# Light Pollution

**Newton Kushwaha[1], Neha Kushwaha[2]**

[1,2]Saraswati Vidya Mandir Inter College Dibiyapur, Auraiya, Uttar Pradesh – 206244 (India)
Harchandpur Road, Rananagar, Dibiyapur, Auraiya, Uttar Pradesh – 206244 (India)

**Abstract:** *Presently, we are not aware of the fatal effects of "light pollution". And many diseases are being treated. Therefore, our objective is to understand and know the direct and indirect effects of light pollution and find solutions by analyzing the data obtained. We analyzed the data obtained from the survey and observation and found that the number of flowering plants along the road, flowering and fruit status is 90% poor. Artificial lighting in the houses is available for 24 hours due to irregular routine of the people. The number of some organisms has started decreasing. Due to the lack of sleep of the children, their nature is becoming irritable and aggressive. The basic tendency of all of us is changing.*

**Keywords:** Light Pollution, Disease, Effects, Artificial Lights, Nature, Irritable, Aggressive, Change

## 1. Introduction

Thomas Alva Edison's invention of the "bulb" has sparked human progress. Today, we are moving towards new heights of development through 'artificial light'. But today the excess of this light has started becoming a curse. The insistence of turning night into day, has started harming humans as well as animals and birds and plants. The signboards, lights on the streets, the light coming out from the windows of homes and offices throughout the night are spoiling our daily routine. Due to which we are facing various diseases. The life of nocturnal creatures and birds has become difficult. Along with the trouble in gathering food, their age is beginning to decline. Some are on the verge of extinction. And by this (Light Pollution) people have started forgetting their culture also. So, we have studied the "pollution" from the unnecessary and unauthorized light under this topic.

## 2. Methodology

a) We will study the effects of light pollution.
b) We will collect the data of the effects of light pollution on humans and culture.
c) We will collect the data of the effects of light pollution on animals and birds.
d) We will collect the data of the effects of light pollution on plants.
e) From surveys and observations, we will analyse the data
f) And we will find the solution based on our data.

## 3. Process

a) From survey, we collected the data of light pollution on humans.
b) From observations, we collected the data of light pollution on animals and birds.
c) From survey, we collected the data of light pollution on humans.
d) We made the bar charts and pie charts of the data.
e) We analyzed the data.
f) And found the solution of the problem on the basis of our analysis.

## 4. Survey Data

Data of the effects of light pollution on humans

**Table 1:** Data of the effects of light pollution on humans

| Sr. No | Name | Presence of artificial light at home | Availability of TV/Mobile at home | Status of light sources at bedtime ON/OFF | Time to sleep and wake up Fixed/ Unsettled | Reason for irregular night routine | Most of the time to complete work Day/ Night |
|---|---|---|---|---|---|---|---|
| 1 | Sunil Kumar | Yes | Yes | OFF | Unsettled | Light | Day |
| 2 | Karuna Shankar | Yes | Yes | OFF | Unsettled | Light | Day |
| 3 | Brajesh Kumar | Yes | Yes | ON | Unsettled | Work | Night |
| 4 | Omveer | Yes | Yes | ON | Unsettled | Light | Night |
| 5 | Jeetu Varma | Yes | Yes | ON | Unsettled | Light | Night |
| 6 | Neelam | Yes | Yes | OFF | Unsettled | Mobile | Day |
| 7 | Pranshu | Yes | Yes | OFF | Fixed | Laptop | Night |
| 8 | Mohit Pratap | Yes | Yes | OFF | Fixed | Mobile | Day |
| 9 | Sudheer Kumar | Yes | Yes | OFF | Fixed | Mobile | Night |
| 10 | Priyanka | Yes | Yes | OFF | Fixed | Laptop | Day |
| 11 | Ramji | Yes | Yes | OFF | Unsettled | Laptop | Day |
| 12 | Neelam | Yes | Yes | OFF | Unsettled | Mobile | Night |
| 13 | Pragya | Yes | Yes | OFF | Fixed | Mobile | Day |
| 14 | Meena | Yes | Yes | OFF | Unsettled | Mobile | Day |
| 15 | Sarita | Yes | Yes | ON | Unsettled | Laptop | Day |
| 16 | Ankesh | Yes | Yes | ON | Unsettled | Duty | Night |
| 17 | Dr. Fool Singh | Yes | Yes | ON | Fixed | Mobile | Night |
| 18 | Pramod | Yes | Yes | ON | Fixed | Laptop | Night |

