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# RAINWATER HARVESTING - AN ALTERNATIVE STRATEGY TO COPE WITH WATER SCARCITY

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## ABSTRACT

The possible negative impacts on a country's finances and economy are rarely considered. It's important to know how beneficial rainwater collecting system investments have been. This study uses cost-benefit analysis to evaluate the economic and financial performance of rainwater collecting systems in rural Delhi (CBA). The government's economic research evaluates the contribution of rainwater collection systems to societal development. The financial research contrasts groundwater vs rainfall for agricultural irrigation from the perspective of a single participant, local farmers. According to the findings, rainwater collection systems may be implemented affordably. Collecting rainwater is beneficial to the society and should be promoted. The financial sustainability of rainwater collection systems depends on groundwater prices and the degree of installation. Because rainwater collection systems impact groundwater costs. Rainwater harvesting systems won't be financially viable if using groundwater is free. If groundwater costs 2 Yuan per cubic metre, only large-scale water treatment facilities are financially sustainable; small and medium-sized systems are not. Under these conditions, only big systems can work normally without interruptions; therefore, farmers are unlikely to employ medium- or small-sized systems.

***Keywords:-*** *Rainwater, Harvesting, Economic*

## INTRODUCTION

The number of people living in the world is expanding at an astounding rate, and as a result, the need for water is growing as well. In order to meet the ever-increasing need for water in many regions of the world, considerable amounts of groundwater are being extracted from its natural sources. Because groundwater is being utilised to a greater level than it ever has in the past, the pace at which it is being depleted is presently exceeding the rate at which it can be naturally replenished. This is the result of human activity. Since of this exploitation, numerous groundwater tables in various regions throughout the world have already been depleted or are on the danger of being depleted. This is a problem because groundwater tables are essential to the functioning of ecosystems. This is an issue that requires quick attention from everyone involved. There has been a rise in the amount of work done in agriculture as a direct result of the growth of urban areas and rural communities. Once again, groundwater sources like as wells, tube wells, and other constructions that are functionally equivalent are being utilised in order to fulfil the demand for water that is being generated by these agricultural endeavours.

The notion of water harvesting is not a new one; rather, it has a lengthy history of use stretching all the way back to ancient times. It was first used in ancient Egypt. A wide variety of water harvesting techniques, practices, and practices have been developed, polished, and evolved further throughout the course of time in order to boost the efficiency of these systems. This has been done in order to make the most of the water that can be collected. Despite the fact that collecting rainwater is not a novel concept, there has not been nearly as much progress made in this regard as there should have been. This is particularly disappointing given the importance of the issue.

The bulk of the precipitation that falls during the monsoon season is lost as a consequence of surface runoff. The water that runs off of rooftops is directly deposited into the sewer, and the water that arrives from storm water runoff also flows straight to the sewer, where it is finally lost. The collecting of rainwater is a method that is friendly to the environment and may be utilised to provide a solution for all of these issues. If rainwater harvesting technologies are utilised, the water may be gathered, stored, and used at a later time. This is all possible in the event that these technologies are utilised. This has the ability to guarantee that not all precipitation is lost to runoff and that water is accessible for a longer period of time than only during the monsoon season. Additionally, this might make it possible for more water to be available.

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The purpose of rainwater harvesting, which is a technique of water supply that is both practical and cost-effective, is the gathering and storage of rainwater for use in many applications, including environmental, agricultural, industrial, and household settings. Rainwater may be harvested by collecting it from roofs and ground catchments and directing it into storage spaces. This process is known as "rainwater harvesting." When surface runoff is collected in reservoirs, it may be utilised for the management of flooding as well as droughts. This is because reservoirs store large amounts of water. This is due to the fact that reservoirs contain significant quantities of water. The replenishment of the groundwater supply by runoff from the land's surface will be advantageous to shallow wells and springs. Runoff from the land can also be collected and used for this purpose. The harvesting of rainwater results in a broad variety of social and economic advantages. Additionally, it provides a contribution to the alleviation of poverty and the advancement of sustainable development.

