

The Economic and Social Benefits of Recycling Used Paper

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Abstract: In this manuscript, a complete case study about the socio-economic benefits of recycling used answer books of students at an educational Institute in India was done. Many developed and undeveloped countries are working in the field of recycling waste papers. A lot of number of used papers are generated by the students of an educational institute in the form of answer books, assignment work, practical files, etc. In this manuscript, the calculation has been made concerning the year-wise number of students at the institute. Calculations have been made for three years (2021-23). It is also calculated that if various types of handmade products are made and sold in the market, the economic benefits become 100 times for file cover production, 300 times higher for notepads, 250 times higher for soft boards, and 200 times higher for bags than the direct sale of scrap papers of the used answer books of students. It will also help to save the environment by saving trees, using less water, less use of fuel, and air, water pollution, and land pollution. The recycling of waste papers and the production of handmade papers will produce employment in the institute.

1 INTRODUCTION

This study examines the societal and economic aspects of recycling. Everyday life in modern civilization, a considerable amount of paper is utilized; most of which, after being used for a short time, is lost among other wastes. Indeed, it sometimes causes pollution in its torn and scattered state. Wood accounts for 90% of the paper pulp utilized today. The amount of money owed for the manufacture of paper is connected to one's surprise, with 35% of deforested land and 1.2% of the yearly gross world product. The paper used for writing or printing is based on wood, and it is unique in its variety - A.S. Nizami, et al., (2017). Fabrics also become their first form during the recycling period. During the creation of printing or copying papers, more than many tons of wood are saved by refining a ton of paper. Wastepaper recycling also saves more than a ton of wood, which is why its significance in preventing pollution and saving the environment is clear. A renewal paper that renews tissues, and newsprint papers, can be prepared, and they can be prepared at least five or seven times. The amount of wastewater and, especially, the amount of paper executive wastes are essential factors in the paper recycling process - Y.Sadef, et al., (2016).

Paper recycling involves taking waste type and filtering it, transforming it into raw materials, and then using it to produce a new product. Types including recovered waste, magazines, envelopes, containers, and any other type of paper are all normally gathered. Paper recycling begins with filtering the waste type by type. The great majority of recycled newspaper is used in handmade document items. The filtered type is usually run through a pulper that keeps operating in combination with compounds and water in combination with compounds and water - Nizami A S, et al., (2017). Document chips and water are mashed into cellulose fragments, separate plants being nominated filament, and these, after preparing, become pulp, a mix of water and fibre. The pulp is created by clipping a set of rotors. The leaves are usually moved through the pulper's screen and as an example, through a pulper, that removes tiny pollutants, such as broken plastic and containers, are removed from the pulper's screens. This technique is known as "webbing." The filters separate any particularly dense fibre bundles in the pulp into individual fibres - A.S. Nizami, et al., (2015). The chemicals that give the detected paper its colour is removed when it does. The pulping machine's screen gets rid of tiny impurities like plastic fragments and cement bulbs. It is known as the

webbing process. Furthermore, the pulp may be encircled by sizable cylinders in the form of cones.

2 LITERATURE REVIEW

First, recycled paper is a cyclical good. It can be bought and sold up to eight times. Unexpected shortages of a given commodity can have devastating effects on a company's bottom line — across many different industries - A.S. Nizami, et al., (2015).

Instead, we found that an incredible number of jobs come out of it — ten times as many, on average. We turn the paper that we gather and sort (which speeds manufacturing) into recycled paper fibre that goes off to make new products. We work with many small businesses and non-profit organizations to sort through around 350,000 tonnes of paper waste each year. We have worked with local employers to create jobs and opportunities for workers with special needs (they have found jobs and independence, and many have turned that experience into a professional career) [6]. We also need to manufacture our recycled papers, and some are made in mills where a mix of virgin fibres is necessary to deliver higher quality than the vast array of recycled paper options that we have - O.K.M Ouda, et al., (2014). In many cases, of course, that virgin fibre is from FSC-certified forests, benefitting organizations that manage forests for paper production. All of this is supposed to go into sustainability plans, it is their triple bottom line, though that is not often discussed. As a result, our partnerships have enabled us to invest in the machinery, diversify our workforce, and increase our volume collected, from just 90 tonnes to 600 tonnes, in just three years.

