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Smart Village Model with Environmental Sustainability

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Executive Summary: The aim of this research paper is to highlight the CSR projects of Cybage (Rural Upliftment Vertical) in order to achieve these objectives, data was collected using questionnaire and data was sought from the beneficiaries who are benefited by the CSR Projects of Cybage in their Village. This report includes 'Environmental Sustainability'-

1. Tree Plantation.
2. Solar Street Lights.

Data was collected from 103 beneficiaries of Tree Plantation Project, and 25 beneficiaries of Solar Street Light Project. Villagers are satisfied with environment sustainability project of Cybage. Awareness about projects is very high. But there are still some issues like non- working and maintenance of some solar street lights and limited coverage of this type of projects, which should be addressed on priority basis by Cybage. Cybage should take an initiative to sensitize village panchayat to develop a self-sustaining model from long term sustainability perspective. CybageAsha meticulously conceptualizes, plans, and executes various drives in and around Pune with exclusive involvement of dedicated CSR Team members and the support of Cybagians who volunteer for several noble causes.

Keywords: Cybage, Solar Street Lights, Tree Plantation, CSR

Introduction

Rural Development program is executed to improve the quality of rural life by developing required infrastructure for villages; making them self-reliant; highlighting the importance of general cleanliness and community health. The basic motive is bringing out their socio-economic transformation through the participation of village residents.

The activities conducted under Rural Development, in beneficiary villages include:

This research paper presents an evaluation of some of these initiatives of CybageAsha and existing status quo, impact assessment and recommendations based on this impact assessment. The purpose of comprehensive evaluation is to assess the short and long-term impact of the projects on the beneficiaries for further improvement.

Research Overview

This research paper is based on the initiatives of CybageAsha that fall under its Rural Upliftment Vertical. Rural Development program is executed to improve the quality of rural life by developing required infrastructure for villages; making them self-reliant; highlighting the importance of general cleanliness and community health; and bringing about their socio-economic transformation through the participation of village residents.

Objectives

- To find whether the Villagers/Stakeholders are happy with the infrastructure quality developed by Cybage.
- To study whether there is any change in mind set of villagers after CybageAsha's presence in the village.
- To study if villagers are motivated to uplift the quality of life in their own village, as an outcome of Cybage intervention.

Scope

Scope of Tree Plantation Project by CybageAsha:

Tree Plantation Project

Village (Taluka)
Mavadi Supe (Purandar)
Pingori (Purandar)

Scope of Solar Street lights Project by CybageAsha:

Solar Street Light Project

Village (Taluka)
Nawali (Purandar)

Review of Literature

By 2050, an estimated 66% of the total world's population will be urban Urbanization, coupled with a changing climate, is a challenge on a global scale that greatly impacts the health and well-being of humans. In order to establish healthy and vibrant communities, trees need to be part of the global discussion. Over the past 30 years, science has demonstrated how trees in

our landscapes benefit people and those well-maintained trees is an important asset to keep a community healthy and safe. Planting and maintaining trees, as part of urban planning and engineering solutions, can serve as a nature-based solution to many challenges communities face: managing storm water, supporting mental and physical health for people, reducing crime, addressing pollution, and providing wildlife habitat. Despite the critical importance or urban forest, urban tree cover continues to decline nationwide each year.

Investing in trees through planting, care, and maintenance will produce a significant return on investments, especially as older and larger trees provide the most benefits. Trees are a long-term solution for many issues people face and they are a valuable resource for every community, especially those in urban or suburban settings. Botanical gardens and arboreta play an important role in this pursuit for a healthy and vibrant urban forest. These institutions provide valuable insight and leadership due to their expertise in botany and horticulture, as well as an established track record of public outreach and training. The future of urban forestry should focus on protecting large trees, as well as improving age structure, standards and planning management.

Trees have a high return on investment due to ecosystem services

Experts suggest that every dollar invested on tree planting and management can result in a high return on investment 4,5 even as high as over 500%4. The compensatory value of the urban forest in the continental US is estimated to be worth more than $2.4 trillion6, with $18.3 billion worth of ecosystem benefits occurring annually Trees and green space provide important direct and indirect benefits social and biological benefits, such as:

- Reducing storm water runoff.
- Reducing air and water pollution.
- Reducing energy costs and use associated with heating and cooling.
- Reducing the urban heat island.
- Protecting roadways and reducing the amount of asphalt sealers required.
- Reducing noise pollution.
- Providing valuable carbon storage and sequestration.
- Increasing food security of urban areas.

Trees Keep Citizens Healthy and Happy

The presence of trees and green space on people can:

- Increase attention, memory reflection and focus.

