river and canal, while internal floods are caused by storm water due to rainfall and insufficient drainage facilities. Normally the low area of the project is submerged by over flowing of Balu River during August-September. Excessive local rainfall sometimes causes flood. The natural drainage system of the project area is being obstructed due to land filling activities for housing development project.

Table 1 : Water quality analysis result at different locations of DND Area

Sampling Location	Source Type	pH	Color	Turbidity	EC	DO	COD	BOD_5	Iron
			Pt-Co unit	NTU	µs/cm	mg/l	mg/l	mg/l	mg/l
Jatrabari WASA pump station	[a]GW	7.1	16	3.3	360	4.55	0.3	0.2	0.6
Mirdhabari WASA pump station	GW	7.12	13	0.5	217	4.6	0.8	0.3	0.02
DND canal water, Mirdhabari	[b]SW	7.12	28	17	228	2.76	13	5.4	< 0.02
Pond water, Mirdhabari	SW	7.4	198	23	502	1.32	25	17	< 0.02
Pond water, Shanir Akhra	SW	7.12	252	30	833	1.21	20	12	< 0.02
Sitalakha River water	SW	6.7	170	67	462	2.2	17	10	< 0.02
Buriganga River water, Pagla	SW	6.9	210	18	504	1.8	12.5	10	< 0.02

[a]*GW: Ground Water,* [b]*SW: Surface water*

ii. *Ecological parameters*

Fisheries: DND is the predominant spawning grounds of open water capture fishery. There exist four major fishery systems in the area. They are: River/Khal fishery, Flood plain fishery, Beel and reservoir fishery, Culture fishery or aquaculture. Of the four (4) fishery systems, both the flood plain and beel and reservoir open water fishery are directly affected by the DND project, with embankment and the subsequent dry-up of flood plain due to the urbanization.

Aquatic biology: The main aquatic flora in this area is Kalmiiata, Shapla, Helencha, Kachuripana. The main aquatic faunas in this are arc different types of fishes. The fresh water fishes are carp (Rui, Katla, Mrigal, Kalibaus etc.), Catfish (Boal, Bacha etc.) and live fish (Koi, Singh, Magur etc.). The other fauna are Tortoise, Frogs, and Water snake etc. The aquatic live in the DND area reduced due to dumping of untreated chemicals of dying industries. Reduction of aquatic biology makes a higher negative impact on the environment of the project area.

Terrestrial flora and fauna: No complete list of terrestrial fauna is available in this region but a number of avian species were observed during field visit in this area including crow, eagle, shalik, sparrow etc. In addition to the avian species, the habitats are likely to contain reptile, mammals. The project area is similar to the character to many areas of alluvial delta in Bangladesh with mixed crop vegetation. Rice, other grains and seasonal vegetables are the main crops in the area. But in present days this area has become less suitable for the terrestrial flora and fauna due to rapid urbanization.

Wetlands: Few years ago there were many low land areas including ponds and reservoir in the DND zone which were actually wetlands. These low land areas serve as breeding ground of fish. At present significant portion of these low land areas are filled by rapid and unplanned urban growth. Industries and building are constructed by filling the wetland area; consequently destruction of aqueous ecology has become obvious for this area.

