

Quality Tools Applied to Reduce, Reuse and Recycle Waste – At Satya Bharti Adarsh Sr. Sec School Rauni, Ludhiana

Bharti Foundation

B-Wing First Floor, Udyog Vihar, Phase IV, Gurgaon-122015, Haryana

Key words: Pareto Chart, DMAIC (Define, Measure, Analyze, Improve, Control), Cause & Effect, Internal Audit, Corrective action Plan (CAP), 3R (Reduce, Reuse, Recycle), 5S (Sorting, Systematic Arrangement, Stay clean, Standard Practice, Spread awareness), Sustainability

ABSTRACT

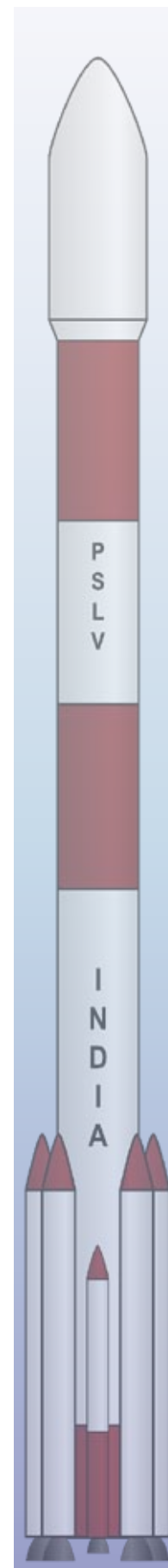
Waste is any substance that is discarded after primary use. Waste management helps school management, students, teachers, parents and community members realize greater economic and environmental benefit from their waste programs. Recycling of waste helped in building culture in school and within society. It benefitted to save energy, reduce water pollution, reduce use of electricity, water consumption and preserve natural resources. Problems were analyzed and all alternative solutions were taken into account. This case study demonstrates application of Six Sigma methodology in Waste management. It started with identifying various wastes generated inside the school. Standard operating procedure and check list were introduced for sustaining the gains.

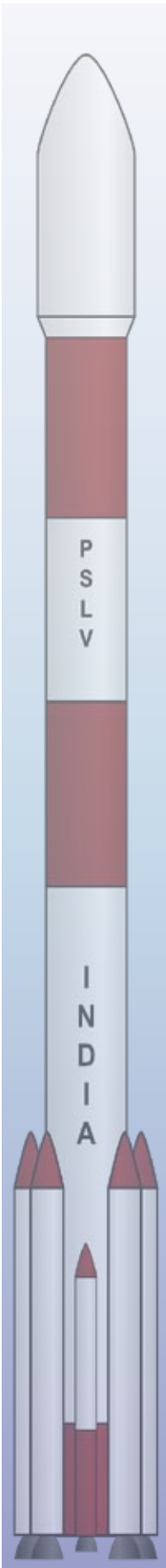
Bharti Foundation was set up in 2000 as the development arm of the Bharti Group of Companies to make quality education accessible to underprivileged children in rural India. Satya Bharti School program is the flagship initiative of Bharti Foundation, focusing on primary, elementary and senior secondary education. Launched in 2006, this education initiative supports the pursuit of excellence and aims to set benchmarks in quality education across the country. The schools provide free quality education to the children with a special focus on the girl child, in the deepest rural pockets of the country. Currently, 249 primary/elementary schools and five senior secondary schools are operational across Punjab, Rajasthan, Haryana, Uttar Pradesh, Tamil Nadu and West Bengal reaching out to 40,676 children and employing 1,635 teachers. Continuing the tradition of contributing towards the nation's agenda, the Foundation has initiated 'Satya Bharti Abhiyan', to improve sanitation facilities in rural Ludhiana.

This paper focuses on the “**Waste Management Project**” implemented in Satya Bharti Adarsh Sr. Secondary School Rauni (Affiliated to CBSE) on applying quality tools to reduce, reuse and recycle waste. The school was set up on 11th April, 2011 on 12.82 acres of land in village Rauni of Ludhiana. The School caters to 34 villages spread over 4 districts namely, Sangrur, Ludhiana, Patiala and Fatehgarh Sahib within the radius of 15 kilometers impacting 1.5 lac inhabitants. Presently it has 689 students.

Like most schools, this school had been struggling with the problem of accumulation tons of waste from various sources. The project was an endeavor to apply a new approach to learning as well as educating others on how to save cost, reduce time and efforts in disposing waste besides inculcating universal values and sensitivity in students towards national resources and environment.

Dr. Deepak Kumar Head Quality, E-mail: deepak.kumar@bhartifoundation.org





Waste is any substance that is discarded after primary use and “Waste Management” is the process of collecting, transporting, processing or disposing, managing and monitoring of waste materials. Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded and these include: paper, water, food waste etc. Waste Management techniques can be varied leading to varying benefits like -

- Health benefits from safe disposal of waste that would otherwise contaminate the environment
- Economic benefits through reuse/recycling of products n discarded as waste and
- Aesthetic benefits from a clean environment without the sight of openly dumped waste

Adarsh School Rauni

The process of waste management included following steps:

Identification of Waste Area: There were six types of resources wasted in our school were Paper, Water, Electricity Fuel, Mid-day meal and other items. A baseline study was done to understand the sources of these wastes.

WASTE AREA

Types of Waste	Sources of waste
Paper	TLM- Teaching Learning Material
	Old books
	Note books
	Notices
	Old projects
Water	Toilets water
	Dish washing
	Moping
	Drinking
Electricity	Fans
	Pumps
	Tube light
Fuel	Transportation
	Cooking
Food (other)	Mid-day meal
	During MDM preparation
Other Articles (other)	Cartons, sacks, flex board, chalks etc.

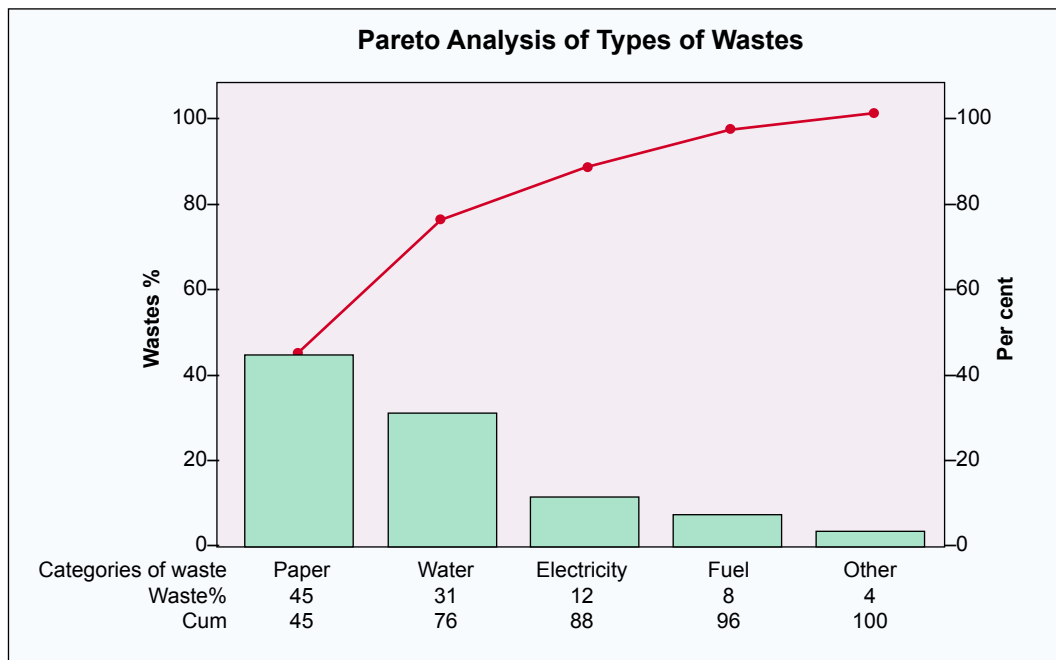
Assessing Impact of Waste Accumulation

- Increase in operational costs in view of waste disposal expenditure.
- Increasing insensitivity and apathy amongst students towards waste accumulation due to continued practice of tearing of note books, wasting meals, creation of unhygienic conditions are observed.
- Results in multiplier effect with increase ineffective waste management of critical resources like reduction of teaching time, ineffective meal.



iv) School loses its reputation on account of ineffective management of resources.