| 19 | Rajpal | Yes | Yes | OFF | Fixed | Mobile | Night |
|----|--------|-----|-----|-----|-------|--------|-------|
| 20 | Krishna Murari | Yes | Yes | OFF | Fixed | Laptop | Night |
| 21 | Vaibhav | Yes | Yes | ON | Unsettled | Study | Night |
| 22 | Neelam | Yes | Yes | OFF | Fixed | Work | Night |
| 23 | Archana | Yes | Yes | OFF | Fixed | Work | Day |
| 24 | Pragya | Yes | Yes | OFF | Unsettled | Study | Night |
| 25 | Priyanka | Yes | Yes | OFF | Unsettled | Electricity | Day |
| 26 | Vimlesh | Yes | Yes | ON | Unsettled | Work | Day |
| 27 | Geeta | Yes | Yes | ON | Unsettled | Work | Day |
| 28 | Vikas | Yes | Yes | ON | Fixed | Mobile | Day |
| 29 | Shivendra Singh | Yes | Yes | ON | Unsettled | Laptop | Night |
| 30 | Chandrashekhar | Yes | Yes | ON | Unsettled | Work | Day |
| 31 | Ramendra Singh | Yes | Yes | ON | Unsettled | Mobile | Night |
| 32 | Shivavendra | Yes | Yes | ON | Unsettled | Laptop | Night |
| 33 | Ramkumar | Yes | Yes | ON | Unsettled | Light | Night |
| 34 | Rammilan | Yes | Yes | ON | Unsettled | Light | Night |
| 35 | Deepnarayan | Yes | Yes | ON | Unsettled | Light | Night |
| 36 | Sudha | Yes | Yes | ON | Unsettled | Light | Night |
| 37 | Neha | Yes | Yes | ON | Unsettled | Study | Night |
| 38 | Babli | Yes | Yes | ON | Unsettled | Work | Day |
| 39 | Prince | Yes | Yes | ON | Unsettled | TV | Night |
| 40 | Ramendra | Yes | Yes | ON | Unsettled | Artificial Light | Night |

1) Graphical representation of the survey data of the effects of light pollution on humans.

| Presence of artificial light at home | | Availability of TV/Mobile at home | | Status of light sources at bedtime | |
|----|----|----|----|----|----|
| Available | Unavailable | Available | Unavailable | ON | OFF |
| 40 | NIL | 40 | NIL | 23 | 17 |
| 100% | 0% | 100% | 0% | 58% | 42% |



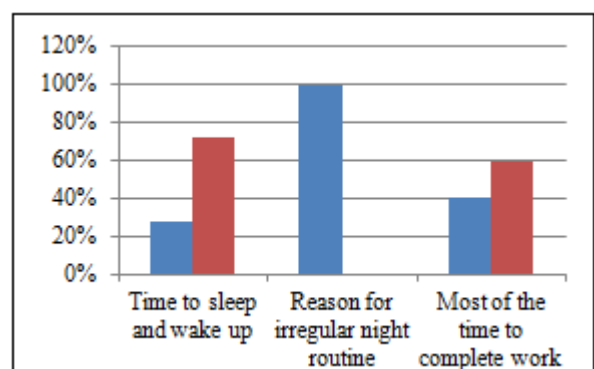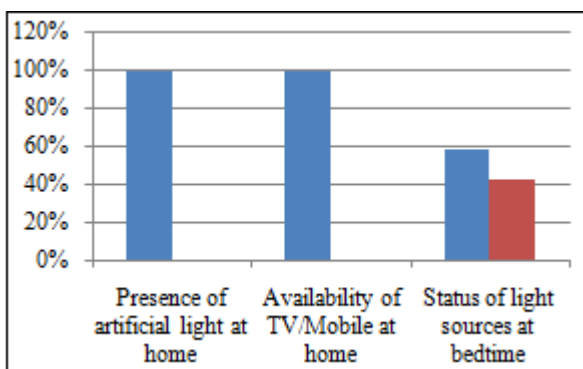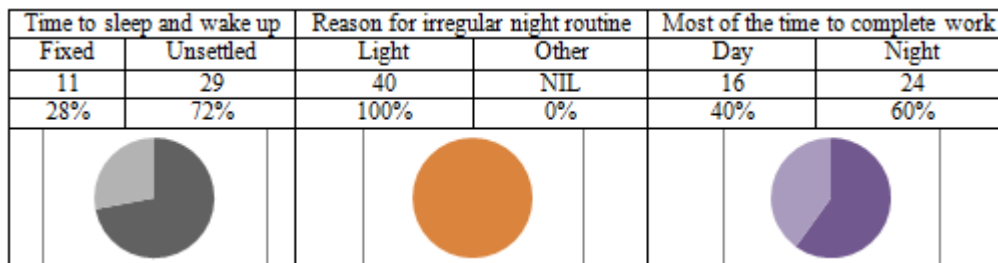| Time to sleep and wake up | | Reason for irregular night routine | | Most of the time to complete work | |
|----|----|----|----|----|----|
| Fixed | Unsettled | Light | Other | Day | Night |
| 11 | 29 | 40 | NIL | 16 | 24 |
| 28% | 72% | 100% | 0% | 40% | 60% |





