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TECHNICAL NOTE

LOCAL PERCEPTIONS OF WATER AND RECOMMENDATIONS FOR IMPROVING WATER CONSERVATION PROGRAMMES

J. CURRY[1] & J. CARSON[2]
[1]School of Environmental Planning, University of Northern British Columbia, Canada.
[2]Land Use Planner in the British Columbia resource sector, Canada.

ABSTRACT

This article discusses the results of a research study that used focus groups and surveys to explore the public's perspectives on water and water conservation programmes in the Lower Sunshine Coast of British Columbia, Canada. Findings suggest that a high percentage of people view water conservation as an important environmental issue in the Lower Sunshine Coast. Recommendations made by research participants to improve local government's existing water conservation programmes and improve regulatory mechanisms are discussed extensively. Some examples of these recommendations include: creating the water conservation programmes appealing to the senses, giving people a reason why they should conserve water, constantly reminding the public and developing a mascot.

Keywords: focus groups, lawn watering, local perception, multiple source of evidence research, outdoor water use, public perception, qualitative research, water conservation, water conservation programs, water demand management.

1 INTRODUCTION

This research examines the local perception of water and water conservation and in doing so recommends appropriate initiatives to support water-demand management. The research centred on the Lower Sunshine Coast of British Columbia, 50 km northwest of the City of Vancouver. The region contains three municipal governments (town of Gibsons, district of Sechelt and Sechelt Indian government district) and one regional government, the Sunshine Coast Regional District (SCRD). SCRD is the main water purveyor to a population of approximately 20,000. High quality potable water is derived principally from the Chapman Creek watershed [1] which contains significant aquatic life; during summer when water availability is low, domestic water consumption is high. While SCRD has limited sprinkling for several decades [2], and more recently introduced a water conservation programme, per capita water use in the community remains high at 644 l/person/day. When there are a number of explanations for the high per capita consumption rate (e.g. system leakage), the absence of metering makes a detailed assessment difficult. However, better understanding of household behaviour by any means is desirable, if we are to come up with solutions. As water infrastructure expansion is expensive, seasonal variation in precipitation patterns is beyond human control and population growth appears inevitable, reducing high water demands is one option for securing additional water capacity. As McKenzie-Mohr and Smith [3] observe, in order for a water conservation programme to be effective, there must be a clear understanding of the local context within the target communities as well as meaningful involvement of the public. This study addresses this need by promoting and capturing dialogue of Lower Sunshine Coast citizens to facilitate the identification and exploration of potential improvements for existing and future water conservation programmes.

2 METHODOLOGY

A multiple source of evidence research approach [4] was employed utilizing an extensive literature review, focus groups, surveys and contextual experience gained by working within the water

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conservation programmes of the SCRD to explore the issue of water conservation in the Lower Sunshine Coast. Quantitative results were analysed through a number of responses to each option in the survey questions in order to demonstrate possible relationships between different answers as well as for the purpose of determining demographic representation. However, due to the small scale of the research and interest in exploring the rationale for certain behaviours and perceptions, qualitative research methods were found to be more enlightening. Qualitative research allows the researcher to explore the different perceptions, values and beliefs held by the participants; through this exploration the research is permitted to evolve as the issue is explored and in the direction that the participants involved lead [4]. While quantitative results are used to support some of the general recommendations made by the researcher, the qualitative research provides ideas for discussion and offers possibilities of how these recommendations can be realised.

Recruitment of participants was accomplished through purposeful sampling [5], in that it was entirely voluntary and achieved through a variety of mediums – an article in the local newspaper, advertisements on local television, a guest appearance on local radio, posters on community message boards, messages sent out to email groups and invitations distributed while visiting some high-density residential neighbourhoods. The incentive to participate in the focus groups was presented as assisting in creating recommendations to local government for future water demand management. The focus groups were facilitated by the same researcher and note-taker for consistent data collection purposes, and notes from each session were compiled and sent to the appropriate focus group participants for comments, additions or alterations. A total of 27 people participated in the five focus group sessions.