- Reduce stress or increased ability to recover from stress.
- Increase life satisfaction and positive thoughts or emotions.
- Lower mortality rates from non-accidental deaths.
- Shorten recovery times in the hospital and increased perception of health.

Large Trees Provide Critical Benefits for their Role in

- Creating habitat for other species.
- Managing important environmental cycles and processes.
- Storing and sequestering significant amounts of carbon.

In today's application, most of the common High Intensity Discharge (HID) lamps, often High Pressure Sodium (HPS) lamps are being replaced by more low powered Light Emitting Diode (LED) lamps. A basic solar powered LED street light system components are: (i) Solar Panel (ii) Lighting Fixture - LED lamp (iii) Rechargeable Battery (iv) Controller (v) Pole. The Solar Panel will provide electricity to charge the battery during day time. The battery's charging is controlled by a charge controller. The operation of the LED bulb is controlled by a control circuit either by using sensors such as Light Dependent Resistor (LDR).

Saving electrical power is very important, instead of using the power in unnecessary times it should be switched off when not in use. In any city "Street Light" is one of the major power consuming factors. Most of the time, street lights are during all night long until the sunrise.

As we know that, now a day's energy sources are limited and energy consumption has increased, so renewable energy sources are used in order to meet the increase the demand for energy. Keeping this in mind in this article, we are discussing about a solar powered LED street light with auto intensity control. This project is driven by solar energy used to control the light intensity from morning to evening based on the brightness. A case study is also done to demonstrate the advantages of this solar LED street light compared to traditional street light.

Because, this solar powered street light can conserve a large amount of electricity compared to the other lights which are a light to their maximum intensity at all times after they are turned on Solar Powered Led Street Light with Auto Intensity Control Circuit and Its Working.

The solar powered street light work on the principle of solar cells or PV cells to absorb the solar energy in the daytime. The PV cells convert solar energy to the electrical energy. The converted energy is stored in the battery and the solar street lights use solar energy. Nowadays solar street lights are available beside the roads. At the night time the lamps start automatically

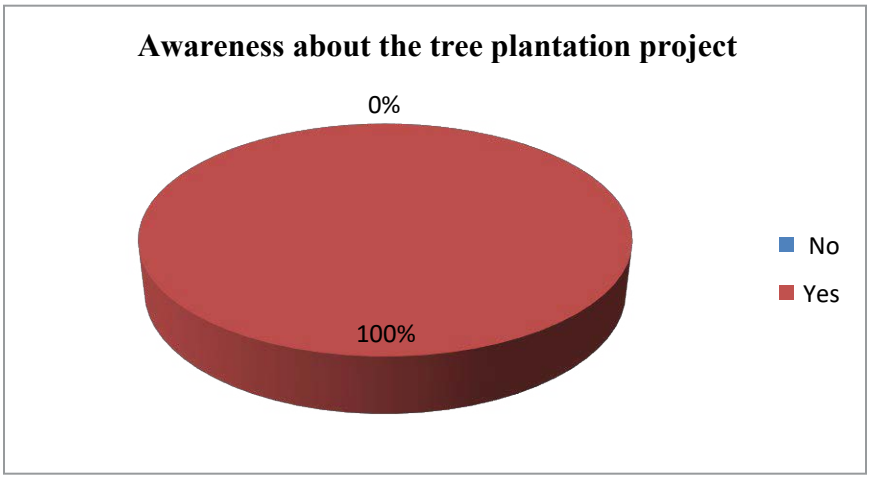
and it uses the electrical energy which is stored in the battery. Every day this process continues. The solar powered led street lights activate from dusk to dawn. The LED Street light automatically turns ON after the dusk and turns OFF after the dawn. The designing of the entire system includes: Solar panels, LED light, Rechargeable battery, Controller, Pole and interconnecting cables.

There is growing evidence that project sustainability is supported by carefully planned and well-implemented project evaluation. This report has been prepared for the management and the CSR team at Cybage. The intent of the report is to provide the CSR team with an overview of the impact of their CSR initiatives under CybageAsha (Rural Upliftment Vertical).