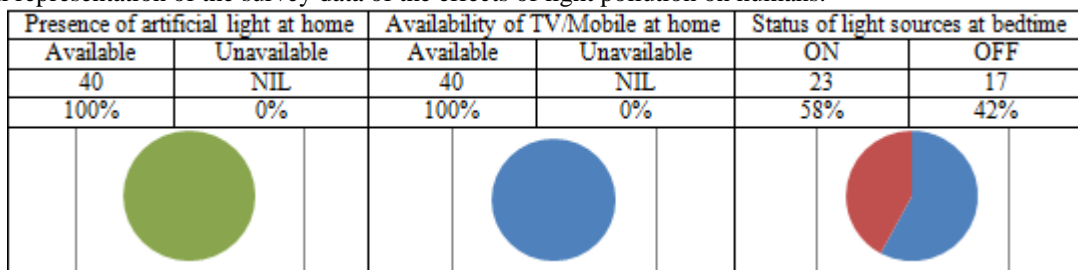**Figure [a]:** Graphical representation of the survey data of the effects of light pollution on humans

2) Data of the effects of light pollution on plants.

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**Table 2:** Data of the effects of light pollution on plants

| Sr. No | Name | Numbers of plants and the Status of Flower and Fruits | |
|---|---|---|---|
| 1 | Sunil Kumar | Bad | - |
| 2 | Karuna Shankar | Bad | - |
| 3 | Brajesh Kumar | - | Good |
| 4 | Omveer | Bad | - |
| 5 | Jeetu Varma | Bad | - |
| 6 | Neelam | Bad | - |
| 7 | Pranshu | Bad | - |
| 8 | Mohit Pratap | Bad | - |
| 9 | Sudheer Kumar | Bad | - |
| 10 | Priyanka | Bad | - |
| 11 | Ramji | Bad | - |
| 12 | Neelam | Bad | - |
| 13 | Pragya | Bad | - |
| 14 | Meena | Bad | - |
| 15 | Sarita | Bad | - |
| 16 | Ankesh | - | Good |
| 17 | Dr. Fool Singh | Bad | - |
| 18 | Pramod | Bad | - |
| 19 | Rajpal | Bad | - |
| 20 | Krishna Murari | Bad | - |
| 21 | Vaibhav | Bad | - |
| 22 | Neelam | Bad | - |
| 23 | Archana | Bad | - |
| 24 | Pragya | Bad | - |
| 25 | Priyanka | Bad | - |
| 26 | Vimlesh | Bad | - |
| 27 | Geeta | Bad | - |
| 28 | Vikas | - | Good |
| 29 | Shivendra Singh | Bad | - |
| 30 | Chandrashekhar | Bad | - |
| 31 | Ramendra Singh | Bad | - |
| 32 | Shivavendra | Bad | - |
| 33 | Ramkumar | Bad | - |
| 34 | Rammilan | Bad | - |
| 35 | Deepnarayan | Bad | - |
| 36 | Sudha | Bad | - |
| 37 | Neha | Bad | - |
| 38 | Babli | Bad | - |
| 39 | Prince | - | Good |
| 40 | Ramendra | Bad | - |

3) Graphical representation of the survey data of the effects of light pollution on plants.