Pareto Analysis was done to understand the proportion of above identified wastes. Pareto Analysis uses the Pareto Principle - also known as the "80/20 Rule".



Conclusion: Here, the cumulative line is steep, with a lot of arch to it, implying that paper and water adds to 76% of the total problems. Focusing on reducing paper and water wastage will cater 76% of problems.

3 R's of Waste Management

3 R's of waste management are Reduce, Reuse, and Recycle in each of the wastes. Waste hierarchy is the order of priority of actions to be taken to reduce the amount of waste generated, and to improve overall waste management processes and programs. This waste hierarchy is the guidance suggested for creating a sustainable life.

The First 'R' – Reduce

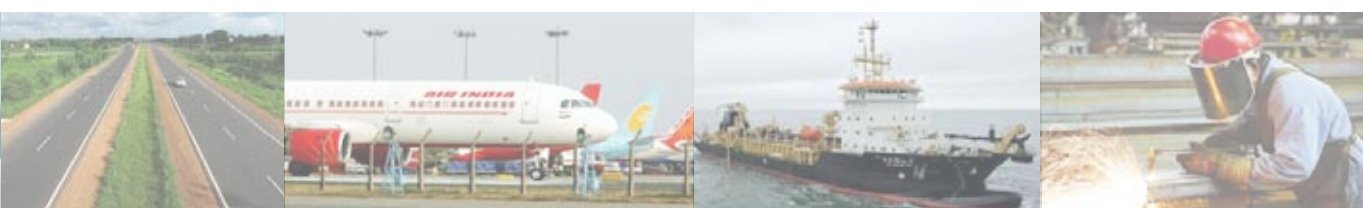
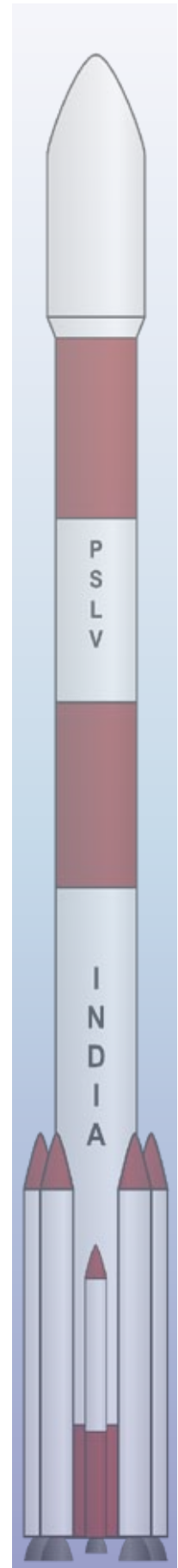
The concept of reducing what is produced and what is consumed is essential to the waste hierarchy. If there is less wastage then there is less to recycle or reuse.

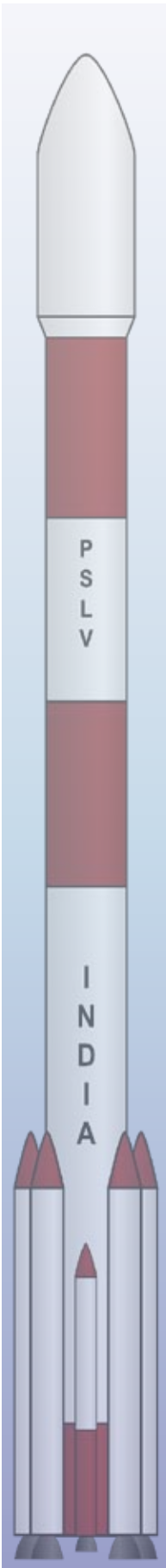
The Second 'R' – Reuse

To reuse is to use an item again after it has been used. This includes conventional reuse where the item is used again for the same function and creative reuse where it is used for a different function.

The Third 'R' – Recycling

The last stage of the waste hierarchy is to recycle. To recycle something means that it will be transformed again into a raw material that can be shaped into a new item. There are very few materials on the earth that cannot be recycled.





Implementation Process

Involved all students of Satya Bharti School along with teachers, parents and community members.. They were empowered to share the concept, methodology and benefits of reduction of wastes. To achieve the target of 3 R, concept of 5S was introduced in the school. Special session on 5S was conducted for teachers and students.

The 5S is based on 5 simple principles

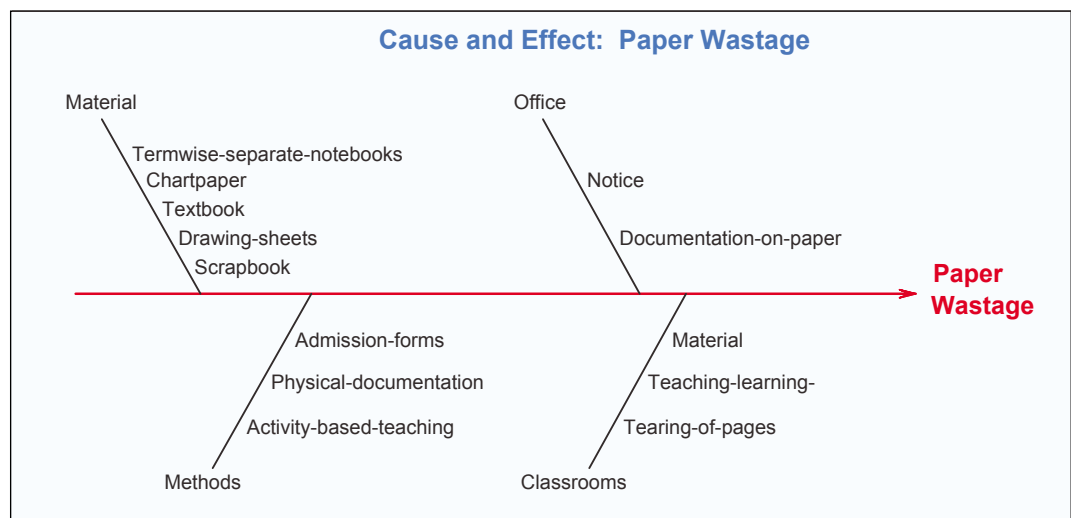
- **Sorting** means eliminating anything that is unnecessary for the equipment to work properly.
- **Systematic arrangement** is the best way of eliminating pointless searching, according to the principle: “a place for everything and everything in its place.”
- **Stay clean** means keeping everything so clean that it shines. In a clean environment, any leak or other abnormality can be detected faster, a prerequisite for quality maintenance.
- **Standard practice** means respecting the previous 3S. Standard practice helps to overcome the natural tendency to slovenliness and a return to old habits.
- **Sustain and Spread awareness:** Spread awareness includes making these 5S method easily understandable, give specific directions to maintain punctuality and share success to enthuse other class and schools.

Cause and Effect Analysis of waste

Cause and Effect Analysis was devised by Professor Kaoru Ishikawa. The diagram is also known as Ishikawa Diagram or Fishbone Diagram (because a completed diagram can look like the skeleton of a fish). Depending on the complexity and importance of the problem, further most likely causes were investigated. It involved setting up of investigations, carrying out surveys, internal audits and so on. It was designed to test which of these possible causes are actually contributing to the problem. The cause and effect were displayed on a fishbone diagram to explore the cause and effect relationship underlying paper wastage.