Data Analysis and Interpretation

Question 1

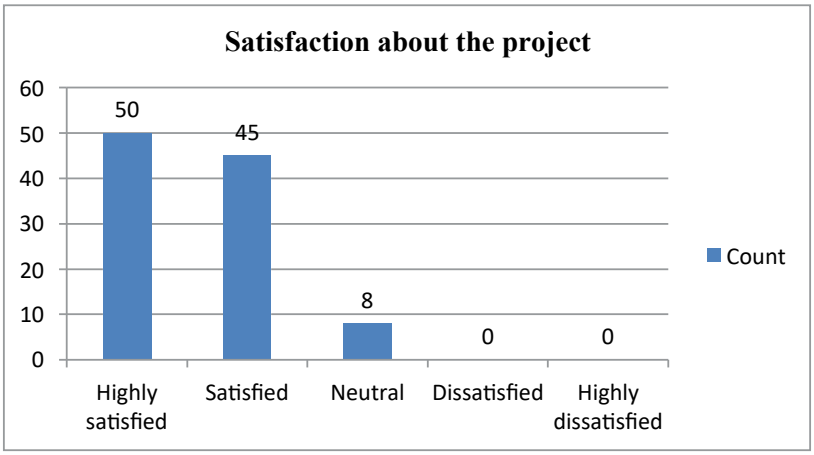
Awareness about the tree plantation project		
Response	**Count**	**Percentage**
No	0	0%
Yes	103	100%
Total	**103**	**100%**



From the above data it is observed that 100% villagers are aware about cybage tree plantation project.

Question 2

Satisfaction about the project		
Response	**Count**	**Percentage**
Highly satisfied	50	49%
Satisfied	45	43%
Neutral	8	8%
Dissatisfied	0	0%
Highly dissatisfied	0	0%
Total	**103**	**100%**



From the above data, it can be interpreted that majority of respondents (49%) are highly satisfied with Tree Plantation Project, 43% respondents are satisfied and just 8% are neutral with the Project. There is no degree of dissatisfaction about the project.

Question 3

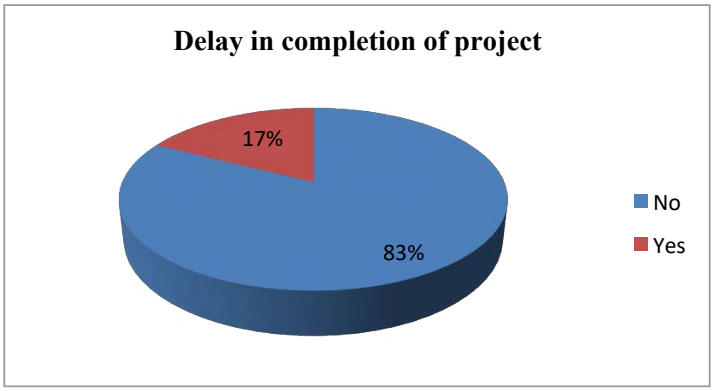
What kind of trees was planted? Response

Mango, Lemon, Banyan, Tamarind, Neem, Amla, Guava, Coconut, Nilgiri, Custard Apple, Aloe Vera, Tomato, Babool, Coconut, Amla, Litchi, Chickoo, Jamun.

Question 4

Delay in completion of project		
Response	**Count**	**Percentage**
No	85	83%

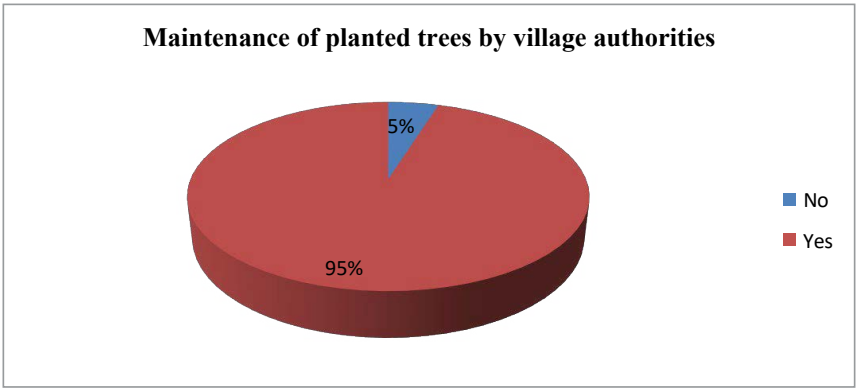
Yes	18	17%
Total	**103**	**100%**



It can be interpreted that majority of the respondents (83%) say that there was no delay in the completion of Tree Plantation Project. 17% respondents believe that there was a delay.

Question 5

Maintenance of planted trees by village authorities		
Response	**Count**	**Percentage**
No	5	5%
Yes	98	95%
Total	**103**	**100%**



From the above data, it can be interpreted that 95% villagers believe that trees are being maintained by village authorities.

Question 6

What was the condition before Tree Plantation? Response

- There was no protection from Sunlight.
- Look and feel of the village was not so good.
- Environment was not so fresh.
- It looked like a barren land with limited number of trees.
- Shortage of rain due to less greenery.