3 METHODOLOGY

Paper waste is a significant problem that has been addressed by this team with a solution that demonstrates that forgoing is possible. Waste papers collected from a university for three years were recycled into saleable products. The university provided the following statistics annually for the years 2020, 2021, and 2022. UG and PG students had increased from 15,000 to 18,000 to 20,000 during these years. A total of 10 theory exams and 8 practical exams were held by students this academic year and a new paper was required for their answer booklets every time. In addition, the students had to prepare notes and assignments for each subject from the course curriculum, and the rest of the paper was wasted after the exam. Waste papers could be recycled into saleable products such as file covers, notebooks, certificates, visiting cards, tote bags, soft boards, etc. instead of being sold directly to some institution as usual. It also analysed revenue generation, employment opportunity, energy saving, decreased environment pollution, storage area in landfills, and savings in the use of oil and tree life in various parameters of sale of waste papers directly and recycling them.

4 OBSERVATION

Below highlighted are some tables with the respective observations which have been scheduled year-wise.

Table 1: Amount waste papers produced by students per year in a given year

Year	2021	2022	2023
Total Number of Student	14000	15000	17000
Waste Paper (kg)	299628	321030	363834

Table 2: Net Income generated following waste-paper recycling

Year	2021	2022	2023
Waste Paper (Kg)	299628	321030	363834
Revenue generation by waste paper @ Rs. 12	3595536	3852360	4366008
Salary of Collection staff (2 person per year)	360000	408000	480000
Net Revenue generation	3559536	3444360	3886008

Table 3: Gross sales of recycled goods during the academic year (2021)

Items	Weight of handmade paper product	Cost of each product (Rs.)	Number of handmade paper products (in crores)	Revenue generation (Rs. in crores)	Staff for Sale (8 person per annum) In lakh Rs.	Staff of manufacturing (8 person per year) in lakh Rs.	Net Revenue (Rs. in crores) by the handmade paper products
Paper File	210 gm	22	1.7	37.29	48	28.8	36.52
Note Pads	60 gm	25	5.93	14.83	96	28.8	13.58
Soft Boards (4'*3')	2.5 kg	600	0.14	85.43	48	28.8	84.66
Carry Bags	120 gm	25	2.97	74.16	48	28.8	73.39

Table 4: Gross sales of recycled goods during the academic year (2022)

Items	Weight of handmade paper product	Cost of each product (Rs.)	Number of handmade paper products (in crore)	Revenue generation (Rs. in crore)	Staff for Sale (4 person per annum) In lakh Rs.	Staff of manufacturing (4 person per year) In lakh Rs.	Net Revenue (Rs. in crore) by the handmade paper products
File Covers	205 gm	20	1.72	41.29	48	28.8	36.52
Note Pads	60 gm	20	6.14	17.83	96	28.8	14.58
Soft Boards (4'*3')	2.5 kg	700	0.15	96.43	48	28.8	94.76
Carry Bags	120 gm	25	2.98	85.16	48	28.8	83.39

Table 5: Gross sales of recycled goods during the 2023 academic year

Items	Weight of handmade paper product	Cost of each product (Rs.)	Number of handmade paper products (in crores)	Revenue generation (Rs. in crore)	Staff for Sale (4 person per annum) In lakh Rs.	Staff of manufacturing (4 person per year) In lakh Rs.	Net Revenue (Rs. in crore) by the handmade paper products
File Covers	205 gm	20	1.82	42.29	48	28.8	36.52
Note Pads	60 gm	20	7.15	18.93	96	28.8	14.58
Soft Boards (4'*3')	2.5 kg	700	0.16	97.43	48	28.8	95.77
Carry Bags	120 gm	25	3.1	96.16	48	28.8	84.4

Table 6: Integrated information on recycled good and recent revenue creation

Parameter	Savings per one ton of papers	Saving due to Recycling of Papers (2021)	Saving due to Recycling of Papers (2022)	Saving due to Recycling of Papers (2023)
Eucalyptus Trees	42	7652	7885	9689
Energy (kw)	4410	1113120	1046800	1382201
Water (gallons)	7810	1862016	1911100	2409260
Oil (gallons)	423	96378	98750	138821
Landfill volume (m3)	4.2	842.7	898.27	1175

Table 7: Environmental Benefits obtained through water paper recycling

Year	No of Recycled product (file cover) in crore	No of Recycled product (Note Pads) in crore	No. of Recycled product (Soft Board) in crore	No. of recycled Product (Carry Bag) in crore	Net Revenue Generated by (file cover) in crore Rs.	Net Revenue Generated by (Note Pads) in crore Rs.	Net Revenue Generated by (Soft Board) in crore Rs.	Net Revenue Generated by (Carry Bags) in crore Rs.
2021	1.7	5.93	0.14	2.97	37.29	14.83	85.43	74.16
2022	0.17	0.61	0.15	0.3	41.29	17.83	9.33	85.16
2023	0.18	0.72	0.16	0.31	42.29	18.93	97.43	96.16
Average	0.16	0.56	0.013	0.19	1.1	42.27	9.3	2.66