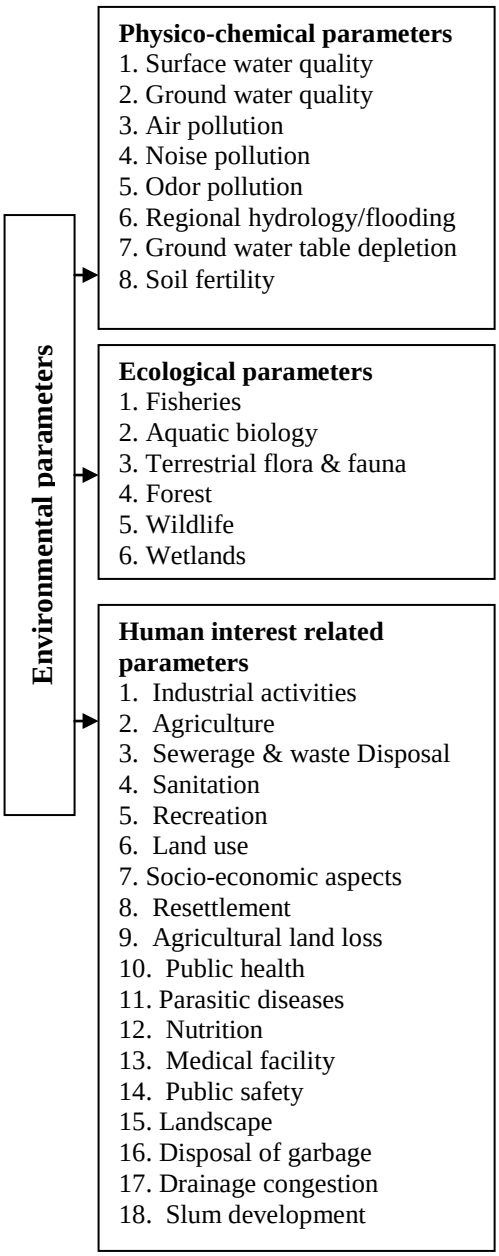


Figure 2 : List of the environmental parameters for assessing environmental degradation in the DND area

iii. *Human Interest Related Parameters*

Industrials activities: In the DND zone, most of the industries are developed in an unplanned manner and these are polluting the environment seriously. Our observation at the time of field visit revealed that most of the industries have no effluent treatment system and emission control system.

Sewerage and waste disposal: In the DND area sewerage system and Waste disposal system is not well organized. Some of the project areas have moderate access of sewerage and waste disposal system while most of the project areas have poor access of sewerage

and waste disposal system. The water borne sewerage system covered around 50% percent of the sampled households of the DND (N) project area. About 20% of the sampled households used septic tanks, of which most are imported type. Brahmanchiron had the highest percentage of households with sewerage facilities (65.2%) while Rajarbagh had the least (0.7%).There is no systematic waste disposal system in this zone.

Sanitation: The populations of the project area are presently using various alternative methods or ways of human waste disposal such as septic tank, pit latrine, leaching pit, katcha latrines and public toilet and open defecation. From the Questionnaire it is came out that almost 92% households have an access of pakha latrine. But this picture is totally different in the slum area, where poor sanitation (open latrine) and water supply system is a major threat to the environment.

Agricultural and recreational land loss: Actually DND project was for the promotion for agricultural activities in this zone but, urbanization trends destroyed the main aim of the project. Rapid urbanization in this area creates a negative impact on agricultural practice. The agricultural area in DND area in 1990 was 3173 ha. It is forecasted that in 2010 agricultural area will be reduced to 532 ha due to urbanization [8]. Large majority of younger of this zone are deprived from outdoor games/sports activities because of the reduction of the open space (playgrounds, parks, lakes).

Landscape: In the DND area, the flood free comparatively low value urban fringe land is going to be under tremendous pressure of development. The general characteristics of the area are conductive to additional development and there are sign of new industries set up in this area. Due to the unplanned development of industries, distortion of natural landscape and natural beauty is highly noticeable in this area.

Drainage congestion: Since this area has no proper drainage system, excessive water logging is one of the most of the common problem in the rainy season. Due to rapid urbanization low lands are filled thus the problem of water logging is going to be more severe problem day by day.

Slum development: Due to rapid urbanization in the DND zone, many people are coming from the outside for work and consequently, for these very low income groups slums are developing in this zone.

Positive aspects of urbanization trends in DND area: Because of its proximity to the Dhaka city and also being relatively flood free, the DND area has been developed quite rapidly during the last decade, particularly in the Northwest corner. There are many industries are developed in the DND zone and these industries create employment opportunities. The newly constructed Dhaka-Narayanganj Spine Road has resulted in land speculation. In regarding land use pattern huge change has been seen in the DND area due to the rapid trends of urbanization. Currently RAJUK is preparing a housing development program for the area [3]. Land value in this area has been increased too high within a decade. Socio-economic aspects including educational status, occupational status, average monthly income, and monthly expenditure and housing condition have been slightly improved some parts of DND area.

