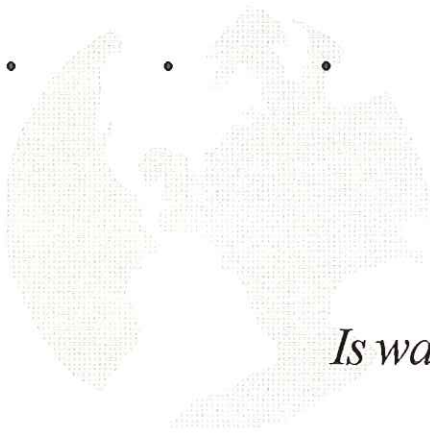


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Rain Water Collection



*Is water conservation necessary within
the city of Arcata?*

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Introduction

Water is a precious commodity. Every living organism on Earth must rely on it in order to survive. It is difficult even to imagine a form of life that might exist without water. This dynamic resource seems to be limitless in supply due to its ubiquitous presence in the oceans, icebergs, rivers, lakes, streams, and especially when it flows out of our faucet whenever we want it to. In total, a volume of some 300 million cubic miles covers 71% of Earth's surface (Nebel and Wright 264). Furthermore, even though Earth has an abundance of water, terrestrial ecosystems, humans, and agriculture must depend on accessible fresh water which constitutes just 0.4% of the total water availability (Nebel and Wright 264).

Hence, there is an inevitable dividing of water between the natural biota and human demands. In high-rainfall regions, there is usually plenty of water for human demands and natural biota. However, in drier regions and with growing human populations there are escalating conflicts between human needs and those of the natural ecosystem. There are some exceptions to the rule though. There are some cities such as Atlanta that receive high amounts of rainfall (45 inches +) but still face water shortages. Around the world there are more examples that we can recount of ecosystems under stress or already dead because of diversions of water for human uses. Moreover, within the human arena, there is growing contention between agricultural, urban, and industrial demands and between countries which share a common water source (Nebel and Wright 264).

In the past, water has been treated as an inexhaustible resource that can be taken for granted. This viewpoint has led to extravagant and wasteful use of water. A sustainable future will depend on learning stewardship of water resources. There are many opportunities for sustainable development in this arena. Let us consider a specific measure that could be implemented to reduce water.

One of the more popular methods today that are being implemented for water conservation is by using rainwater collection systems. Rainwater collection systems are an ancient technology for collecting and storing water which is usable for irrigation and/or drinking purposes. In parts of the world where rain falls every season and other sources are scarce many cultures still rely on rainwater as their fundamental source of water. Rainwater collection systems are also useful for

households in developed parts of the world as an inexpensive method of reducing consumption of treated water.

The rainwater collection system is a simple system based on the harvesting of rainwater and gravity flow pressure principles. Rainwater runs off the roof of the house and into rain gutters. The gutters channel the water and empty it into a standpipe. One of the advantages of rainwater collection systems is their flexibility. A system can be as simple as a whiskey barrel placed under a rain gutter downspout for watering a garden or as complex as an engineered, multi-tank, pumped and pressurized construction to supply residential and irrigation needs.

Strictly speaking, rainwater collection is an entirely new water supply, quite apart from existing surface and ground water supplies, rather than a conservation technique. Whether this system is used for irrigation, augmentation, or as an alternative to traditional supplies, rainwater collection is a viable option for new and existing construction, and will decrease the population's reliance on dwindling groundwater supplies and reduce demand for surface water.

Rainwater collection systems will provide citizens with a set of activities to increase their awareness and enhance their technical skills. Also, rainwater collection systems are based on local resources, community-based operation and maintenance, and basic health education. The overall focus of our project is community empowerment and ownership. Our rainwater collection systems are formulated to take into account Arcata's water needs and water shortages during the summer months. The community can implement construction, policies, and education that will provide the source of water that is both inexpensive and sustainable.

Successful implementation of rainwater collection systems relies on acceptance of the project by the community and the local government. The criteria for selecting a household are based upon an on-site evaluation, family size, and participation. The geography of the site for proposed placement of the rainwater collection systems will include: the soil type, proximity to an established outlet of clean available water, zones of flooding or alluvial wasting, rainfall records, and topography.

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ARCATA CITY WATER DEPARTMENT

given citizens the impression that water conservation is unnecessary. However, the city of Arcata receives very little rain in the summer months. The implementation of rainwater collection systems would decrease the demand for water.

As the world's population continues to grow at a rate of about 10,000 per hour, the same finite water resources are going to have to go farther and be treated wisely in order to meet our basic needs. Now is the time to heed our responsibility and lend a helping hand to our Earth while at the same time making sure that water, the elixir of life, will be available to not only humanity, but to the rest of the natural environment.

Problem Statement

As it is with many environmental problems, rainwater collection is an issue that does not receive the attention, education, or economic support that it should receive. Yet this is a simple issue that is applicable to any bioregion worldwide. Water reuse is a problem that individuals and households can alleviate. The portion of the rainwater reuse problem that will be covered within this document is that rainwater within the city of Arcata is not being fully utilized as a source of irrigation during the summer months (June-September). The rainwater issue presents a number of problems. This document will concentrate on the idea that rainwater is not being used to its' full potential.

Objectives

To inform 200 individuals about rainwater collection systems about their water conservation abilities by the beginning of the summer of 2001.

To reduce the usage of Arcata city water supply during the months of June through September by 2% by the year 2005.

To reduce storm drainage flow by 5% by the year 2005.

To increase the utilization of storm water through rainwater collection systems within the city of Arcata by 5% by 2005.