Case 1: Reduction of paper wastage

For Paper Wastage the problem statement recorded was that the data for last three years from 11th April 2011 till 30th April 2014 indicated that overall wastage of paper was



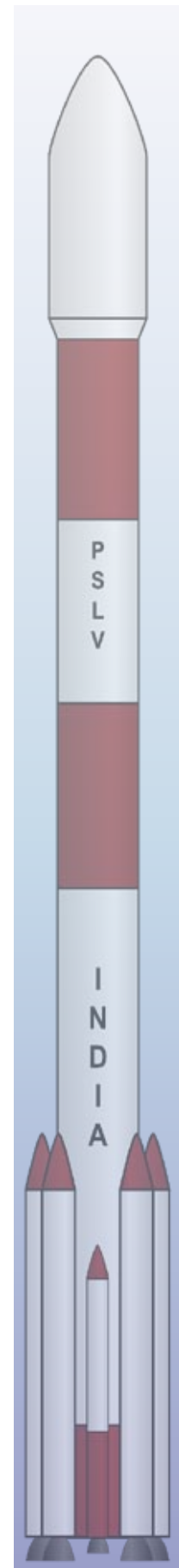
8.33 kg per day that resulted into loss of Rs. 334 per day approximately including new books provided every year increased the expense of the school. Our Goal was to reduce wastage by 90% in the next 9 months. The cause and effect were displayed on a fishbone diagram to explore the cause and effect relationship underlying paper wastage.

Identification of Scope for Reduction of Waste: In this case, the effective zones where we could reduce paper waste are office and classroom. Steps taken in the office were

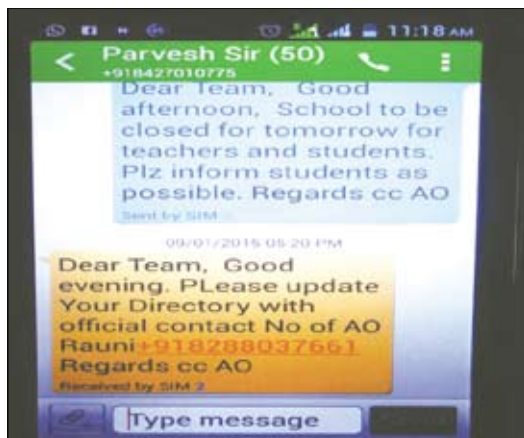
- Common Registration Register was used for consecutive four years although mostly work was done on computers and soft copies of documents were used instead of hard copies.
- Orders were placed as text SMS and record was kept in the form of photographs. Record Maintenance on register was noted directly with pen avoiding printouts. It was made mandatory to use common single sheet for excursion, campaign, traveling Consents and payments.
- Refinement in admission process was done. Earlier, Admission forms of every registered student were filled. Now, admission form of only admitted student is filled. Few best practices are introduced to reduce paper wastage in school.

Following class room activities were adopted to reduce paper wastage:

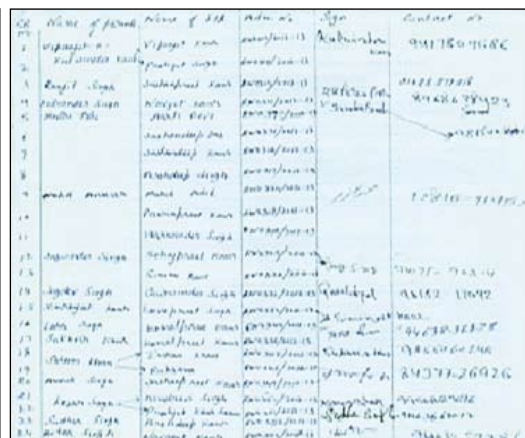
- “Less waste class” competition was organized quarterly.
- Same notebooks were used for complete session instead of using two separate ones for SA1 & SA2.
- Practice of paging certificate was introduced i.e., page numbers were put on note books to avoid tearing of pages.
- Students were guided to cross the wrong written words instead of wasting the whole page.
- Collaborative projects were introduced to avoid multiple projects. Students participated in different activities such as challenging classes to reduce waste in their class rooms, group discussions to reduce wastage and sharing ways to reduce wastage in the classrooms during morning assembly.



Practices to Reduce Paper Waste in Office



Orders as text message



Common consent forms



ACTIVITIES TO REDUCE PAPER IN CLASSROOM



Challenging classes to reduce waste in their class rooms



Group Discussions to reduce wastage



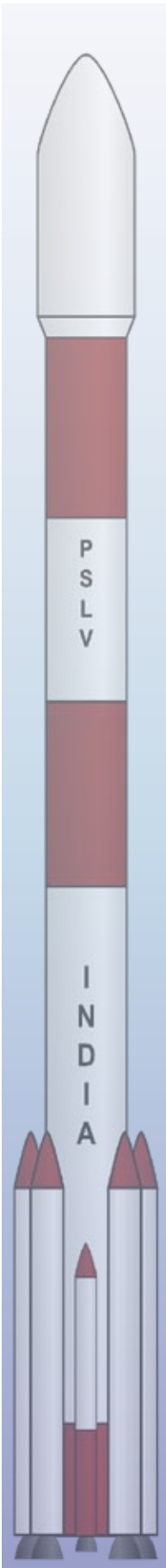
Sharing ways to reduce paper wastage in classrooms during morning assembly



Collaborative project in class IX which was evaluated for subjects Science, Maths and English

Reuse the Waste: After reducing paper waste, we tend to reuse the paper wastes generated in office and classrooms and following steps are implemented:-

- Both sides of A4 sheets are used in office and back side for rough work and other non-official purposes. Old files were reused by pasting slips on cover page.
- In the class rooms, best craft made from waste were recognized and hanged.
- Chalk box and dust bins were made from waste cartons.
- Newspaper was used as cover paper, TLM, drawing and coloring by students.
- Good conditioned charts are stored for future usage. Backsides of charts are used for various purposes.



ACTIVITIES IN CLASSROOM



ARTISTIC WAY TO REUSE WASTE PAPER

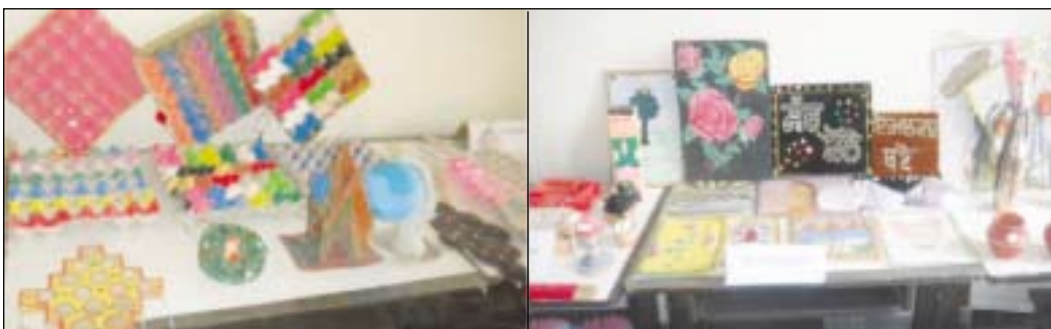


Reusing card board box as chalk box and dust bin

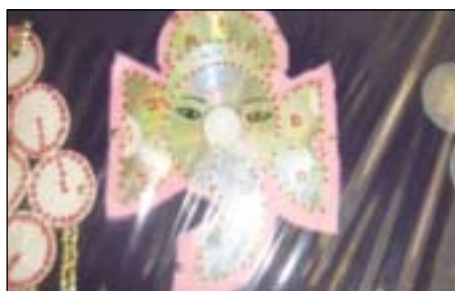
Reusing newspaper as cover

Concept of waste management lab was introduced in order to inspire that nothing can be wastes, it can be used in one or the other way. Waste management lab was setup in the school to display articles prepared from waste - straw, paper, sacks, egg shell, matchbox, pebbles, bangles, cardboard etc. 5S practice was also introduced which helped lot in managing wastes.