**Advantages of Rain Water Harvesting**

- A reduction in the volume of water that is lost through surface runoff and through the discharge of storm water.
- A reduction in the amount of both urban flooding and soil erosion that occurs.
- A reduction in the amount paid for water each month
- A reduction in the amount of pressure that is exerted on the sources of ground water.
- The ease with which one can obtain water for an appreciable stretch of time
- Employed for the purpose of performing artificial recharging of the groundwater table
- A remedy that is kind to the natural world, particularly in places where water is in short supply.

**Disadvantages of Rain Water Harvesting**

- In regions that see either no precipitation at all or only a very little amount of precipitation on average each year, the practise of collecting rain water may not appear to be a practical option.

- The cost of installation for rain water gathering systems in buildings that already exist is much greater than the cost of installation for rain water gathering systems that are installed during the development phase of a building.
- Preventing the system from being blocked requires performing routine maintenance, which is something that must be done.
- Storage limits can be caused by a number of factors, including the geography, the type of equipment that is used, the amount of precipitation, and the absence of suitable storage places. The Importance of Water Harvesting from the Clouds and Rain
- It is required to meet the demands for water while also restoring the groundwater table since the water sources are running out of water at a quicker pace. This makes it necessary to fulfil the needs for water. Rainwater has the potential to be put to use in this manner, which means that it may be utilised to recharge depleted groundwater. The collecting of rainwater can be helpful in minimising soil erosion brought on by runoff, which is something that really must be avoided at all costs.
- Rainwater helps water sources and the infrastructure that distributes it carry a lower weight, which is one of the many benefits of collecting rainwater.
- Rather than making use of the water supply that is metered, to collect rainwater for the purpose of using it for a range of purposes in order to save monthly water bills.
- Rainwater collection has the potential to significantly reduce the likelihood of flooding in urban settings, which is one of the many benefits of collecting rainwater.

## OBJECTIVE

1. To study oneconomic analysis of rain water harvesting.
2. To study on Advantages and Disadvantages of rain water harvesting.

## METHODOLOGY

A cost-benefit analysis is a method that is utilised for the purpose of carrying out the research that is necessary in order to finish the financial and economic aspects of collecting rainwater. The economic analysis and the financial analysis are each one of the components that go into making up the assessment framework. Both of these aspects are illustrated in Figure 1. The study

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of the economy is carried out by first assessing the effects that will have not only on the economy but also on society and the environment. During the course of the financial analysis, both the costs and the possible returns on investment are taken into consideration. In addition, three separate systems, each of which has its own unique monetary implications, are analysed and contrasted here. The first two methods, both of which entail the use of groundwater, are examples of the first two possibilities, while the third alternative calls for the collection of rainfall (Option 3). The objective of this comparison is to ascertain which of the two alternatives is more advantageous in terms of one's financial situation.

If the potential benefits of the rainwater harvesting project have a ratio that is greater than one and outweigh the potential costs of the project, then the project may be considered economically feasible. In the event that the ratio is lower than one, it is impossible to consider the project economically viable, and it will need to be scrapped.

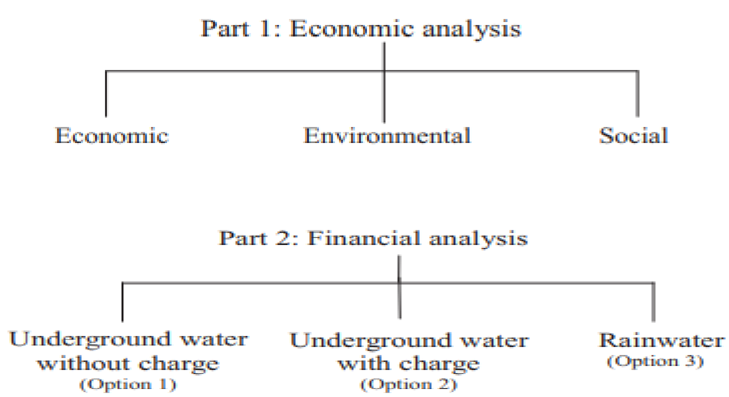


Fig. 1 The investigation is split into two parts.