Table 2 : Measured air quality data at different locations of the DND area

Parameters	Measured Concentration			Bangladesh Standard (ECR, 2005)[10]
	Mirdhabari Bazar[a]	Fatullah[b]	Shiddirganj[c]	
PM_{10} ($\mu g/m^3$)	74	166	133	50 (annual average) 150 (24-hr average)
SPM ($\mu g/m^3$)	312	499	405	200 (8-hr average)
NO (ppm)	0	0	0	0.053 (annual)
NO_2 (ppm)	0	0	0	
SO_2 (ppm)	26.6	23.8	26.1	0.14 (24-hour)
CO (ppm)	2.6	4,2	3.9	35 (1-hour)
CO_2(ppm)	530	657	589	--
H_2S(ppm)	5.23	3.42	1.21	--
O_3 (ppm)	0	0	0	--
TVOC (ppb)	1544	1245	1187	--

Note: Weather condition at the measuring time: Ambient Temperature (°C) 32.7[a], 33.2[b], 32.9[c]; Relative Humidity (%RH) 71.7[a], 81.3[b], 74.6[c]; Measuring date: 12 Sept 2009[a,b] 13 Sept 2009[c]; Measuring equipment: for SPM and PM_{10} - Envirotech APM 460NL, for rest of the gaseous pollutant- Wolfpack Area Monitor; Measuring location: beside Mirdhabari school[a], beside main road[b,c]

Table 3 : Ambient noise level at different locations of the DND area

Location	Time	Equivalent Noise Level, L_{eq}	Max	Min
		dBA	dBA	dBA
Jatrabari More[a]	Day	78.7	97.3	56.0
	Night	74.8	87.6	44.3
Mirdhabari Bazar[b]	Day	68.7	87.2	50.7
	Night	61.9	75.7	46.1
Fatullah[c]	Day	76.5	90.2	58.3
	Night	-[e]	-	-
	Day	73.6	86.4	66.6
Shiddirganj[d]	Night	-	-	-

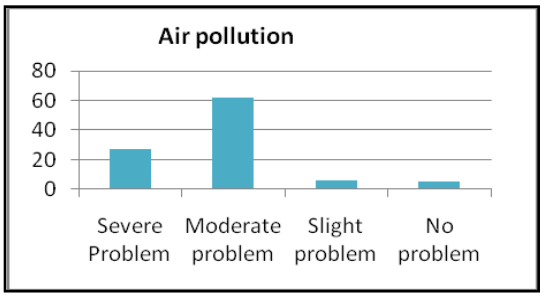
Note: Measuring date: 12 Sept 2009 [a,b,c] 13 Sept 2009 [d]; Measuring equipment: TES 1350A sound level meter; Measuring location: Jatrabari bazaar to demra road [a], beside Mirdhabari school [b], beside main road [c,d]; -[e] not measured; noise level monitoring time at each location was about 20 minutes and equivalent noise level (L_{eq}) was calculated from about 100 observation recoded data

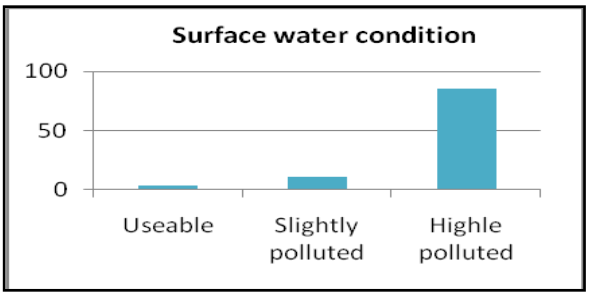
Table 4 : Bangladesh Standard for Noise Level at different types of areas (as per Noise Pollution (Control) Rules, 2006)[11, 12]