Question 7

Benefits derived from the project		
Response	**Count**	**Percentage**
Clean and fresh air	90	87%
Shade during summer season	52	50%
A cool place for villagers to sit and chat	39	38%
Any other	6	6%

From the above data, it can be interpreted that 90 out of 103 (87%) respondents are getting clean and fresh air. 52 out of 103 respondents (50%) are getting shade during summer season. 39 out of 103 respondents (38%) are getting cool place for villagers to seat.

Question 8

What change in your lifestyle has this project brought?

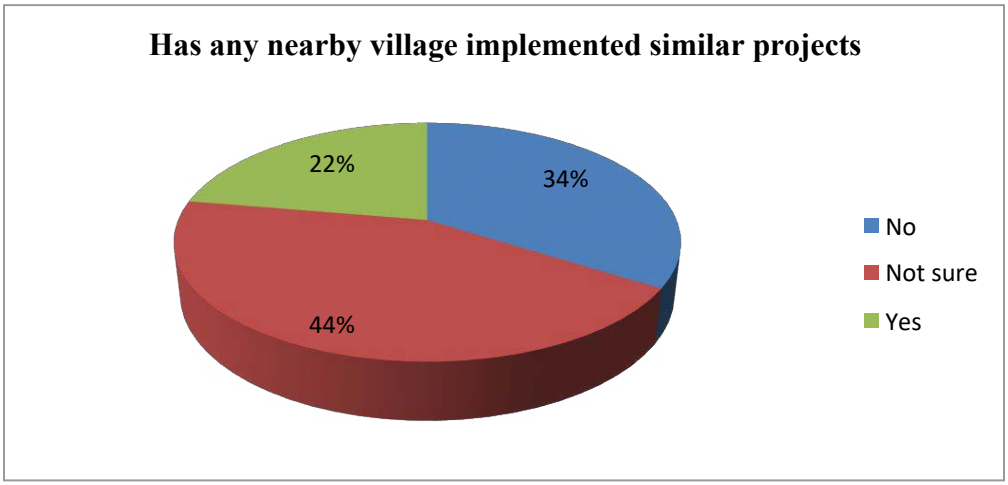
Response

- Fresh air.
- Good greenery.
- Protection from sunlight.
- Weather in the surroundings has changed.
- Lifestyle of people changed.

- Healthy Environment.
- Better rainfall.
- Newer fruits available to the villagers.
- Enthusiasm among villagers about a better and greener village in future.
- A sense of happiness among the villagers.
- A better place to sit, relax and do some activities.

Question 9

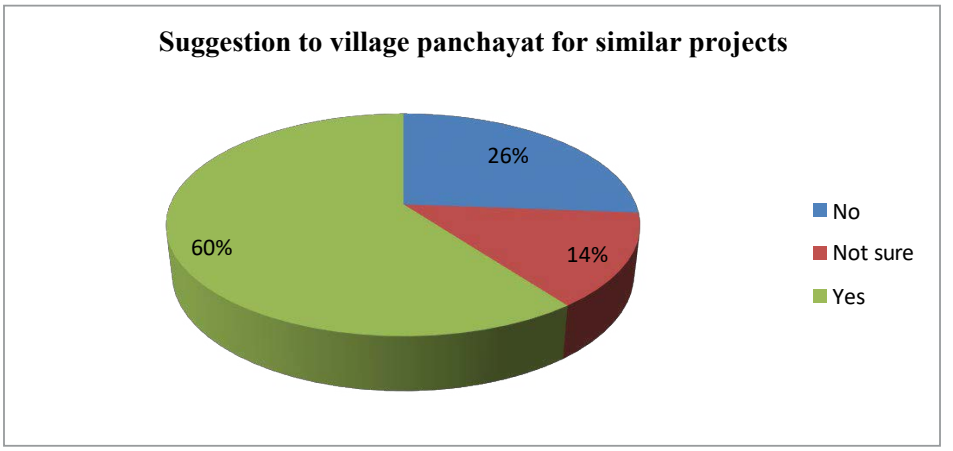
Implementation of similar projects in nearby villages		
Response	**Count**	**Percentage**
No	35	34%
Not sure	45	44%
Yes	23	22%
Total	**103**	**100%**



From the above data, it can be interpreted that 44% respondents are not sure if any similar project(s) has been implemented in nearby villages. 34% respondents say that no such project has been implemented in nearby villages. 22% respondents say that similar projects have been implemented in nearby village's like-Pimpri, Nandi, Piserway and Rajora.