INTRODUCTION OF 5S



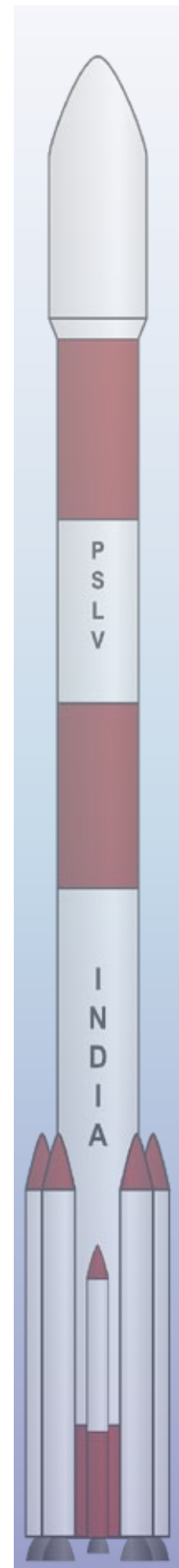
5S DEMONSTRATION IN ART & CRAFT ROOM

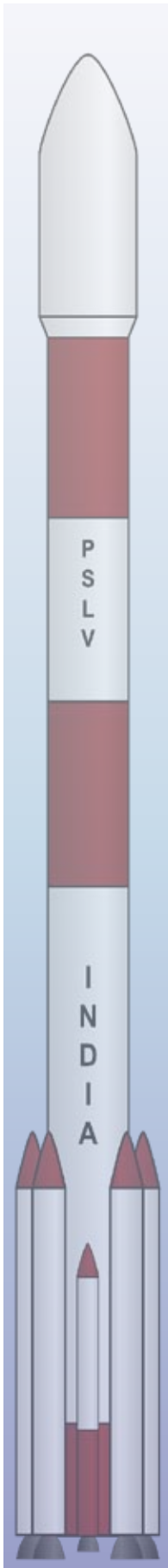


Systematically displayed Craft work



5S demonstration on class room boards





Systematically arranged lunch boxes of teachers



Systematically arranged registers in admin cupboard

Recycling of waste: Further, Implementation of third R – Recycling of paper waste was introduced

- Newspaper and other papers generated inside the class rooms were used during art and craft sessions.
- Papers that were not at all in use were dumped.

Paper garbage was piled up in the big holes in the ground called landfills. These waste papers were put aside to be converted into N-P-K fertilizer nitric acid with phosphoric acid and potassium hydroxide are present in the soil to convert waste paper into N-P-K fertilizer.

Before adopting Waste Management Process, Our Annual Cost On these Articles

Sl. No.	Articles	Cost Per Annum (Rs.)
1	Brown Cover	6880
2	Dust Bin	600
3	Chalk Box	280
4	Drawing Sheet	896
5	TLM	8640
6	Note Books	34400
7	Books	68800
8	Cleaning Agent of Glass Panes	200
	Total	120696

After adopting Waste Management Process

Sl. No.	Substitutes	Cost Per Annum (Rs.)	Savings (Rs.)
1	News Paper Cover	0	6880
2	Card Board for Dust Bin	40	560
3	Card Board for Chalk Box	0	280
4	Drawing on News Paper	0	896
5	Reusing Good conditioned TLM	4320	4320
6	Same Note Books in both terms	17200	17200
7	20% Books Reused	13760	13760
8	News Paper is used to Clean Glass Panes	0	200
	Total Savings Per year		44096

As a result of savings total **Quality Net Income was Rs. 44096/-**. In this analysis, we noticed that before adopting waste management process the cost (per annum) of brown paper was Rs. 6880. So, instead of using brown paper, use of newspaper was introduced which lead to cost Rs. 0 (per annum). Plastic dustbins were replaced by cardboard dustbins which saves Rs. 560 per annum. Also, chalk box and drawing sheets was replaced by



cardboard chalk box and newspaper. Cost of TLM Rs. 8690 per annum reduced to Rs. 4320 per annum as good conditioned TLM was reused. Same notebook used in both terms saved Rs. 17200. 20% of books were reused that saved Rs. 13760 per annum. Newspaper was used to clean glass pane which saved Rs. 200. As a result total quality net income was Rs. 44096.

Impact of reducing paper wastage resulted into

- Reduction in operational budget of school that by 20%.
- Putting Less efforts for Data entry for stock saved 20% of the time.
- Good habits inculcated among students e.g., paging and certification to maintain their note books.
- Most teachers became computer savvy.
- School staff learnt time management as well as to manage resources.
- Reducing paper wastage saved expenses of parents as use notebook was reduced.

Case 2: Reduction of water wastage

Problem Statement: The data for last three years from 11th April 2011 till 30th April 2014 indicated that the overall consumption of water during winter season was 12000 liters per day that resulted into consumption of electricity of 2.5 units per day. During summer season consumption of water was 36000 liters per day that again resulted into consumption of electricity of 7.5 units per day. The total expenditure during winters on electricity consumption was Rs. 17.5 per day and during summer it was Rs. 52.5. It resulted into high expenses of the School.

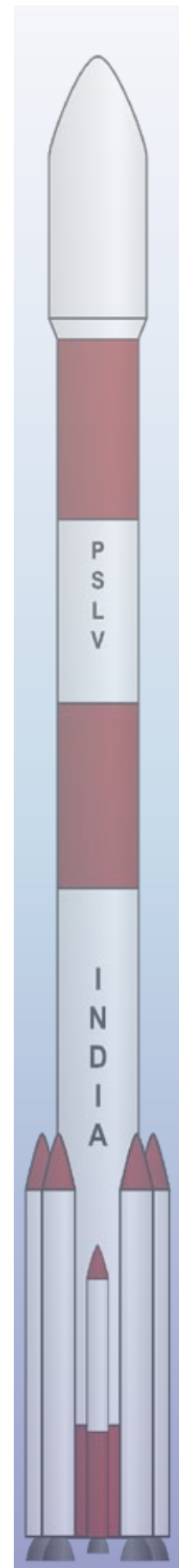
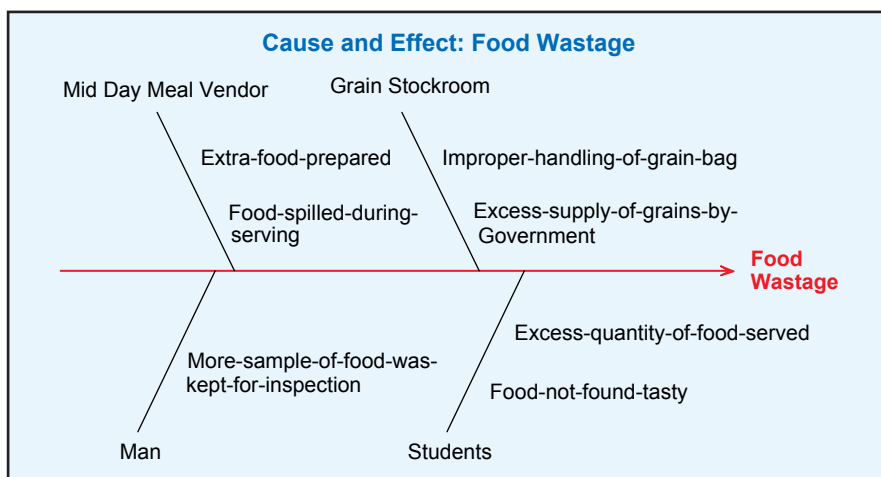
Goal Statement: “To reduce wastage of water by 12000 liters i.e., 30% and consumption of electricity by 2.5 units i.e., 30% in next 7 months”.

Scope Included: Water Filling Tank

Scope Excluded: Classrooms, MDM Hall, Principal Office

The cause and effect analysis was done through fishbone diagram to explore the relationship underlying a particular problem.

In order to reduce water wastage, students were introduced with new processes for drinking water and wash rooms. New processes for dish washing after Mid-Day Meal were



also introduced with students. Following practices were set up for reduction of water:-

- i. Streamlining water breaks to avoid water wastage
- ii. Proper monitoring of drinking water area
- iii. Teacher guidance to take half glass at one time
- iv. Practice for dish washing in less water
- v. Community Awareness campaigns
- vi. Establishment of Conserve water club (CWC). Members of CWC scrutinize maintenance of taps, water wastage and works on water conservation. Activities under CWC are
 - Checking and repairing leakage of taps
 - Community Campaign
 - Parents and community members collected waste water from water purifiers & used it to water their plants.