**Table 1. Effects on the economy, the ecology, and society caused by collecting rainwater.**

| | |
|---|---|
| Economic cost | Initial investment |
| | Operation and maintenance cost |
| Environmental costSocial cost | N[a] |
| | Agricultural risk |
| Economic benefit | Increase of agricultural production |
| | Planting in winter time |
| Environmental benefit | Water saving |
| | Energy saving |
| Social benefit | Raising social awareness |
| | Improving employment |

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[a] There is no significant negative impact on the environment caused by rainwater harvesting systems.

**Analyses of the economy**

The most significant economic, environmental, and social consequences that are brought about by rainwater collecting systems are outlined in Table 1, which may be seen below. These results are based not just on research that has been published but also on interviews conducted with representatives from the Delhi Water Authority and the Delhi Agro-Technical Extension Center.. It is widely agreed upon that rainwater harvesting projects do not have any negative impacts on the environment in the area in which they are located. This is due to the fact that collecting rainwater and then putting it to use for agricultural irrigation is a natural process. In Table 1, the cost to the environment is represented by the letter "N." This suggests that there will not be any major negative effects on the surrounding ecosystem. It is essential to be aware of the fact that the calculations that will be carried out will not take into consideration each and every one of the impacts that are outlined in Table 1. During the course of the study, monetary weights are only given to those economic, environmental, and social aspects that are considered to be among the most significant overall. The following is an explanation of the thought process that went into choosing effects and establishing values. In the first place, rainwater harvesting systems have a negative effect on society as a whole because their construction, as well as their operation and maintenance (O&M), require a significant amount of limited resources. This makes it difficult to implement these systems in areas where these resources are in short supply. As a result, both the original investment and the expenditures associated with operation and maintenance are regarded as being damaging to the economy, as shown by Equations (1) and (2). (2).

$$E_C = C_I + C_{O\&M} \tag{1}$$

$$C_{O\&M} = \sum_{t=1}^{m} \frac{O_t}{(1+i)^t} \tag{2}$$

If the following values for the variables are known, then the following equation can be written: EC = economic cost, CI = initial investment, CO&M = present value of O&M cost, Ot = O&M

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cost in year t, I = discounting rate and m = assessment period. (the combined age of the individuals) The discount rate I that is utilised for cost benefit analyses in India is 8%, according to the information that is provided in the paper that was published in 2006 and given the title Indian Economic Evaluation Parameters on Construction. The paper was given the title Indian Economic Evaluation Parameters on Construction. The rate that is being utilised here takes into consideration the inflation rate that the nation as a whole is experiencing. It is predicted that the duration of the evaluation period, which is designated by the letter m, will be 10 years. Since there are no traded components in the economic cost and no large distortions in Beijing's water treatment construction market pricing, market prices may be utilised to compute CI and O&M costs. This is due to the fact that the market prices of water treatment construction in Beijing are not significantly distorted in any significant way. This is because the economic cost does not take into account any goods or services that are exchanged with other parties (Ot).

Second, there is no way to get around the unavoidable presence of air pollution in the city due to the large number of manufacturing facilities that have been constructed in the area surrounding the city as well as the enormous amount of garbage that is produced by residential usage. There is no way to get around the unavoidable presence of air pollution in the city because there is no way to get around the unavoidable presence of air pollution in the city. The same chemicals that poison the air can also contaminate the precipitation that falls from the sky. When rainwater is collected for the purpose of irrigation in agriculture, contaminating substances have a greater chance of getting into the food produced, which is a significant threat to the industry. The utilisation of polluted rainwater in agricultural production presents a risk that might be seen as a social cost that may be experienced as a direct consequence of rainwater collection projects.