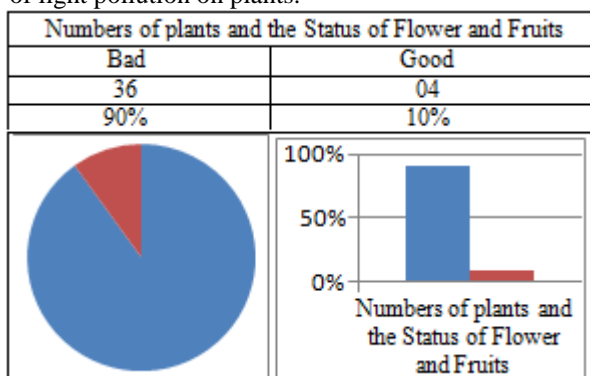| Numbers of plants and the Status of Flower and Fruits | |
|---|---|
| Bad | Good |
| 36 | 04 |
| 90% | 10% |



**Figure [b]:** Graphical representation of the survey data of the effects of light pollution on plant

4) Doctor's suggestion – Heart diseases are increasing due to unbalanced routine. And waking up late at night increases stress.

## 5. Observational Data

1) Data of the effects of light pollution on animals and birds

**Table 3:** Data of the effects of light pollution on animals and birds

| Sr. No. | Observation Date | Observation Time | Observation of Animals and Birds at Night | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Turtle | Firefly | Frog | Moth | Owl | Bat |
| 1 | 20.08.2017 | 8:30 PM | - | 15 | - | 20 | - | - |
| 2 | 21.08.2017 | 8:00 PM | - | 16 | - | 15 | - | - |
| 3 | 22.08.2017 | 8:15 PM | - | 14 | - | 10 | - | - |
| 4 | 23.08.2017 | 8:40 PM | 01 | 11 | 01 | 15 | - | - |
| 5 | 24.08.2017 | 8:23 PM | - | 14 | - | 13 | - | - |
| 6 | 25.08.2017 | 8:47 PM | - | 12 | - | 12 | - | 3 |
| 7 | 26.08.2017 | 8:50 PM | - | 11 | - | - | - | - |
| 8 | 27.08.2017 | 8:05 PM | - | 16 | 01 | - | - | - |
| 9 | 28.08.2017 | 8:00 PM | - | 14 | - | - | - | - |
| 10 | 29.08.2017 | 8:20 PM | - | - | - | - | - | - |
| 11 | 30.08.2017 | 8:00 PM | - | - | - | - | - | - |
| 12 | 31.08.2017 | 8:48 PM | - | - | - | - | - | - |
| 13 | 01.09.2017 | 8:30 PM | - | - | - | - | - | - |
| 14 | 02.09.2017 | 8:25 PM | - | - | - | - | - | - |
| 15 | 03.09.2017 | 8:13 PM | - | - | - | - | - | - |
| 16 | 04.09.2017 | 8:40 PM | - | - | - | - | - | - |
| 17 | 05.09.2017 | 8:10 PM | 01 | - | 01 | - | - | - |
| 18 | 06.09.2017 | 8:45 PM | - | - | - | - | - | - |
| 19 | 07.09.2017 | 8:16 PM | - | - | - | - | - | - |
| 20 | 08.09.2017 | 8:39 PM | - | - | - | - | - | - |
| 21 | 09.09.2017 | 8:21 PM | - | - | - | - | - | - |
| 22 | 10.09.2017 | 8:10 PM | - | - | - | - | - | - |
| 23 | 11.09.2017 | 8:25 PM | - | - | 01 | - | - | - |
| 24 | 12.09.2017 | 8:38 PM | - | - | - | - | - | - |

2) Data of the effects of light pollution on culture.