Question 10

Suggestion to village panchayat for similar projects		
Response	**Count**	**Percentage**
No	27	26%
Not sure	14	14%
Yes	62	60%
Total	**103**	**100%**



From the above data, it can be interpreted that 60% respondents say that they have suggested their village panchayat to come up with similar projects. 26% respondents have not suggested their village panchayat to come up with similar projects. 14% respondents are not sure.

Question 11

What could have been done differently to maximize the impact for the beneficiaries? Response

- It would have been better if trees were planted by road side.
- There should be more Plantation.
- More variety of plants needed.
- A proper plan for the care and up-keep of trees is needed.
- Ayurvedic trees should be planted.
- Adequate water supply for maintenance of trees should be arranged.

Findings - (Tree Plantation)

- Majority of beneficiaries are satisfied with the initiative of Tree Plantation by Cybage.
- Villagers feel that the look and feel and the environment of their village has changed due to this initiative of Cybage.
- Majority of respondents believe that the project was completed well in time by Cybage.
- Villagers are maintaining planted trees very well.
- Villagers are getting clean, fresh air and shade from sun during summer season and are very happy about it.
- Villagers want more plantation in their village and are expecting variety of trees including Ayurvedic ones, in future plantation drives.
- Majority of respondents are not sure if any other similar project has been implemented in nearby villages.

Recommendation

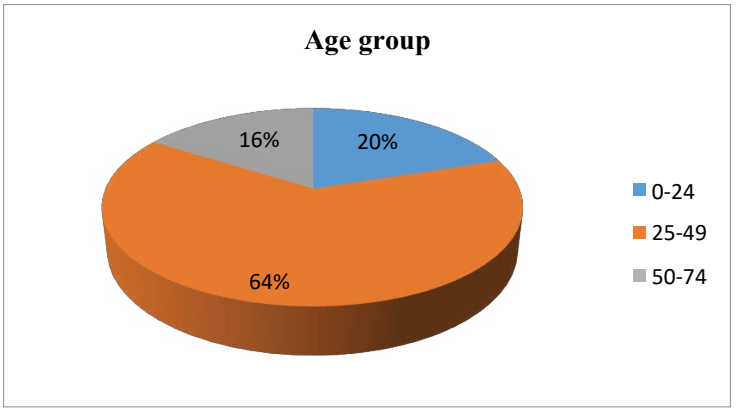
- Awareness campaign must be conducted to sensitize the villagers about the importance of Tree Plantation.
- More number of trees should be planted in the village. There are still some areas where there are no trees.
- More number of trees bearing fruits, Ayurveda herbs etc. should be planted which may help the villagers generate some income out of its sale/usage.

Analysis and Interpretation of Data Received from Villagers

Solar Street Light

Age group of respondents

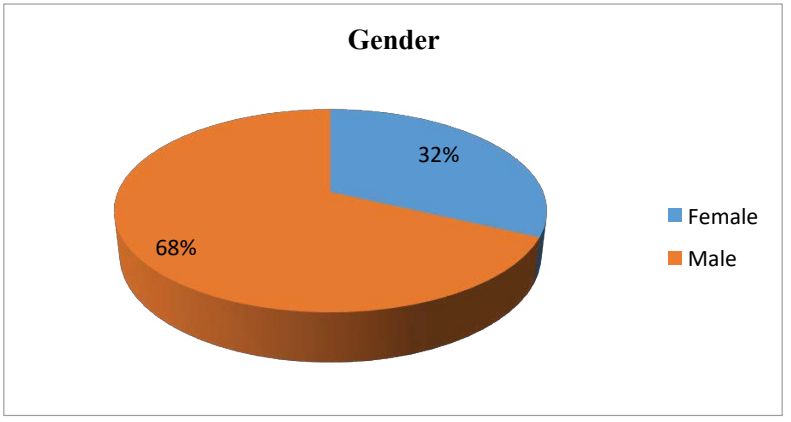
Age group of respondents		
Age group	**Count**	**Percentage**
0-24	5	20%
25-49	16	64%
50-74	4	16%
Total	**25**	**100%**



From the above data, it can be interpreted that majority of respondents (64%) are from the age group 25-49, the next majority (20%) lies in the age group 0-24, & very less respondents (16%) fall under the age group of 50-74.

Gender of Respondents

Gender of Respondents		
Gender	**Count**	**Percentage**
Female	8	32%
Male	17	68%
Total	**25**	**100%**



From the above data, it can be interpreted that majority of respondents (68%) are males and remaining (32%) are females.