Area type	Noise level (dBA)	
	Day	Night
Silent zone	50	40
Residential area	55	45
Mixed area	60	50
Commercial area	70	60
Industrial area	75	70

b) Assessment and quantification of environmental degradation

From the various literature surveys we found there are many approaches for evaluating the overall value of environmental quality considering some environmental factors [2, 4, 5, 6, 7, 9]. In our analysis, first we did a qualitative assessment [a] (see table 5) on each environmental factor based on our field investigation and public opinion survey. Next qualitative assessment was translated into quantitative approach. Both positive and negative environmental factors are considered to assess the net environmental value of environmental quality. According to the LGED guideline for EIA[5], the degree of environmental impacts due to urbanization of DND project consider within the range of -5 to +5 where -5 represent an severe negative impact and +5 represents the very high positive impact and higher the number, higher the degree of impact. We estimate the overall value of environmental quality following method of Environmental Evaluation System (EES) [5]. Details assessment and quantification results are shown in Table 5.





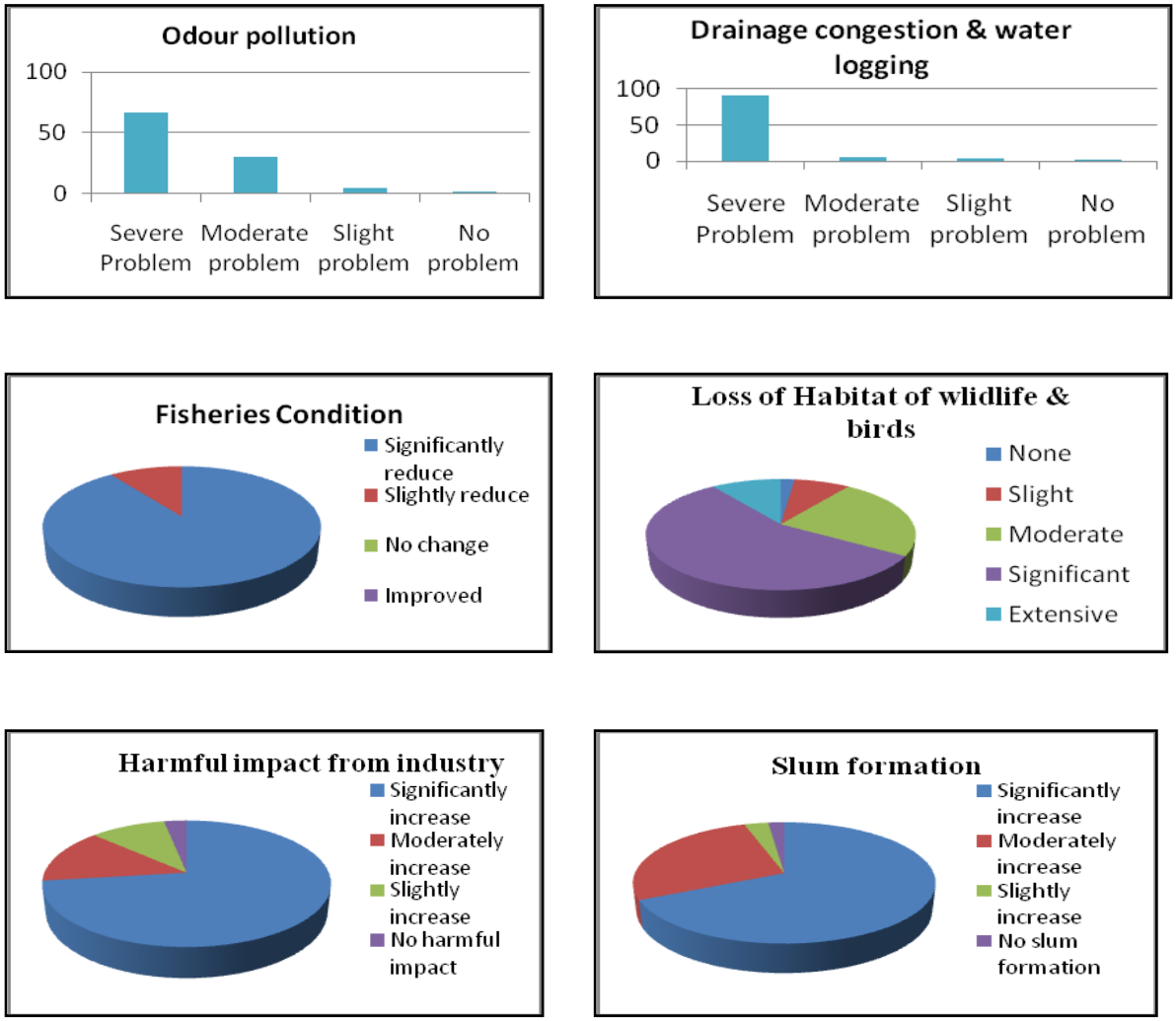


Figure 3 : Responses of questionnaire survey regarding some important environmental parameters. (Represented value in first four bar graphs indicates the percent (%) of people responded in each option. About 2250 people of DND area were participated in this questionnaire survey including around 65 % male and 35% female)

Table 5 : Quantification of environmental impact on various selected environmental parameters

Environmental Parameter	QEI[a]	(Wi)	Degree of Impact		$Wi*(Vi)_1$	$Wi*(Vi)_2$	NEQV
			$(Vi)_1$	$(Vi)_2$			
Physio-chemical parameters		**250**					
Surface water quality	S	60	-1	-4	-60	-240	-180