5 DISCUSSION

It would be logical to predict that the rise of technological advancements would lead to the decline of paper used for a variety of purposes, but the paper is more popular than ever. Here, selling waste papers, either directly or as a product for ultimate use in an industrial procedure, varies significantly — both economically and environmentally. In University education, students undergo five theory tests, four practical tests, five home assignments, and four lab files per semester. Table 1 shows how much wastepaper is produced by the students at an institute in a consecutive year. Table 2 expresses the net Income generated by the recycled waste papers. This study considers three major tables 3, 4, and 5 to evaluate, and explain how waste of used student papers may produce employment and enhance earnings by turning into numerous products. The economic values of these hand-made paper products are estimated in Table 6. This work has therefore demonstrated the benefit of saving, for environmental

and natural resources, the waste of student-used papers for recycling-in-depletion on genuine fibres since the recycled paper does have better environmental benefits than wood fibres, Table 7; and recycling the waste of used paper has a significant positive effect on the environment throughout its life-cycle, the Table illustrates extensively specific ways by which used student's papers save every University or institution annually in terms of water, electricity, fuel, and trees. Besides, there could be little potential economic gain, if the waste were to be exported internationally for recycling and paying for transporting and recycling the waste papers locally could be commercially preferable.

6 RESULTS

The calculations for revenue generation, employment creation, and number of trees saved, fuel oil saved, water saved, and electric energy saved by paper recycling are shown in the tables. The paper used by

the students over the previous three years i.e., 2021-2023 is shown in Table 1. The sales revenue from the wastepaper in 2021-2023 by employing two people without any processing of the waste-paper is going to be Rs 3048480, Rs 3682176, and Rs 4064640 as shown in Table 2. The revenue generation will shoot up in a big way when the used answer books of the students are recycled and converted into different types of handmade paper products such as carry bags, file covers, soft boards, and notepads. In 2021, this generated an income of Rs 2.65 cr from the production of file covers, 9.25 cr from the production of note pads, 7.73 cr from soft boards, and 5.61 cr from the carry bags with employing four people as per Table 3. In 2022, similar products from recycled paper gave the sales revenue of 2.56 cr from the production of file covers, 11.14 cr from the production of note pads, 9.32 cr from soft boards, and 6.54 cr from the carry bags employing four people as per Table 4. In the year 2023, similar paper products generated a revenue of 3.47 cr from the production of file covers, 12.4 cr from the production of note pads, 10.38 cr from soft boards, and 8.36 cr from the carry bags employing four people as per Table 5. Integrated information on recycled goods and recent revenue creation for the year 2021, 2022, 2023 and their average basis is given in table 6. Recycling can provide economic benefits as well as help save the environment by saving trees and cutting down on air, water, and land pollution. Table 7 shows through this study, it is resulted that in 2021, recycling the used answer books of the students, can help save 1762006 gallons of water, 95377 gallons of oil, 7638 trees, and 1013000 kW of electricity. In 2022, recycling using answer books of the students helped to save 1911100 gallons of water, 98750 gallons of oil, 7885 trees, and 1046800 kW of electricity. In 2023, recycling using answer books of the students helped to save 2308250 gallons of water, 128720 gallons of oil, 9587 trees, and 2308250 kW of electricity. It means that the recycling process can provide many more economic benefits to the country, and it can also generate employment.

7 CONCLUSION

From the above analysis, this study concludes that recycling wastepaper will lead to the development of our environment, forests, and trees, and having people undertake recycling will benefit society. Recycled paper from the recycling machine looks as thin and smooth as wood paper. Banners, titles, postcards, etc. may also be made with recycled paper.

After analysing this study, it is observed that recycling used answer books of the students of the educational institute into carry bags, file covers, soft boards, note pads, etc., the amount of generation of revenue increased. As compared to the direct sales of the used answer books of the students, the revenues are significantly higher than from direct sales. It is up to 200 times higher for carry bags, 100 times higher for file covers, 300 times higher for note pads, and 250 times higher for soft boards than the directly sold used answer books of the students. In addition, the production of handmade paper products also helps to save trees, less use of water, less use of fuel, air, water, and land pollution, and can also generate employment. In conclusion, by recycling used answer books the students, less usage of emissions of greenhouse gases.

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