The third equation demonstrates that the social cost of agricultural risk, denoted by the symbol EA, can be calculated by using the average revenue from the vegetable, denoted by the symbol ai, and the total amount of agricultural production that is declining. This is demonstrated by the fact that the third equation contains the symbol EA. The findings of interviews with project managers revealed that cucumbers, tomatoes, lettuce, and marrow make up eighty percent of the crops that are cultivated utilising rainwater reuse systems. These conclusions were based on the

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findings of the interviews. According to the findings of the study, the quantity of these crops that are harvested is the only component that is taken into consideration when making the decision. The results of a study that was carried out by Wang et al. (2007) indicate that the usual profits that can be made from selling these kinds of vegetables in Delhi (ai) are roughly 2.5 Rupees per kg ground (kg). An estimate of the total quantity of agricultural production that has been lost can be obtained by multiplying the total number of vegetables produced by the rate at which the total number of vegetables produced as a result of dirty irrigation water is falling, which yields an answer in terms of an absolute value (defined as ar). It is feasible for annual agricultural production to decline by ten percent (ar) as a direct result of the use of unclean water for irrigation purposes in agriculture. This reduction in output would be caused by the use of dirty water in agriculture (Kang and Meng, 2014; Kuang and Sun, 2018). After that, the potential yield of vegetables may be determined by multiplying the unit agricultural output, also known as ap, by the irrigated land area (defined as as). The city of Delhi has an average vegetable production (ap) of 4.6 kilogrammes per square metre, as stated in the issue of the Delhi Statistic Yearbook that was published in 2010.

$$E_A = a_i \times (a_p \times a_s \times a_r \times 80\%) \qquad (3)$$

Table 2. The amount of groundwater saved.

| Systems | Sources | Use for irrigation | Groundwater resources depletion | Groundwater saving amount |
|---|---|---|---|---|
| Case A: Traditional system | A1. Groundwater: pumping $X$ m$^3$ | A1. $X$ m$^3$ groundwater | A. $X$ m$^3$ pumping groundwater $-10\%X$ m$^3$ rainwater penetration $-Y$ m$^3$ irrigation water penetration | =Case A – Case B = $X - 10\%X - Y - (-Y)$ = $90\%\ X$ m$^3$ |
| | A2. Rainwater: no rainwater is harvested. 10% $X$ m$^3$ of the rainwater penetrates the soil | A2. 0 m$^3$ rainwater | | |
| Case B: rainwater harvesting system | B1. Groundwater: no pumping | B1. 0 m$^3$ underground | B. $-Y$ m$^3$ irrigation water penetration | |
| | B2. Rainwater: all $X$ m$^3$ rainwater is harvested. No rainwater penetrates the soil | B2. $X$ m$^3$ rainwater | | |

Third, there is no rise in the volume of irrigation water since it is expected that the amount of rainfall that is collected is just adequate to fulfil the demand for irrigation. This presumption

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prevents there from being an increase in the amount of agricultural production. This indicates that the study does not take into consideration the possible economic gains that may be gained from increasing agricultural production. In addition, as was mentioned previously, the storage tank is often not utilised during the colder months due to the lack of demand for its services. During the colder months, the storage tank may be transformed into a garden in particular circumstances. Plants that thrive in the shade, like mushrooms, will flourish in the storage tank since it is the perfect environment for their growth. The hypothesis underlying this study is that all of the rainwater collecting systems' storage tanks are put to use for planting during the colder months. The potential for monetary gain from the cultivation of plants using rainwater that has been collected is one of the potential economic advantages of rainwater collecting systems. According to the interviews that were carried out with the project managers in Beijing, mushroom cultivation has been performed all through the winter in certain areas of the city. We shall proceed with the assumption, in the interest of keeping the study as uncomplicated as possible, that all rainwater collection systems generate revenue during the winter months through the growing of mushrooms. Because of this, the economic advantage, which will be referred to as the unit revenue from mushrooms (also abbreviated as am), and the area of storage tanks will be used to determine the economic advantage. The economic advantage will be abbreviated as EP.