PRACTICES TO SAVE WATER



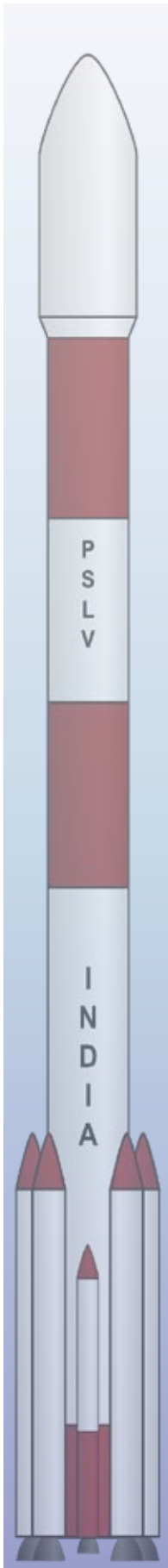
Taking half a glass water or as per need



Monitoring during water breaks



Practice to reduce wastage of water during dish washing





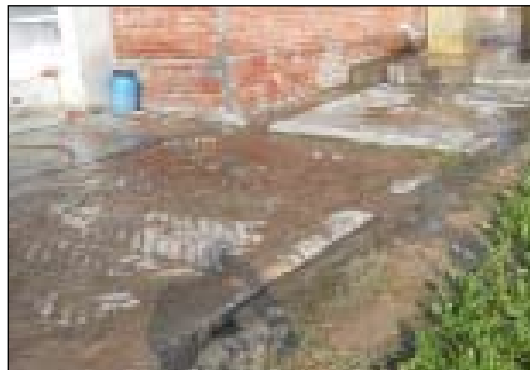
Community campaign by CWC members

After reducing wastage of water, we move forward to next step reuse of water. Wasted water was used in plants. Overflowed water was used in kitchen garden.

IMPLEMENTATION OF SECOND R



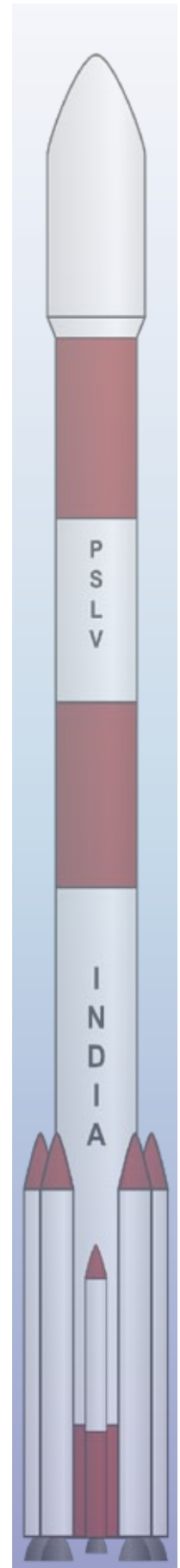
Wasted water used to water plants

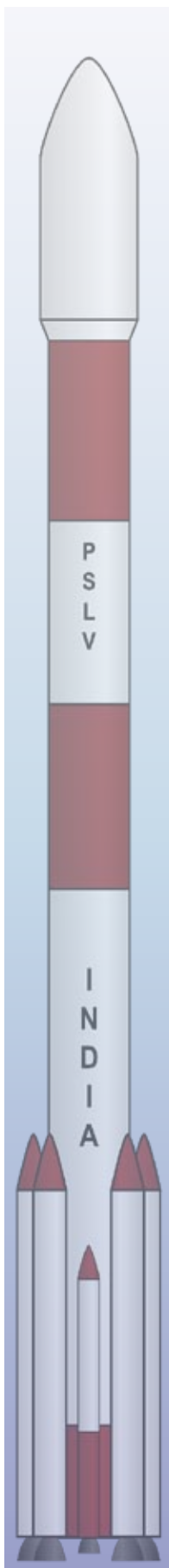


Water overflowed used in kitchen garden

IMPLEMENTATION OF THIRD R, i.e., RECYCLING WATER

4.2.3 Rain water harvesting system was being followed in school as well as in community for the recycle of water.





Tangible benefits to reduce water wastage were:

	No. of working days	No. of tanks (capacity 2000 liters)	No of times tanks filled in a day	Water used per day (in liters)	Electricity used to fill tanks	Electricity cost (per unit Rs. 7)
Before Adopting Waste Management Practices	1	6	3	36000	7.5 units	52.5
After Adopting Waste Management Practices	1	6	2	24000	5 units	35
Savings				12000	2.5 units	17.5

As a result savings of

- i. Water consumed 12000 liters per day i.e., 2,76,000 liters per month
 - 19, 32,000 liters in 7 months
- ii. Electricity: 2.5 Units per day i.e., Rs. 17.5
 - 57.5 Units per month i.e., Rs. 402 approx.
 - 402.5 Units in 7 months i.e., Rs. 2817 approx.
- iii. QNI : Rs. 2817/- and savings of 12000 liters of water per day.

Before adopting waste management practices, six tanks of capacity 2000 liters were filled 3 times in a day for the whole working day. 36000 liters of water was used per day and 7.5 units (per day) of electricity were used to fill these tanks which costs Rs. 52.5 (Rs. 7 per unit).

After adopting waste management practices, these six tanks are being filled two times for whole one day i.e., 24000 liters of water is used and 5 units of electricity used to fill the tanks which costs Rs. 35. Total electricity saved per day is 2.5 units and 12000 liters of water is used i.e., Rs. 17.5 per day.

These practices helped to save huge amount of water that is 276,000 liters of water per month. These practices saved about 57.5 units of electricity per month which costs Rs. 402 approximately. In seven months, 402.5 units of electricity were saved which costs Rs. 2817 approximately.

Total quality net income was of Rs. 2817.

Impact of reducing water wastage

Water management practices are capable of reducing water consumption resulting into savings of electricity bills by 33.33% per day.

Students adopted good practices such as practice of filling half glass water at a time. They formed a 'Conserve Water club' and also started expressing sensitivity towards environment.

- Teachers also imbibed the habit of turning off taps after usage. They increased awareness amongst community which also led to develop habit of water conservation.
- Support staff adopted the habit of using waste water in plants. MDM vendors also participated and judiciously used water for washing utensils. Wasted water is used in



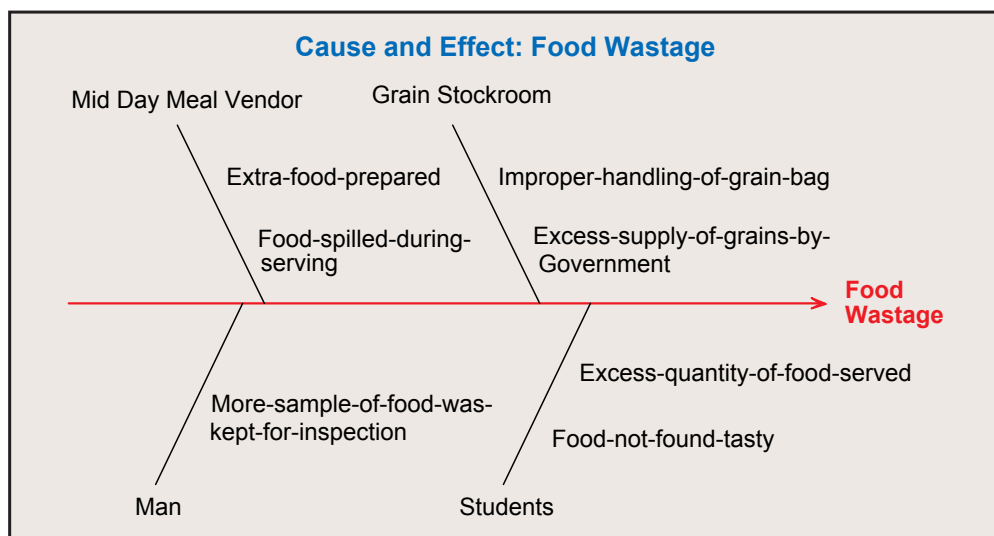
kitchen garden.

- Parents also adopted rain water harvesting system in their home. They also started using wasted water when needed leading to save electricity as well as money. In community awareness of reduce wastage of water increased leading decrease in diseases by proper sanitation system.
- These practices not only increased awareness of water conservation, it also helped to save electricity i.e., a non-renewable resource.