Ground water quality	VL	20	0	-1	0	-20	-20
Air pollution	M	40	0	-3	0	-120	-120
Noise pollution	VL	10	0	-1	0	-10	-10
Odour Pollution	M	50	0	-3	0	-150	-150
Climate Change	VL	10	0	-1	0	-10	-10
Regional hydrology & flooding	VL	10	0	-1	0	-10	-10
Ground water table	M	30	0	-3	0	-90	-90
Soil fertility	M	20	0	-3	0	-60	-60
Ecological parameters		**200**					

Fisheries	H	60	2	-4	120	-240	-360
Aquatic Biology	H	50	1	-4	50	-200	-250
Terrestrial flora & fauna	M	40	1	-3	40	-120	-160
Forest	M	20	2	-3	40	-60	-100
Wildlife	M	10	0	-3	0	-30	-30
Wetlands	M	20	0	-3	0	-60	-60
Human interested related parameters		**550**					
Employment opportunities	P	70	-1	4	-70	280	350
Commercial & service facilities	P	40	0	3	0	120	120
Industrial activities	H	10	0	-3	0	-30	-30
Agriculture	M	15	2	-3	30	-45	-75
Water Supply	P	25	0	3	0	75	75
Electricity and gas supply	P	25	0	3	0	75	75
Sewage and waste disposal	M	20	-1	-2	-20	-40	-20
Sanitation	M	10	-1	1	-10	10	20
Recreation	L	10	1	-2	10	-20	-30
Road & railway	P	10	0	3	0	30	30
Land use & land value	P	60	0	5	0	300	300
Socio-economis aspects	P	30	-2	3	-60	90	150
Resettlement	M	10	0	-2	0	-20	-20
Agriculture land loss	S	30	0	-5	0	-150	-150
Public Helth	L	10	0	-2	0	-20	-20
Parasitis Diseases	L	10	0	-2	0	-20	-20
Nutriation	L	10	1	-2	10	-20	-30
Public Safety	L	10	1	-1	10	-10	-20
Landscape	L	15	1	-1	15	-15	-30
Disposal of garbage	M	20	0	-4	0	-80	-80
Drainage congestion	S	40	0	-5	0	-200	-200
Slum Development	M	10	0	-3	0	-30	-30
Flood control	P	60	-4	3	-240	180	420
Total		**1000**			**-135**	**-960**	**-825**

Here, P=Positive impact; S=Severe negative impact; H=Higher negative impact; M=Moderate negative impact; L=Low negative impact; VL=Very low negative impact; QEI=Qualitative Environmental Impact. Wi=Relative importance value, $(Vi)_1$=Degree of impact without urbanization, $(Vi)_2$=Degree of impact with urbanization, Net environmental quality value (NEQV) =$Wi*(Vi)_2$-$Wi*(Vi)_1$