$$E_P = a_m \times S_P \tag{4}$$

The utilisation of groundwater resources is cut down significantly as a result of rainwater collecting systems, which brings us to the fourth benefit of these systems: a reduction in the quantity of energy that is consumed. In order to provide clarity on the amount of groundwater that can be saved, Table 4 compares and contrasts two methods of irrigating agricultural land: the traditional method of making use of groundwater (Case A), and the new method of making use of rainfall. This table's objective is to make it easier to understand how much of the groundwater resource can be preserved (Case B). It is premised on the concept that the total volume of rainwater that is collected is X m3, and that the total volume of water that is necessary for irrigation is also X m3 in order to accomplish the desired level of crop growth. In Case A, rainwater is not collected, and precipitation cannot directly irrigate the crops because the majority of the crops are grown within greenhouses. Case A provides a perfect illustration of the time-honored practise of irrigating crops with groundwater, as this particular scenario demonstrates. The particular mode of operation in the system that is referred to by the word "traditional" is described below. As a direct consequence of this, groundwater is the one and only source of potable water that is used for irrigation in Case A. According to the Delhi Water Resources Bulletin (1988–1998), in rural areas of Delhi, only 10% of the precipitation is recharged into groundwater, while the remaining 90% of the precipitation either evaporates or creates runoff. This is the case even though rural areas receive more precipitation overall. As a result, in Case A, x m3 of rainfall only seeps into the ground 10% of the time, whereas x m3 of groundwater is extracted for agricultural purposes. On the other hand, in Case B, X m3 of rainfall is collected, and rather of utilising groundwater for irrigation reasons, it is repurposed for agricultural uses. This is in contrast to Case A, in which groundwater is used. The volume of irrigation water that seeps into the ground during the process of watering the crops is comparable to the volume of water that seeps into the ground during the process of watering the crops under Case B, which is regarded to be Y m3. When Case A is compared to Case B, one may get the conclusion that the quantity of groundwater that is conserved is equal to 90% X m3 by virtue of the proximity of the two cases (Table 2). It follows that rainwater harvesting systems are capable of preserving 90% of the groundwater that would have been utilised to gather the same amount of rainwater if it hadn't been for the rainwater collecting systems.

In addition, the amount of energy required to extract water from reservoirs that receive rainwater is far less than that required to get water from greater depths. There is a one-to-one relationship between the depth of the water that has to be pushed and the quantity of energy that is required. In comparison, the depth of a tank normally ranges anywhere between 2 and 8 metres, whereas the depth of a well typically ranges anywhere between 80 and 100 metres. If there were no rainwater collecting system, the amount of energy needed for irrigation would be 0.27 kWh/m3. On the other hand, if there was a rainwater collection system, the amount of energy needed for irrigation would be lowered to 0.02 kWh/m3, which is a significant savings. As a direct consequence of this, the unit of measurement for energy savings is 0.25 kilowatt hours per cubic

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metre. According to the equations (5–), the benefits of preserving water and energy are both seen as having a favourable impact on the natural world.

$$E_B = E_W + E_N \quad (5)$$

$$E_W = U_W \times W_S \quad (6)$$

$$E_N = U_N \times N \times W_R \quad (7)$$

where EB stands for the value of the environmental benefit, EW stands for the value of the water savings, EN stands for the value of the energy savings, and UW stands for the unit value of water. WR stands for the total amount of rainwater harvesting, UN stands for the unit value of energy, N stands for the unit energy savings, WS stands for the amount of groundwater that was saved, which accounts for 90% of WR, and WR stands for the total amount of rainwater harvesting.

We make use of the values that are directly derived from the appropriate literature for determining the unit value of water (UW) and the unit value of energy (UN). According to the calculations that were done by Chen et al. (2006), the value of one cubic metre of groundwater in India is around 6.5 Indian Rupees. Some computations can benefit from the utilisation of groundwater's unit value, which is set at 6.5 Yuan per cubic metre (UW).