**Table 4:** Data of the effects of light pollution on culture

| Sr. No. | Observation Date | Observation Time | Observation of Culture | | |
|---|---|---|---|---|---|
| | | | Stars (3000 at a time) | Pole Star | Milky Way |
| 1 | 20.08.2017 | 8:30 PM | 10% | - | - |
| 2 | 21.08.2017 | 8:00 PM | 12% | - | - |
| 3 | 22.08.2017 | 8:15 PM | 11% | - | - |
| 4 | 23.08.2017 | 8:40 PM | 11% | - | - |
| 5 | 24.08.2017 | 8:23 PM | 13% | - | - |
| 6 | 25.08.2017 | 8:47 PM | 12% | - | - |
| 7 | 26.08.2017 | 8:50 PM | 10% | - | - |
| 8 | 27.08.2017 | 8:05 PM | 12% | - | - |
| 9 | 28.08.2017 | 8:00 PM | 10% | - | - |
| 10 | 29.08.2017 | 8:20 PM | 10% | - | - |
| 11 | 30.08.2017 | 8:00 PM | 12% | - | - |
| 12 | 31.08.2017 | 8:48 PM | 11% | - | - |
| 13 | 01.09.2017 | 8:30 PM | 10% | - | - |
| 14 | 02.09.2017 | 8:25 PM | 12% | - | - |
| 15 | 03.09.2017 | 8:13 PM | 11% | - | - |
| 16 | 04.09.2017 | 8:40 PM | 11% | - | - |
| 17 | 05.09.2017 | 8:10 PM | 10% | - | - |
| 18 | 06.09.2017 | 8:45 PM | 12% | - | - |
| 19 | 07.09.2017 | 8:16 PM | 10% | - | - |
| 20 | 08.09.2017 | 8:39 PM | 13% | - | - |
| 21 | 09.09.2017 | 8:21 PM | 11% | - | - |
| 22 | 10.09.2017 | 8:10 PM | 12% | - | - |
| 23 | 11.09.2017 | 8:25 PM | 11% | - | - |
| 24 | 12.09.2017 | 8:38 PM | 13% | - | - |

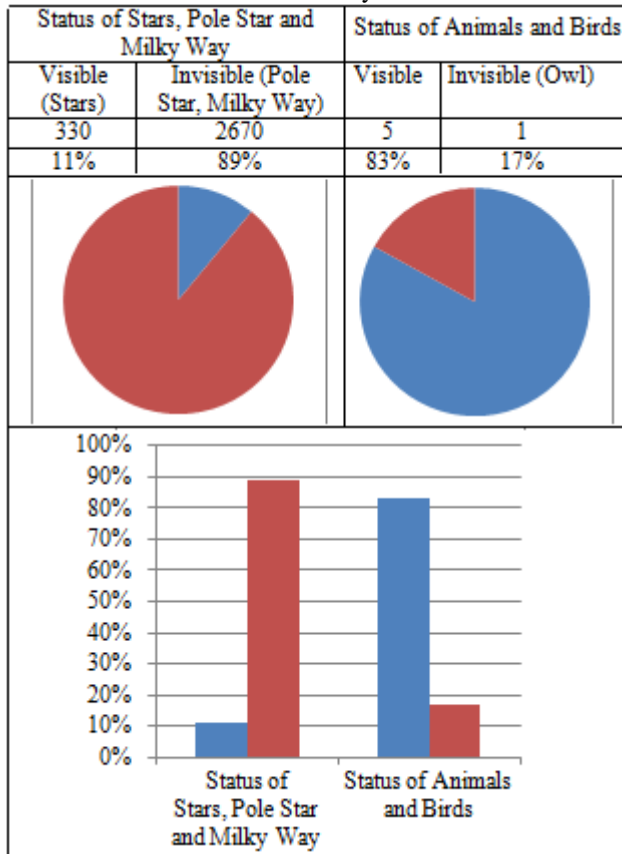3) Graphical representation of the data obtained from the observation and their analysis.



| Status of Stars, Pole Star and Milky Way | | Status of Animals and Birds | |
|---|---|---|---|
| Visible (Stars) | Invisible (Pole Star, Milky Way) | Visible | Invisible (Owl) |
| 330 | 2670 | 5 | 1 |
| 11% | 89% | 83% | 17% |

**Figure [C]:** Graphical representation of the data obtained from the observation and their analysis

## 6. Data Analysis

The flowering condition of trees are getting worse by 90% due to 'light pollution' caused by sparkling lamps at night.
1) 72% of people are having unbalanced routine due to artificial light.
2) 17% of organisms are not visible due to 'light pollution'.
3) Visions of stars and pole stars are rare due to 'light pollution'.

## 7. Conclusion

Like air pollution, "**light pollution**" is also spreading silently. Due to its effect, children and humans are surrounding by many diseases. Fruits have started coming down on plants. Due to which our biodiversity is under threat.

## 8. Future Scope

We will do more intensive study on light pollution. We will do experiments in the lab and collect more data.

## Reference

[1] Vigyan Pragati (Nov 2015)
[2] Article – Mr. Vishnu Prasad Chaturvedi

## Author Profile

**Newton Kushwaha** is student of class 9th. He has special interest to work in the field of computers.

**Neha Kushwaha** is student of class 12th. She has passion to read Science books and magazines. She like to roaming.