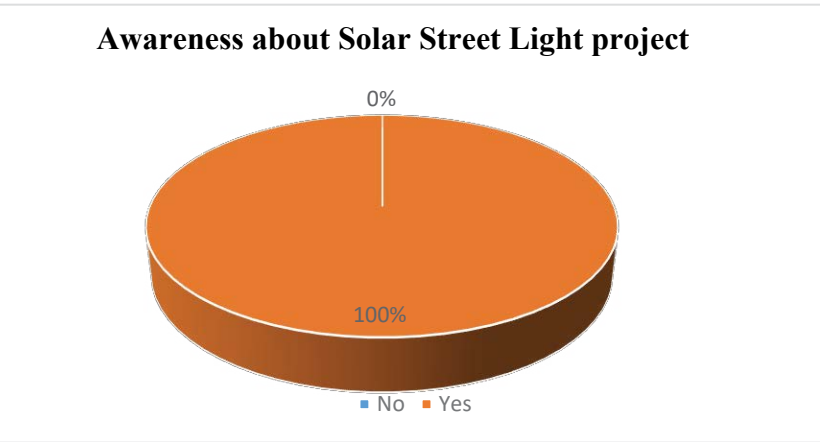
Current Employment/Occupation of Respondents

Current Employment	
Response	**Count**
Farmer	19
Gram Seva	1
Housewife	2
Student	3
Total	**25**

From the above data, it can be interpreted that majority of the respondents are Farmers followed by students and housewives.

Question 1

Awareness about Solar Street Light project		
Response	**Count**	**Percentage**
No	0	0%
Yes	25	100%
Grand Total	**25**	**100%**



From the above data, it can be interpreted that all the respondents (100%) are aware about Cybage Solar street light project.

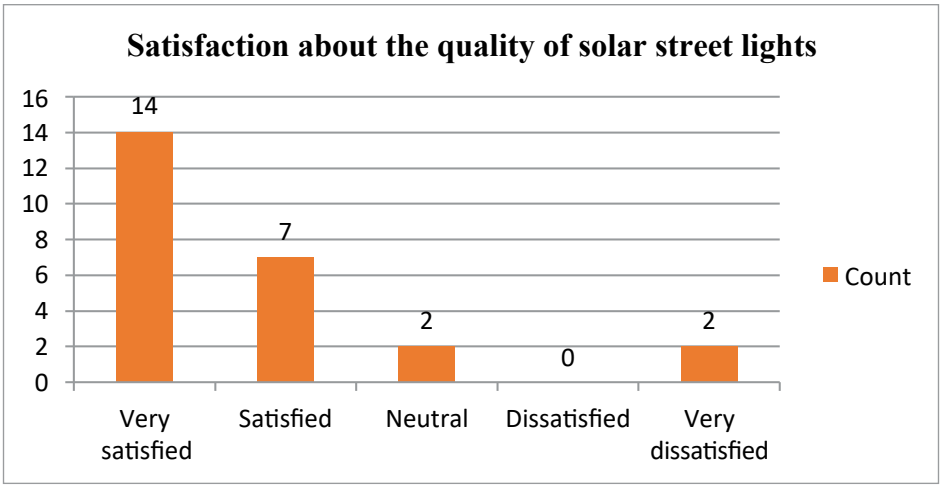
Question 2

Satisfaction about the project		
Response	**Count**	**Percentage**
Very satisfied	11	44%
Satisfied	13	52%
Neutral	1	4%
Dissatisfied	0	0%
Very dissatisfied	0	0%
Total	**25**	**100%**

From the above data, it can be interpreted that majority of respondents (52%) are satisfied with solar street light project, 44% respondents are highly satisfied whereas some of respondents (4%) remain neutral and there is no dissatisfaction about the Project.

Question 3

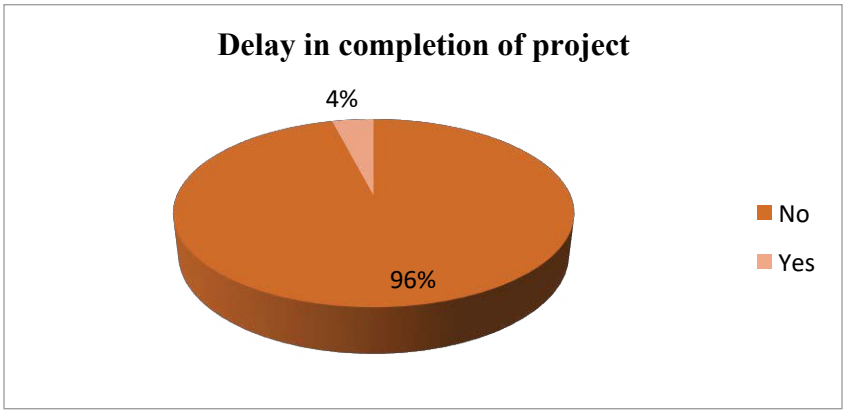
Satisfaction about the quality of solar street lights		
Response	**Count**	**Percentage**
Very satisfied	14	56%
Satisfied	7	28%
Neutral	2	8%
Dissatisfied	0	0%
Very dissatisfied	2	8%
Grand Total	**25**	**100%**