This study considers the cost of coal power plants in India to be the value of energy since coal power accounts for 70 percent of India's total energy output. As a result, the value of energy is regarded to be an important factor in this study present an estimate of the overall cost of operating a coal power plant in India. This estimate takes into consideration the expenses of capital, fuel, operation and maintenance, as well as the costs associated with pollution. According to the conclusions of this study, the standard cost of running a coal power station in India is 0.03 cents per kilowatt-hour (namely 0.2 Yuan per kWh).

Last but not least, broadening people's understanding of the critical nature of reducing water waste can be accomplished through a variety of public education and business-oriented initiatives. The installation of rainwater harvesting systems is one method that can be used to

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raise awareness and save money on the expense of future campaigns that aim to raise awareness. This is because rainwater harvesting systems can be used to collect and store rainwater. We are operating under the presumption that the educational impact that is brought about by the utilisation of rainwater harvesting devices is equivalent to the educational impact that is brought about by public campaigns. Therefore, one social benefit that may be attributed to rainwater harvesting systems is a reduction in the expenses that are incurred by campaigns. This is one social advantage that may be attributed to rainwater harvesting systems. According to what was previously discussed, the total amount spent on public awareness raising efforts in Delhi for water savings (designated as K) is approximately 2.78 million Yuan per year, and approximately 2.25 million individuals are influenced by the programmes.

$$E_{aw} = E_u \times \left(\frac{K}{M}\right) \tag{8}$$

The operation and maintenance of the large- and medium-scale rainwater collection facilities both require the assistance of a number of staff members. These plants have a wider surface area for collecting rainfall. As a consequence of this, employment possibilities will now be available in the region. A significant aspect that may contribute to boosting employment numbers is a rapid expansion of the economy. We adopt the premise that the effect of a large-scale rainwater collecting system is similar to the effect that economic expansion has on employment levels. That is to say, the value of increased economic growth that contributes to increased employment can be considered a benefit of increased employment that is achieved through the gathering of rainwater. This is because increased employment leads to increased economic growth, which in turn contributes to increased employment. On the other hand, the benefits of increasing employment are not brought about by rainwater collection systems that are not as widespread. When it comes to smaller facilities, the facility owners frequently manage and maintain the plants themselves. The maintenance of the smaller plants does not necessitate the participation of any additional staff members. Therefore, rainwater harvesting systems that are medium and big in size are the only ones that take into mind the social benefit of increased employment. The calculation that explains how to compute the social value of additional job possibilities brought

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about by rainwater collection is provided below for your convenience (9). According to the definition that is utilised in economics, the employment elasticity, which is denoted by the symbol, is equal to the ratio of the increase in employment, which is denoted by the symbol Ew/W, to the increase in economic growth, which is denoted by the symbol Eem/Y. In other words, the employment elasticity is equal to the ratio of the increase in employment to the increase in economic growth. In this equation, Ew represents the number of employees working at the rainwater collecting facility, W represents the total employment in the region, and Y represents the regional gross domestic product. Eem It is estimated that India's employment elasticity is 0.3, which means that a one percentage point increase in economic growth might result in a 0.3% increase in employment. This is because employment is positively correlated with economic growth (Li, 2003). In addition, the administration of a rainwater collecting plant of medium size normally only requires one worker, but the management of a plant on a large scale typically requires two people.

When calculating the social benefits of medium and large rainwater harvesting systems, the benefit of increasing social awareness (Eq. 8) is added to the benefit of improving employment (Eq. 9). When calculating the social benefits of small rainwater harvesting systems, only the benefit of increasing social awareness (Eq. 8) is considered.

$$E_{\mathrm{em}} = \frac{(E_w/W)}{\beta} \times Y \qquad (9)$$

**RESULT**

Table 3 shows the findings of an economic study on three different-sized rainwater gathering facilities. This table contains all current effect values. The ratio of benefits to expenditures determines an endeavor's economic feasibility. Table 3 shows that a small plant's benefit-to-cost ratio is 1.6, a medium plant 2, and a large plant 2.5. All three sizes of rainwater collecting systems have ratios over one, indicating that they are economically practical. Rainwater collection systems assist society in many ways. Installing rainwater collection systems is in the government's best interest.