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Alternative Solutions

In order to develop a list of possible solutions, alternatives were brainstormed. Numerous ideas were generated ranging from actually building a collection system for display to creating a city/school run web site on rainwater collection. This list was then narrowed down to a feasible set of possibilities; each of would adequately meet the outlined objectives stated previously.

The alternatives were:

- 1.) Perform a workshop on rainwater collection
- 2.) Develop a web page promoting rainwater collection in Arcata
- 3.) Conduct a survey on rainwater collection
- 4.) Construct an informative packet on rainwater collection systems
- 5.) Publicize rainwater collection through the local media

These alternatives were then ranked according to their ability to satisfy certain criteria. The criterion included ease of implementation, technical expertise required, cost, monitoring, time involvement, and effectiveness. The ranking was based on a 1-5 scale; 1 being poor and 5 being excellent.

1.) Workshop

The workshop ranked relatively high in the alternative decision matrix due to its reasonably simple nature. A workshop can be put on with little expenditure and without an enormous amount of technical expertise required. It could also be organized without extensive research needed (ease of implementation) and would require little or no follow- up (monitoring). However, the workshop ranked low on time involvement and effectiveness. It was determined that significant time would be needed to advertise and to get a facility in which to conduct the workshop. Its low effectiveness rating is attributed to the feeling that few people would be exposed to the benefits of rainwater collection in this manner. However, the workshop ranked low on time involvement and effectiveness. It was determined that significant time would be needed to advertise and to get a facility in which to conduct the workshop. Its' low effectiveness rating is attributed to the feeling that few people would be exposed to the benefits of rainwater collection in this manner.



2.) **Web page**

The web page rated as the lowest of our alternatives when ranked in the decision matrix. This was due to the time involved in developing a web page, the technical knowledge required for programming, and overall difficulty of implementation. It was determined, however, that a web page could be very effective in educating the public on the benefits of rainwater collection if entered into the proper search engines.

3.) **Survey**

The survey was rated highly and was surpassed only by the pamphlet. This was attributed to its relative ease of implementation and lack of technical expertise required. It was realized, though, an effective survey would require a non-biased set of questions and a certain degree of calculations and statistics. A survey can be conducted with little or no cost and would not require excessive monitoring. It rated high in both of these areas. The survey fell short, however, with the time involvement and effectiveness criteria. A great deal of time would be put into actually surveying the public in order to get an adequate data set. This, much like the workshop was considered to not be effective in educating Arcata individuals on the benefits of rainwater collection.

4.) **Pamphlet**

The pamphlet ranked highest among the alternatives, and was ultimately the solution that was implemented. It rated highly with all of the developed criteria, especially considering the time constraints that were present. It was felt a pamphlet could be relatively effective in educating Arcata residents of the importance of water conservation and the benefits of rainwater collection. This, in conjunction with the ease of implementation, low costs, and lack of technical expertise required made the pamphlet the highest ranked alternative.

5.) **Media**

The idea of publicizing rainwater collection through the local media low in the decision matrix, mostly due to lack of contacts in the media industry and the technical expertise required to develop an informative public service announcement promoting rainwater. It was also determined that high cost would be involved



in the development of an announcement of this nature and in reserving airtime. Significant time would also be needed to develop an effective ad campaign.

It was determined that a campaign such as one promoted on Arcata Cable Access Television (ACAT) would be highly effective in informing citizens about rainwater collection. A more comprehensive workshop held at an undisclosed location in Arcata, and simulcast on ACAT would allow greater exposure to community members of relevant information. Also, we could request ACAT re-air the workshop throughout the year, until increased support and awareness was generated.

Alternatives

	Ease of Implementation	Technical expertise required	Cost	Monitoring	Time Involvement	Effectiveness	Totals
1.) Workshop	3	4	4	5	1	1	18
2.) Web Page	2	1	3	2	2	5	15
3.) Rainwater Survey	4	4	5	3	1	2	19
4.) Rainwater Pamphlet	4	5	4	3	4	3	23
5. Publicize Rainwater through media	2	2	2	4	2	5	17

1= poor
5= excellent

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Environmental Impact Statement

Implementation Strategies

Alternative I: Rainwater Collection Workshop

Implementation:

Use local media resources to inform Arcata residents about the specifics of where the workshop will take place.

Set up location details

Contact interested parties about representation at workshop

Alternative II: Web Page

Implementation:

Create and design a web page format

Register web page at a reputable domain server

Update and maintain web site periodically

Alternative III: Rainwater Survey

Implementation:

Formulate questionnaire about rainwater collection awareness and interest

Survey local residents at high traffic areas such as grocery stores, etc.

Tabulate results

Come to conclusion about results

Alternative IV: Rainwater Pamphlet

Implementation:

Research and accumulate information pertaining to existing rainwater collection systems

Outline research information to pamphlet format

Generate multiple alternative styles

Decide on best outlay design

Distribute to environmental resource centers such as the North Coast Environmental Center, Campus Center for Appropriate Technology, etc.



Alternative VI: Publicize Rainwater Collection through Media

Implementation:

Produce video and audio commercials for broadcasting on local radio and television stations.

Decide upon the duration of the commercials' airing time

Decide upon the best times to air the commercials

Monitoring and Evaluation Plan

The first step in monitoring the progress of whether the city of Arcata has reduced the usage of water by comparing the ratios of water flow of the present time to those of 2005.

The second step in this process would be to evaluate overall water usage within the city limits of Arcata. This could be accomplished by reviewing water usage statistics documented by the city of Arcata to ascertain whether a five-percent reduction was achieved by 2005. The same procedure would be followed to assess a reduction in storm drainage flow.

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