From the above data, it can be interpreted that majority of respondents (56%) are highly satisfied with respect to the quality of solar street light, (28%) respondents are satisfied whereas some of respondents (8%) remain neutral and (8%) respondents are highly dissatisfied about the quality of the Project.

Question 4

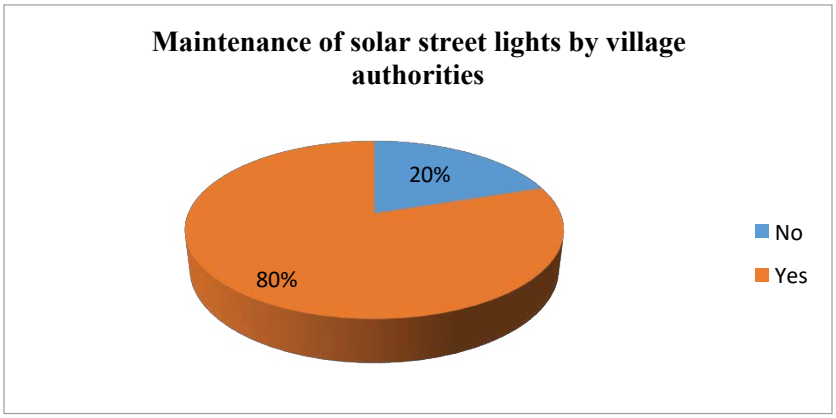
Delay in completion of project		
Response	**Count**	**Percentage**
No	24	96%
Yes	1	4%
Total	**25**	**100%**



From the above data, it can be interpreted that majority of respondents (96%) find that there was no delay in completion of project. Remaining just (4%) find that there was a delay in completion of project mainly because the street light were installed first and batteries later.

Question 5

Maintenance of solar street lights by village authorities		
Response	**Count**	**Percentage**
No	5	20%
Yes	20	80%
Total	**25**	**100%**



From the above data, it can be interpreted that majority of the respondents (80%) find that there is proper maintenance of solar street lights.

Question 6

Condition before Solar street light installation		
Response	**Count**	**Percentage**
Heavy electricity bill	3	12%
Shortage of electricity supply	25	100%
Any other	3	12%

From the above data, it can be interpreted that 25 out of 25 (100%) respondents said that there was a shortage of electrical supply in village before solar street light installation. 3 out of 25 (12%) respondents say that the electricity bill was very high & 3 out of 25 (12%) put forth some other reasons as condition before street light installation.

Question 7

Benefits of solar street lights to the villagers		
Response	**Count**	**Percentage**
There is now proper illumination on the internal roads of villages	13	52%
The solar street lights reduces electricity bill of the village	16	64%
Safety for villagers at night	24	96%
Conservation of energy	1	4%
Proper utilization of natural resource	10	40%
Any other	0	0%

From the above data, it can be interpreted that 24 out of 25 (96%) respondents said that as a benefit of solar street light it is safe for villagers during night. 16 out of 25 (64%) respondents said that it reduces electricity bill of the village. 13 out of 25 (52%) respondents said that there is now proper illumination on the internal roads of villages. 10 out of 25 (40%) respondents said that proper utilization of natural resource is happening. Also 1 out of 25 (4%) said that it helps in conservation of energy.

Question 8

What change in your lifestyle has this project brought?

Response

- Safety and illumination in village.
- Solar lights helps in night when power is off.
- It also reduces electricity bill.
- Very helpful at night for working.
- Helpful for children to study at night time.
- Driving on roads is much safer.