IV. Conclusions

The DND area was originally a flood control, drainage and irrigation project but the development trend goes towards urbanization, i.e. the original objective has been totally changed. As urbanization is inevitable, immediate measures should be taken to create the area into a planned town as because the present trend is going on in an unplanned manner. From this study it is reveal that surface water pollution, air and noise pollution, odor pollution, soil fertility, fisheries, aquatic biology, terrestrial flora and fauna, drainage congestion, sewerage and waste disposal, poor sanitation, resettlement, agricultural land loss, public health, parasitic disease, public safety, and improper disposal of garbage etc. are most important environmental concerning factors for environmental degradation. However, there are some positive impacts due to urbanization which can be listed as: employment opportunities, land value, water supply, power/gas supply facilities, development of new industry, development of new road, and slight improvement of socio-economic condition. Our quantification efforts of environmental quality value [see table 5] indicate that overall environmental quality in DND zone is highly degraded due to rapid unplanned urbanization.

There should be make a plan for the recycling and reclamation of waste is to be promoted for conservation of resources. The green belt and landscaping should be prepared as per master plan. There should be sufficient provision for both capital and O&M facility especially for road, sewerage system, treatment plant, solid waste management and for other utility services. To facilitate the development activities there should be a management organization responsible for getting approval for development plan and budget from higher authority, implementation of primary level of development work and monitoring private level development work. The environmental-monitoring program is necessary for monitoring of ambient environmental quality. Monitoring data should be compiled, analyzed and evaluation report is to be prepared for future reference and management decision.

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Global Journal of Science Frontier Research
Enviornment & Earth Sciences
Volume 12 Issue 1 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Fertility Status of Soil in the Green Belt of Indapur Tahsil, Dist - Pune (Maharashtra) India

By Bhore J. B. , Dangat V. T. , Jaybhaye R.G. & Gatkul B. I.
Pune University

Abstract - The increasing land use intensity without adequate and balanced use of chemical fertilizers. Little or no use of organic manure have caused severe fertility deterioration of soil. Resulting in declining of crop productivity. Study was carried out in the belts namely sample sites 1 to20 which is a green belt of indapur Tahsil in pune district. (Maharashtra) To investigate the fertility status of soil during 2010 and 2011. Present study show that the soil were acidic and alkaline in nature in all season. Available nitrogen & phosphorous and potash show low soils were not sufficiently fertile for crop production.

GJSFR-H Classification : *FOR Code: 050303*

Strictly as per the compliance and regulations of :

Fertility Status of Soil in the Green Belt of Indapur Tahsil , Dist - Pune (Maharashtra) India

Bhore J. B. [α], Dangat V. T. [σ], Jaybhaye R.G. [ρ] & Gatkul B. I. [ω]

Abstract - The increasing land use intensity without adequate and balanced use of chemical fertilizers. Little or no use of organic manure have caused severe fertility deterioration of soil. Resulting in declining of crop productivity. Study was carried out in the belts namely sample sites 1 to20 which is a green belt of indapur Tahsil in pune district. (Maharashtra) To investigate the fertility status of soil during 2010 and 2011. Present study show that the soil were acidic and alkaline in nature in all season. Available nitrogen & phosphorous and potash show low soils were not sufficiently fertile for crop production.

I. Introduction

The demand of soil for diverse purpose such as construction, industrial, agriculture urbanization is increasing continuously thereby decreasing soil quality drastically. Soil quality is the capacity of soil to function within natural or managed ecosystem boundaries to sustain plant and animal productivity maintain or enhance water and air quality and support human health and habitation. (D. L Karlen).

Aeration is important in promoting plant growth chemical interaction taking place between aeration condition & chemical composition of the soil (M. M. Rai 2008) The main reason of soil quality degradation in irrigated areas are the inadequate & unbalanced application of agrochemicals fertilizer pesticides to soil (B. Mujumdar & M. P. Sharma) The knowledge of the fertility status of soil is essential for judicious application for higher crop production. ph ,Organic matter ,N, P & exchangeable K, concentration of macronutrients & micro nutrients are appropriate describing soil quality and agricultural productivity.(R.A. Bowman) Bulky organic manures increase organic matter content & hence improve the physical properties and improve in soil aeration and water holding capacity.