Case 3: Reduction of food wastage (Mid-day meal – MDM)

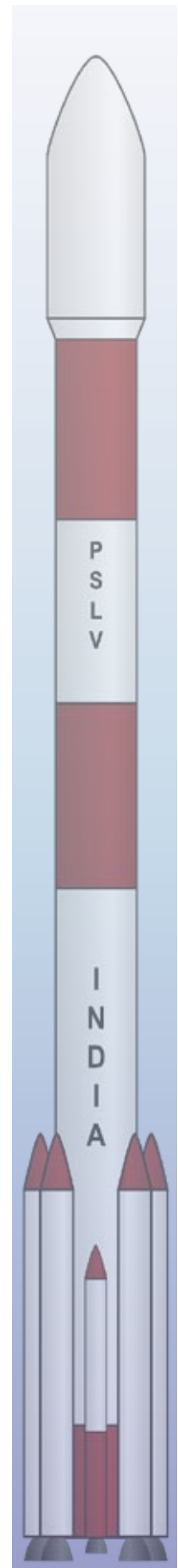
Problem Statement: The data for the last three years i.e., from 11th April 2011 till 30th April 2014 indicated that an overall wastage of food was 4 kg per week i.e., 666.66 grams per day, resulting into the loss of approx. Rs. 59.35 per day and increased the expenses of the School.

Goal Statement: To reduce wastage by 95% in next 9 months.

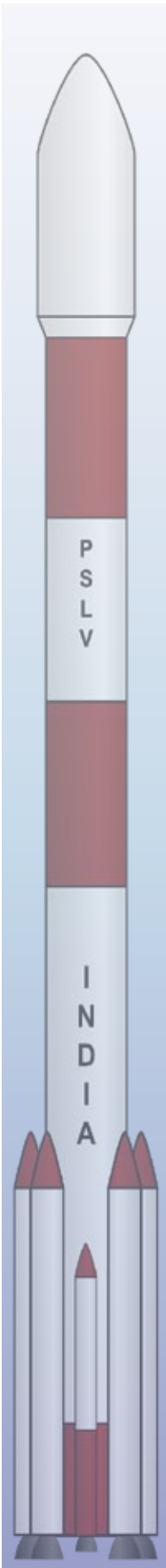


Key Practices Introduced to Reduce food Wastage

- Handing over grains to vendor according to attendance.
- Food served according to the need.
- Teachers regular monitoring of food served during lunch time to avoid wastage.
- Provision of half chapattis if being asked.



MID-DAY MEAL PRACTICES



No spilled food



Food served according to the need



Habit of proper consumption of food



Zero wastage

Tangible benefits in reducing food wastage are given in below table:

Before implementation of best practices			After implementation of best practices			Net savings (Rs)
Food wastage (gm/day)	Cost per day (Rs)	Value	Food wastage (Kg)	Cost per day (Rs.)	Value	Per annum
666.66	59.35	Increased food wastage	Almost zero	59.35	Take food according to need	12285
Total						12285

As a result

- Values : Inculcating good habits in students
- Waste land : Using waste land as a kitchen garden
- QNI : Rs. 12,285/- per Annum

Before implementation of best practices almost 666.66 gm. of food was wasted per day Rs. 59.35 and after implementation of best practices wastage reduced to almost zero. Total net savings was Rs. 12,285.

Impact of reducing food wastage

Awareness on reduction of food wastage was increased among MDM vendor team members. Reducing food wastage saved lots of money. School administration adopted the culture



of monitoring MDM service. Students inculcated good eating habits which resulted into a good hygienic environment where students have learnt not to waste food. Reducing food wastage increased students' attendance resulting in learning levels. Teachers also became habituated of inculcating best practice. Surplus food is now used as manure in kitchen garden if any.

Case 4: Reduction in Fuel Consumption

Problem Statement: The data for last three years from 11th April 2011 till 30th April 2014 indicated that overall consumption of wood was 8.33 kg per day that cost Rs. 300 per day.

Goal Statement: To reduce consumption by 20% in next 9 months.

Steps for reduction of fuel wastage

While preparing MDM, Cow dung cakes was used instead of fuel wood as it is cheaper, ecofriendly and insect repellent gases is generated when burnt. Ash of cow dung is used as manure and as cleaning agent. Students were instructed to use cycles instead of motor bikes. Staffs shared common transport for coming to school. Support staff were also instructed to use cycles.

IMPROVED PRACTICES



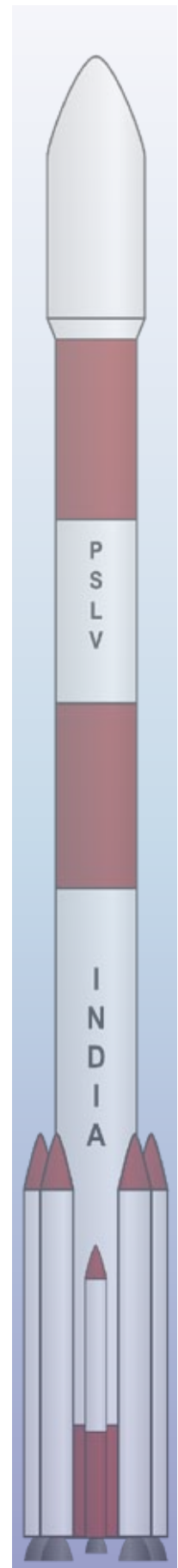
Use of cow dung instead of wood



Support staff using cycle



Large number of students use cycles



Financial benefits in reducing food wastes are given in table below:

Before				After				Savings
Actual fuel		Cost of fuel per day (Rs)	Cost per			Cost of fuel per day (Rs)	Cost per	(per annum)
Wood and	8.33 Kg per day	300		Cow dung cakes	100 Cow dung cakes	250		12400

As a result:

Savings of nature : Savings tree and used cow dung

QNI : Rs. 12,400/- per Annum

NOTE : School working for 248 days in an academic session

Amount of wood kerosene used for cooking Mid-Day Meal was 8.33 kg which was replaced by 100 cow dung cakes. Use of wood and kerosene costs us Rs. 300 per day and Rs. 74400 per annum however cow dung cakes costs us Rs. 250 per day i.e., Rs. 62000 per annum which led us to total savings of Rs. 12400.

Impact of reducing fuel wastage

Use of cow dung cakes reduced MDM cost and hence resulted in less expense on maintenance of vehicles. Smoke of cow dung act as insect repellent reduced flies. Only judicious use of fuels was done.

Use of cycles instead of other vehicles improved physical fitness. It reduced burden on teachers' pocket.

Development of harmony in teachers due to more time spent together for travelling to school. Support Staffs understood the importance of savings fuel and also they motivated to save environment.

MDM Vendors used ecofriendly fuels resulted in less expense on fuel. Less maintenance of vehicles was required resulted in fewer burdens on Parent's pocket.

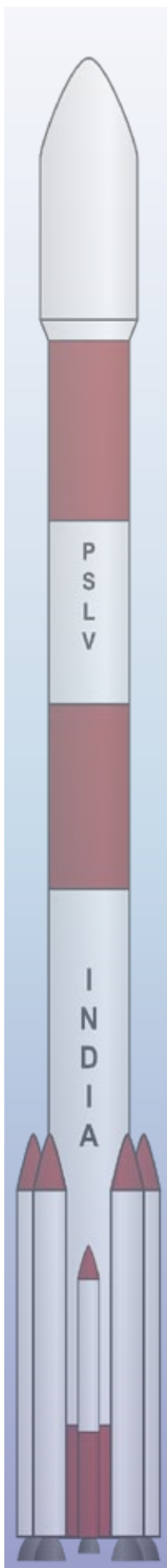
Use of these practices lead to produce less pollution. It also helps in savings sustainable resources and fuels like kerosene oil, LPG etc.