In response to the seasonal pressures of outdoor water use, focus groups were divided into those who water their lawn and those who do not water their lawn. The method of targeting one specific behaviour is recommended by McKenzie-Mohr and Smith [3] within the research and behaviour change theories of community-based social marketing.

The focus group and survey questions were developed through examples from the literature review and issues present within the local community. The questions covered demographics, perceptions of the community, water, lawns and different types of gardens as well as water conservation programmes. Furthermore, open-ended questions were included to encourage creative recommendations. Although this set list of open-ended questions were discussed in all focus groups, unrehearsed follow-up questions were often used for clarification and further exploration of the subject and material collected. Analysis of the qualitative data from these focus groups was accomplished through looking for patterns and consistencies, or lack thereof, within the focus group discussions, and placing them into categories. While analysis of quantitative data from the pre-focus group demographic questionnaires were analysed for demographic representation, qualitative findings were the main focus for analysis purposes.

As there were numerous interested residents who were unable to make the focus group meetings, or were not interested in being part of a group discussion, surveys were developed to accommodate these individual's convenience or comfort level. As only interested parties were given surveys, there was a 100% survey return rate. Two surveys were created, again to separate those who water their lawn from those who do not water their lawn. However, it is important to note that the bulk of the discussion in this article focuses on the questions that were identical between the two surveys. There were 33 survey respondents in the survey component of research.

3 RESULTS AND DISCUSSION

The numerical or quantitative results have been developed exclusively from the survey responses while the qualitative results are primarily based on the findings of the focus group, however, wherever appropriate, these results will be explicitly attributed to survey responses.

The perceptions of water and water conservation vary in the Lower Sunshine Coast. While perceptions do not necessarily dictate corresponding behaviour, they can suggest those that can influence the decisions to conserve, or not to conserve water. One of the links between belief and action found in this study indicates that while 85% of the survey participants felt that water conservation in the Lower Sunshine Coast is necessary and 45% of the survey respondents continue to water their lawn in a wasteful manner in contrast to basic water conservation principles. This failure to link beliefs with corresponding behaviour has been discussed in numerous studies [6–10]. However, a different study began with the preferred behaviour, then explored and compared the beliefs and values of low-water consumers with those of high-water consumers, demonstrating that households with lower levels of water consumption had more awareness of environmental issues than those who consumed more water [11]. The implication of this finding is that while education is useful and necessary, it must be complemented with other methods, such as incentive programmes, for example, to ensure that chosen behaviour corresponds with available information and is thereby effective in reducing water consumption. Many researchers, including McKenzie-Mohr *et al.* [8] and Hawken *et al.* [12], have advocated this type of multi-method approach to improve the environmental behaviour.

Approximately 70% of survey respondents know the source of their water. However, 70% of survey participants also indicated that they knew very little or nothing about the process that delivered water to their home. With the exception of some basic knowledge, they were not aware of the amount of infrastructure involved and the processes through which water is brought to their home. A more comprehensive understanding of this process could assist in improving water conservation, as residents will be able to understand better the amount of energy and financial resources required to deliver water.

Within the survey responses, 51% of participants indicated that there is currently enough potable water, however, many of these respondents felt that there might not be sufficient water supply to meet demand in the near future. This belief was a common threat to all focus groups.

There were numerous responses citing the proximity to the ocean, the number of streams and the large amounts of rainfall from fall to spring. The high visibility of water in its many forms during most of the year in the Lower Sunshine Coast leads to an underlying assumption by many residents that there is an infinite supply, and so it is not important to conserve water. As a result, many focus group members recommended that more education be available to explain to the public that the most significant local water issue is a storage capacity problem combined with high per capita usage, and if water conservation is not adopted by residents, solving the water issues will consume substantial financial resources and may contribute to further ecological damage.

Approximately 85% of the survey respondents stated that they felt that water conservation in the Lower Sunshine Coast is important. The mainly perceived benefits given to support water conservation amongst focus groups and survey responses are shown in Table 1.