Question 9

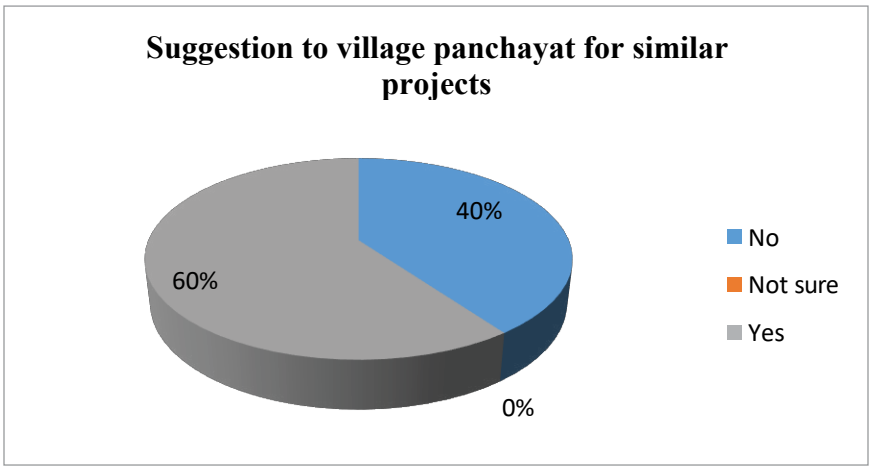
Implementation of Similar projects in nearby villages		
Response	**Count**	**Percentage**
No	20	80%
Not sure	2	8%

Yes	3	12%
Grand Total	**25**	**100%**

From the above data, it can be interpreted that 80% respondents said that there is no such project in nearby village. 12% respondents said that similar projects have been implemented in nearby villages. 8% respondents are not sure if any similar project has been implemented in nearby villages.

Question 10

Suggestion to village panchayat for similar projects		
Response	**Count**	**Percentage**
No	10	40%
Not sure	0	0%
Yes	15	60%
Grand Total	**25**	**100%**



From the above data, it can be interpreted that 60% respondents said that they have suggested their village panchayat to come up with similar projects. However, 40% respondents have not suggested their village panchayat to come up with similar project

Question 11

What could have been done differently to maximize the impact for the beneficiaries? Response

- More voltage of light required for night time.
- Should plant more solar street lights and in also nearby place or locality.
- Need to maintain solar street lights. Some lights are not working.
- Quality of solar street lights could have been better. Some of the key findings are:

Villagers are satisfied with environment sustainability project of Cybage. Awareness about projects is very high. But there are still some issues like non-working and maintenance of some solar street lights and limited coverage of this type of projects, which should be addressed on priority basis by Cybage. Also, they are quite satisfied with construction quality of these projects. But, they expect Cybage intervention on a greater magnitude in order to cover majority population of villages. Also the issues like- theft of batteries and solar street lights should be addressed. Cybage should take an initiative to sensitize village panchayat to develop a self-sustaining model from long term sustainability perspective.

Limitations

Any research project functions within constraints and these result in limitations that provide context to the report. Some of the limitations of this assessment are as under:

- The study was carried out within small time duration and so a census type collection of data was not possible.
- While for villages where the projects have been completed recently, commenting on the benefits derived from the project could be premature.
- Due to busy schedule of beneficiaries, some of them might have given hurried response.

Findings from Villager's Response Solar Street Light

- Majority of the respondents were satisfied with the project.
- Majority of the respondents believe that there was no delay in completion of project.
- Some of the respondents who said that the village authorities were not maintaining solar street lights on regular basis mentioned that Battery and lights are stolen and the gram panchayat is not doing anything about this. They are of opinion that they maintain the street Lights by themselves & village authority doesn't help.
- Problems before Solar street light installation included - heavy electricity bill, Shortage of electricity supply, Difficulty in working and problem of theft.

- According to some of the respondents following villages have implemented similar projects: Raak, Kolavire and Guleche.

Recommendation for- Solar Street Light

- The number of Solar street lights should be increased to cover more areas.
- Quality of lights should be maintained by planning a regular check and maintenance.
- Some solar street lights are not working. They should be repaired.
- Theft of lights and batteries need to be addressed.

Conclusion

This research paper gives a brief idea about CSR projects done by Cybage in rural areas in Pune district. This project is related to Environment Sustainability. From the above analysis it can be concluded that Cybage is doing good work in terms of providing environmental sustainable solutions in villages as per requirement of the villagers. The villagers are satisfied with the performance of Cybage projects in their village. Some of the key points indicating the positive impact of 'Environmental Sustainability' Project Category, for the beneficiaries are indicated below:

- Tree Plantation Project has impacted the lives of around 2630 villagers across 2 villages surveyed.
- Solar Street Light Project has impacted the lives of 1065 villagers residing in the village surveyed by means of 15 Solar Street Lights installed by Cybage.

But, there are still certain issues like non-working and maintenance of some of the solar street lights and limited coverage of this type of projects, which should be addressed on priority basis by Cybage.