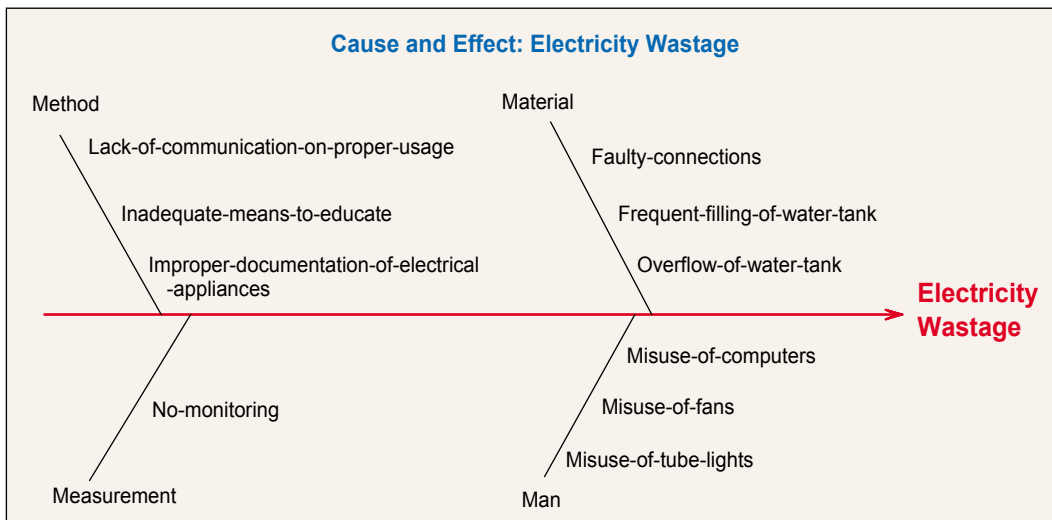
Case 5: Reduction in Electricity Consumption

Problem Statement: The data for last 12 months, from 1st May 2013 till 30th May 2014 indicated that an overall consumption of electricity was 15 units per day that resulted into the cost of Rs. 105 per day and increased the expenditure of the school.

Goal Statement: "To reduce electricity consumption by 30% in the next 9 months".

Scope Include: Classrooms, MDM Hall and Principal's Office





Scope Exclude: Water filling tank

Effective use of electricity

Fans were used on need basis or diagonally sometimes. Monitoring of electricity consumption was done in school through documentation. ISI marked electric gadgets were only used. Proper ventilation was ensured in each classroom infrastructure. These practices of electricity consumption were financially beneficial.

Financial benefits in reducing electricity consumptions are explained as follows:

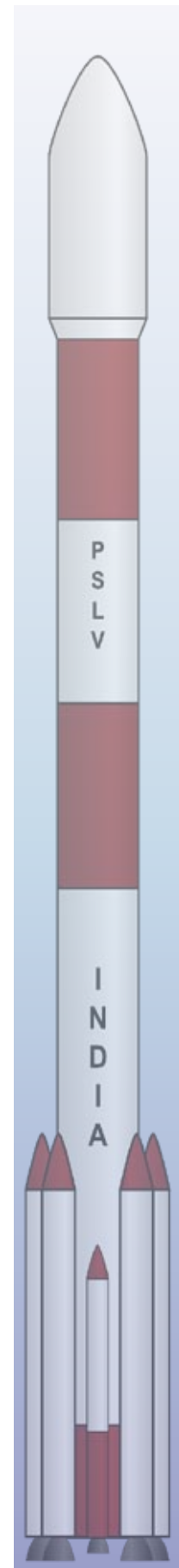
Year	Before/after	No. of rooms using electricity	Per day consumption	Cost @ Rs. 7 per unit
May-13	Before adopting best practices	14 rooms	10 units	70 per day
May-14	After adopting new practices	18 rooms	12.5 units	87.5 per day
Savings			Per room per day (Rs.)	Overall savings Per year in (Rs.)
			0.14 savings	625

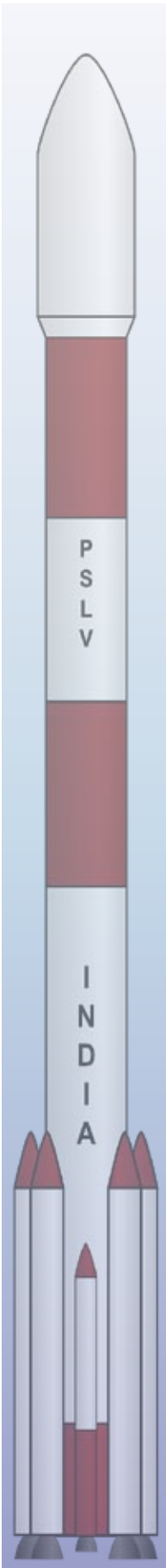
As a Result, Savings of QNI: Rs. 625/- Per Annum

Before adopting best practices, electricity was used in 14 rooms per day consumption was 10 units and cost per day was Rs. 7 per unit i.e., Rs. 70 per day. After adopting best practices, electricity consumed by 18 rooms is 12.5 units per day, total cost of Rs. 87.5 per day. Overall savings per year is Rs. 625.

Impact of reducing electricity wastage

- Reducing of electricity wastage has reduced electricity bills and improved monitoring process through Log Book.
- Students learnt importance of electricity conservation. Teachers adopted a habit of monitoring of electricity usage in classes. They improved interpersonal relational





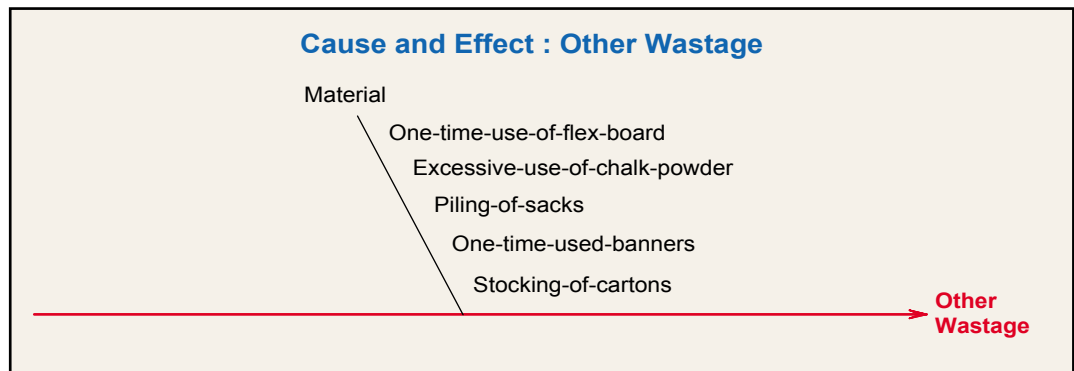
relationship as a result of sitting together in one staff room after school hours to optimize use of electricity.

- Support staffs became conscious in monitoring of electrical appliances. They increased awareness to save electricity. They helped in regular maintenance and prompt repair of electrical gadgets.
- Awareness among MDM vendor to save electricity also increased as a result of exposure. Awareness among parents increased to use electricity judiciously through their ward and savings money through electricity conservation.
- Community people also started saving of electricity and continuity of these practices will help in reduction of power cuts.

Case 6: Reducing cost by optimal use of miscellaneous items like, Chalk powder, Banners, Sacks, Flex board, and Cartons

Problem Statement: The data for last three years from 11th April 2011 till 30th April 2014 indicated that overall wastage of other items was of Rs. 21, 900 per annum. Overall an expense of Rs. 65, 700 was incurred in other items during last three years that resulted into increasing the expenses of the School.

Goal Statement: To reduce expenses by 90% in next 9 months.



ARTICLES MADE BY OTHER MATER



Reusing flex board as display board



Curtains made by sacks





Door mats made from waste dupattas and sacks



Students engaged in art work from wastes



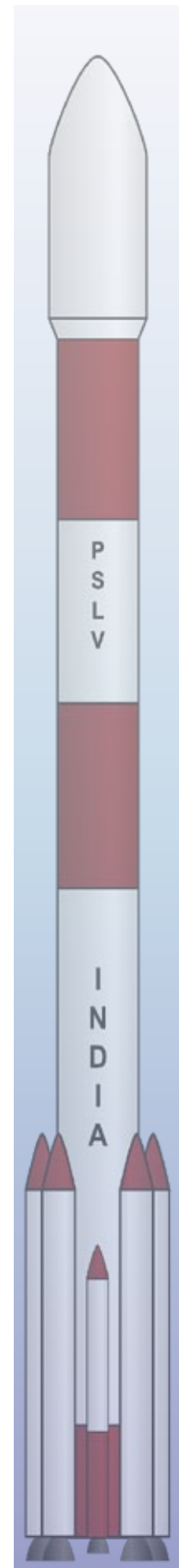
Art work from ice cream sticks, match box sticks etc.