II. Experimental

Twenty representative sites from the study area were selected for the characterization of the soil sample. representative sample sites study area that free from waste water soil sampling was done seasonally for wet & dry seasons during 2010-2011

Soil samples were air dried, crushed & screened through 2 mm sieve. Soil Ph determined by Ph meter. Organic matter, N, P, *exchangeable* K analyzed with soil testing kits.

III. Result

Ph of the soil samples were found acidic and alkaline in both the seasons, The study revealed that ph 6.9-9.1 during dry & wet season. larger amount of ionic matter was present in oil sample during dry & wet season.Organic matter of all the sample was found to be higher in wet season compared with the dry season except site S8,S9,S20 The average N concentration in organic material range of 1 to 13% Gibbsite Al(OH)3 adsorb the greatest amount of Phospharous at Ph 4To5. P availability in most soil is of maximum near ph 6.5 (John L. Halvin2010) The range of available P was 7.3 to38.7 in dry & wet season Soil exchangeable potassium as K2O in both seasons was within medium category (<400Kg/ha) in majority of sample in soil . P availability in most soil is negligible at site rajwadi and saradewadi, which is maximum at a site S1, S5, S9, S11, S13 at site of study area of indapur district pune.

Pre - Monsoon 2010
Physicochemical Parameters of Soil

Sr. No.	Sample Site	P^H	N	P	K	C
1	Nimgaon	8.5	142	36.0	303	0.71
2	Kati	8.9	212	7.4	362	0.84
3	Bijawadi	8.4	137	7.3	354	0.81
4	Bhandgaon	7.6	139	21.4	349	0.92
5	Sardewadi	9.1	152	37.0	406	0.93
6	Rajwadi	7.5	283	--	287	1.20

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7	Zagadewadi	7.6	144	21.1	381	0.89
8	Sardewadi	8.0	212	--	125	0.65
9	Zagadewadi	7.5	376	36.2	383	0.61
10	Malwadi	7.6	421	21.3	331	0.79
11	Varkute	9.1	138	38.7	359	0.72
12	Galandwadi	7.1	110	28.6	341	0.88
13	Varkute	7.5	127	41.0	382	0.93
14	Kalthan 1	8.4	256	21.4	352	0.71
15	Kalthan 2	8.6	197	19.1	297	0.90
16	Pondkulwadi	6.9	403	31.9	171	1.01
17	Bhadalwadi	7.2	396	27.2	187	0.91
18	Karewadi	8.1	317	17.4	156	0.94
19	Walchand Nagar	8.3	258	19.6	298	0.76
20	Bankarwadi	8.6	310	24.1	323	0.61

Post - Monsoon 2011

Physicochemical Parameters of Soil

Sr. No.	Sample Site	P^H	N	P	K	C
1	Nimgaon	8.7	167	26.0	341	0.79
2	Kati	9.1	241	13.4	379	0.91
3	Bijawadi	8.5	156	14.3	368	0.86
4	Bhandgaon	7.8	183	27.4	387	0.95
5	Sardewadi	9.0	174	39.2	438	0.98
6	Rajwadi	7.8	294	9.3	314	1.10
7	Zagadewadi	7.6	179	12.1	391	0.90
8	Sardewadi	8.3	272	7.2	215	0.67
9	Zagadewadi	7.8	396	31.2	417	0.72
10	Malwadi	7.6	483	22.3	351	0.84
11	Varkute	9.0	196	28.6	386	0.86
12	Galandwadi	7.4	173	21.6	370	0.90
13	Varkute	7.8	149	35.0	431	1.06
14	Kalthan 1	8.6	279	12.4	383	0.75
15	Kalthan 2	8.5	237	9.6	347	0.96
16	Pondkulwadi	7.2	441	28.9	267	1.01
17	Bhadalwadi	7.4	423	23.7	234	0.97
18	Karewadi	8.3	361	14.4	215	0.97
19	Walchand Nagar	8.6	278	17.6	318	0.86
20	Bankarwadi	8.6	351	21.1	384	0.69