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**Table 3. The fiscal analysis of collecting rainwater for later use**

| | Small size systems | Middle size systems | Large size systems |
|---|---|---|---|
| Cost | | | |
| Economic cost | 25,403 | 278,314 | 424,719 |
| Social cost | 24,705 | 329,406 | 494,109 |
| Total | 50,108 | 607,720 | 918,828 |
| Benefits | | | |
| Economic benefits | 26,840 | 241,563 | 697,848 |
| Environmental benefits | 52,983 | 706,437 | 1,059,656 |
| Social benefits | 66 | 285,773 | 571,465 |
| Total | 79,889 | 1,233,773 | 2,328,969 |
| Ratio (benefits/cost) | 1.6 | 2 | 2.5 |

**Table 4. A rundown of the various costs and benefits associated with the various system sizes**

| | Option 1 | Option 2 | Option 3 |
|---|---|---|---|
| *Small size systems* | | | |
| Financial cost | | | |
| Initial investment | 0 | 0 | 27,000 |
| O&M cost ( Rs. /year) Rupees | 156 | 2556 | 60 |
| Financial benefits | | | |
| Subsidies (Rupees) | 0 | 0 | 9000 |
| Incomes from crops ( Rs. ./year) | 5000 | 5000 | 5000 |
| *Medium size systems* | | | |
| Financial cost | | | |
| Initial investment (Rupees) | 0 | 0 | 300,000 |
| O&M cost ( Rs./year) | 2080 | 34,080 | 800 |
| Financial benefits | | | |
| Subsidies (Rupees) | 0 | 0 | 150,000 |
| Incomes from crops ( Rs. /year) | 98,000 | 98,000 | 98,000 |
| *Large size systems* | | | |
| Financial cost | | | |
| Initial investment Rupees | 0 | 0 | 450,000 |
| O&M Cost ( Rs. /year) | 3120 | 51,120 | 1200 |
| Financial benefits | | | |
| Subsidies (Rupees) | 0 | 0 | 300,000 |
| Incomes from crops ( Rs. /year) | 137,000 | 137,000 | 137,000 |

Tiny plants' social benefits are limited to increasing social awareness, whereas medium and large plants also promote employment. Table 3 shows that as a result, the social benefits of microscopic plants are much lower than those of medium and large plants. Table 3 shows that little plants cost 25,403 Indian Rupees economically and 24,705 socially. The environmental advantages of small plants are worth 52,983 Rupees, the difference between these three costs. The environmental benefits are double the economic and social disadvantages. Medium and large plants' environmental benefits far outweigh their costs. This is true independent of plant efficiency. This shows that rainwater collection systems benefit the ecosystem, while consuming resources during construction and threatening agricultural productivity. This is true notwithstanding the environmental benefits of rainwater collection.

## CONCLUSIONS

The quantity of water that is required as well as the total number of people in the world is quickly expanding. The collection of rainwater is a solution that is good for the environment and may assist contribute to satisfying these demands. Because of the severity of the water crisis in a nation like India, which has a huge population, the water resources of the country need to be handled extremely carefully. This is because of the fact that India has a large population. The harvesting of rainwater contributes to the satisfaction of the demand for water, the restocking of groundwater resources, the reduction of monthly water bills, and the enhancement of the general environmental health. According to the results of the economic study, rainwater harvesting systems of all sizes, including small, medium, and big, are all capable of being economically feasible solutions. This is the conclusion reached by the researchers. This illustrates that rainwater collecting systems contribute to society in a positive way, which is why they are becoming increasingly popular. The government should actively promote the installation of rainwater collecting systems since doing so is in the public's best interest.

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