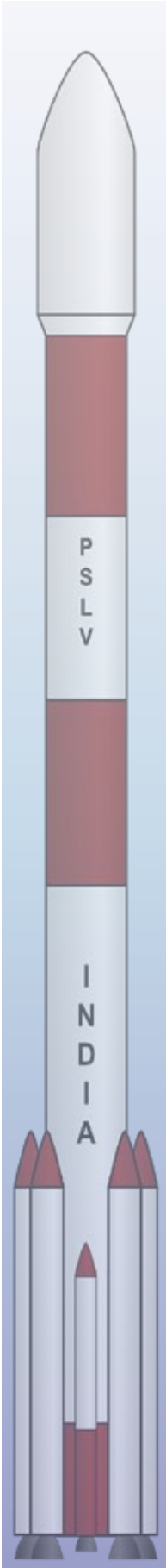
Strategy to optimize use of other articles

- Reuse of banners, flex board as display board.
- Use of Curtains and foot mats made of sack.
- Waste chalk used in white washing boundary bricks.
- Septic tank residual used as manure.
- Material from ice cream sticks, empty bottles, wax, thread, beads, wax for making diya's, decorative earthen pieces.

Financial benefits in order to reduce wastes:

Septic tank						Other materials		Savings per annum
Before			After			Curtains	Doors/mats	Per annum in Rs.
Cost of evacuating septic tank	Manure cost	Total cost	Cost of evacuating septic tank	Manure cost	Total cost			
6000-8000 per year	12000 per year	20000 approx.	Zero	Zero	Zero	Rs. 1600 savings	Rs. 300 savings	21900





QNI: Rs. 21,900/-

Before adopting waste management process, cost of evacuating septic tank per year was Rs. 6000-8000. Manure cost was Rs. 12000 per year i.e., total cost of Rs. 20000 approximately. After adopting waste management process, cost of evacuating septic tank, manure cost and overall total cost became zero. Savings on other materials such as curtains and door mats are Rs. 1600 and Rs. 300 respectively. Overall total savings per annum is Rs. 21900.

Impact of optimization

- School Administration started optimal utilization of budget and available resources and also Enhancement of management Skills.
- This process resulted in emerging creativity amongst students. Increase of awareness and creativity among teachers to use ecofriendly goods.
- Support Staff's learnt new ways to manage waste material.
- MDM vendors learnt to manage waste which reflects in his MDM practice. Parents were motivated to manage waste material and increased awareness to use waste material in different ways.
- Community inculcated moral values to use ecofriendly goods. They also started managing requirement as per sources available. This process promoted cheaper goods from environment as compared to luxury goods.

SUSTAINABILITY OF PROJECT

Consolidated Savings

Consolidated savings catering to wastages	
Sl. No.	QNI in Rs.
Paper	44096
Water	2817
Food	12,285
Fuel	12,400
Electricity	625
Other items	21,900
Net QNI	94,123

The consolidated quality net income out of six case studies was of Rs. 94,123. To validate and ensure compliance periodic audits are conducted by team Quality.

Internal Quality Audits

Regular quality checks are an essential element for ensuring effective implementation of processes and other quality initiatives in the system. At the Satya Bharti Schools regular theme based audits are conducted by the Quality team at individual schools to identify the gaps. These processes are audited on the basis of standardized processes defined in the School Operating Manual thus ensuring quality. Audits for the 45 defined and standardized processes are regularly conducted. Reports on the findings and gaps are submitted to





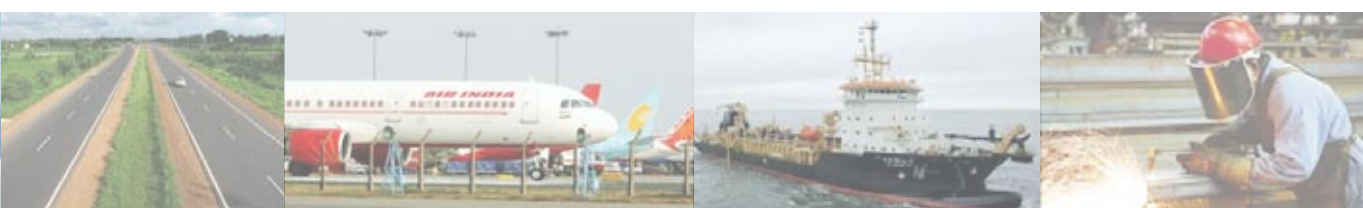
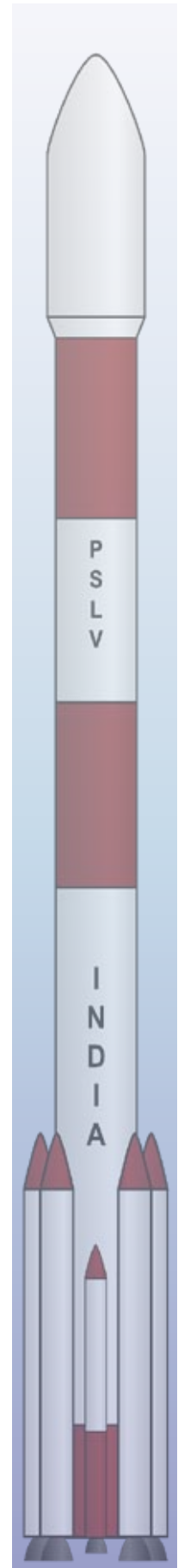
the school principal. Periodic reviews on current status of Corrective Action Plan (CAP) based on the audit findings are also discussed. A closure report on CAP is submitted by the school management. These gaps are regularly checked and status is shared with top management.

External Quality Audit

External quality audits are also conducted at the Satya Bharti Schools to get an unbiased feedback on the way the schools are being run. The findings of external audits are also assessed internally to find the weak spots and feedback is provided to the concerned department for necessary action.

Conclusion and Way Forward

1. The exercise of implementing quality tools has contributed immensely in building the quality perspective amongst all stakeholders towards efficient school functioning and has initiated the process of inculcating universal value and sensitization amongst students.
2. Certain platforms have been identified to continue the process of sensitization and improved practices.
3. Morning assembly has been identified as a strategic platform for reinforcing continuation of best practices and students are being slated to play a key role in sustaining the changed mind set and habits.
4. Students' clubs to be engaged more and made responsible to think out of the box to initiate activities to sensitize their peers, parents to introduce for each sector who will decide various activities to influence others on waste management.
5. Rewards and recognition for the staff and students who lead to innovations in the field of waste management.
6. Use of renewable sources instead of non-renewable resources to be encouraged.



ANNEXURE

*One Copy : 2 Rs.	Rs. 2
Total Books	43 (Class I-IX)
Total Note Books	43
No. of Students Per Class	40
No. Covers Required	$40 \times (43+43) = 3440$
Cost:	$3440 \times 2 = \text{Rs. } 6880$

** One Dust Bin	Rs. 30
Total Dust Bins Required	20
Total Cost $30 \times 20 =$	$30 \times 20 = \text{Rs. } 600$
*** One Chalk Box	20
Requirement	14
Total Cost: 14×20	$14 \times 20 = \text{Rs. } 280$

**** 1 Drawing Sheet Costs	Rs. 1
Sheets Required Weekly	$14 \text{ Classes} \times 2 = 28$
Sheets Required Annually	$28 \times 32 = \text{Rs. } 896$
Total Cost	$896 \times 1 = \text{Rs. } 896$

*One Chart Costs	Rs. 5
Class Rooms:	$14 + 4 \text{ Labs} = 18$
Tim Required $18 \times 24 \times 4$ (Rotation)	(Rs. 8640)

**Note Book Costs	Rs. 10
Note Books Required	(Rs. 34,400)

***Book Costs	Rs. 40 Average
Books Required	$43 \times 40 = 1720$
Total Cost	$1720 \times 40 = \text{Rs. } 68800$