Table 1 : Standard Specification for soil - ISO

Sr. No	Parameters	Std. permissible limit
1	pHtr	6.5 to 9
2	Organic carbon	1 to 3 %
3	Phosphorous pent oxide	55 Kg/acre
4	Potassium oxide(potash)	300 Kg/acre

IV. Discussions

Soil PH data showed that it was slightly declined in the wet season in all the locations due to runoff of nutrients in the rainy season. continuous expose of soil to highly alkaline irrigation effluents leads to salinity in soil making it unsuitable for irrigation purpose (P. K. Bauru) soil sample were found more acidic in wet season than the dry seasons by the leaching effect of rain water during summer which replace basic cat ions (Ca+, Mg+, Na+, and K+) with H+ ions .Applicable of long term inorganic fertilizers instead of green manure farmyard manure and crop straw residues had also enhanced in decreasing soil Ph (K.N. Tiwari) Thus Micro nutrient Fe ,Cu ,Zn in soil were more available to plant . The availability of N, P, K& organic carbon decreases with the decrease in ph. The increase in EC due to agricultural runoff from farmland and domestic waste water disposal. Low soil ph in wet seasons is due to higher leaching induced by heavy rainfall in the absence of adequate amount of soil organic matter.

Agriculture soils of the study area promote soil aggregation prevent losses of nutrient and enhance the mineralization of organic N;P making a suitable environment for plant growth [C.Palm.et.al] organic matter content thus may serve as a reservoir of plant nutrients promoting water storage as well as microbial activity .Organic carbon content of surface soil increased significantly in wet seasons in all sampling sits with incorporation of waste organic substances .application of domestic waste products, green manure, farm yard manure and crop straw residue with fertilizer in fields by the rural people of the study area might also increased Organic Matter in wet season available N content in wet season was found to be higher in majority of soil sample which might be due to the extensive application of nitrogenous fertilizers and also the decomposition of domestic waste product in aqueous environment. Which is increase in available N in surface of soil might be attributed to the direct addition nitrogen through farmyard manure and green manure to the soil. Available P in soil samples show medium to high category and it was found to be decreased from dry season to wet higher amount of organic matter in wet season enhanced the mineralization of organic P to available P. due to higher rainfall and higher rate of decomposition of organic matter increase the leaching of available P from surface soils [Jayswal et .al] due to smaller size of k+ ion it can be easily leached from the surface soil during the rainy season , continuous use of fertilizers and intensive cropping had resulting in lowering of potassium status of soil indicating need to apply the potassium to the crop macro-nutrient (N , P, K, Ca, Mg, Na are needed in plant relatively higher amount than micro nutrients (Fe,Mn,Cu,Zn etc.) [Dilip kumar Das 2004]

V. Conclusion

The study was the understanding of complex nature of soil using an integrated approach which can be applied to monitor, soil quality of fields and support management decisions .Socioeconomic issues also have a strong effect on soil .quality. hence the soil quality assessments were successful in reconciling farmers and scientific knowledge the results indicate that without both local and scientific knowledge a satisfactory level of crop production and maintenance of soil quality cannot be achieve at the same time ,therefore researchers must continue to face the challenge to provide base for bridge building between farmers and scientist knowledge reconciling local and scientific knowledge is one of the most important steps towards evaluating the feasibility of alternative production systems and sustainability of land use in terms of long term soil quality.

Now it is the demand of the time to developed an integrated inorganic, organic soil fertilization program me for higher crop yield and improved soil health to achieve the goal of increase and sustained soil productivity without inclusion of integrated inorganic, organic fertilization, programmed with special attention.

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18. **Pick a good study spot:** To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. **Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be

sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page

- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to

shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.
- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic

principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.

- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Administration Rules Listed Before Submitting Your Research Paper to Global Journals Inc. (US)

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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ISSN 9755896