The high percentage of people in the Lower Sunshine Coast who think that water conservation is needed (85%) should translate into strong support for water conservation programmes. It is clear that there are many reasons why people feel water conservation is important and equally abundant are the approaches that the local governments of the Lower Sunshine Coast can employ to improve the current water conservation programmes and to reduce the high average per capita water consumption. Having said this, it is important to understand and take into account the portion of the public who feel that water conservation is an unnecessary and useless exercise in the Sunshine Coast. While this view was expressed by a minority (12%) of the research participants, it represents an important part of the public who did not participate in this research and who are not interested in water conservation. The solutions to improve water management in the Lower Sunshine Coast

Table 1: The mainly perceived benefits of water conservation.

- *Environment*: Ecosystems including fish population need adequate levels of water in summer to survive.
- *Climate change*: Precipitation in the future is unpredictable.
- *Reduced infrastructure costs*: Water conservation delays the need for construction of a new storage or supply of infrastructure.
- *Land development*: It increases water demand and results in need to conserve it.
- *Reduction of water wastage*: Unnecessary cost for treatment and more chlorine into environment.

Table 2: The mainly perceived barriers to water conservation.

- *Contextual circumstance*: A great deal of precipitation, visible streams and ocean.
- *Convenience and separation*: 'The convenience of water makes us wasteful of it'.
- *Cultural mentality*: The right to use as much water as wanted.
- *Aesthetic appeal*: Green lawns are desired.
- *Priorities*: Not inclined to consider water conservation in everyday choices.
- *Development*: 'Why should I conserve to allow people to move to my community?'
- *Perceived sacrifice*: 'Hot showers feel so good'.

offered by these groups of people were desalination, building new dams and making new land use developments pay for water use through lot fees. While these types of supply management solutions are being used elsewhere, they are expensive and ultimately the best new source of potable water is the water we choose to conserve [13]. With similar proactive thinking, the SCRD board has adopted a policy of 'aggressive demand management' [14].

The mainly perceived barriers to water conservation discussed by both the focus groups and the survey respondents are discussed in Table 2.

These perceived barriers to water conservation are useful when developing water conservation programmes as they can become the targets for campaigns educating the public that some of these perceived barriers may not actually be barriers. Opportunities for environmental education are considerable within the context of these perceived barriers and should be utilized. If they are too difficult to dismantle through education, these barriers can be reduced through methods like incentive programmes.

The level of awareness concerning the multitude of SCRD water conservation initiatives was disappointing, with only 58% of the survey participants indicating that they had heard of existing initiatives. There were also a large number of existing water conservation initiatives that were never mentioned. Consequently, better exposure of these programmes is required to improve the basic public awareness of water issues and also to improve participation in the water conservation programmes.

The survey respondents generally did not provide a large amount of feedback when asked as how to improve existing water conservation programmes. Many survey respondents (67%) did not answer to this question. However, the focus groups that provided a forum to discuss the issue more thoroughly were much more productive. However, those who did respond contributed to the items that are mentioned in the following sections.

3.1 Suggestions: regulatory mechanisms

Financial motivation and water metering to promote fairness: Many participants indicated that financial motivation for conserving water such as water metering would be the most effective tool. The reasons given for this choice were that meters provide an equitable method of charging for water and put a price on a resource that people take for granted. One participant said 'if I try to conserve water, I pay more per litre of water than people who don't try and conserve', therefore, in order to reward those who do conserve, water meters can be used. Other participants commented that 'metering is probably the only thing that will convince most people' and 'to get people motivated you have to make it financial' just like buying electricity. However, there were also some participants who felt that the installation and administration of water meters is too costly, and the money could be better spent in building a new dam. As is apparent, water metering is a divisive issue and should be discussed further with the public.

Enforce water conservation regulations: Some research participants indicated that they did not feel that watering restrictions were being followed in their neighbourhoods, because the local governments were not serious in enforcing them. If bylaws are in place to promote water conservation, the onus is on the local government to enforce them.

Look at other water uses besides watering: There were numerous comments made by focus group participants regarding the waste of water in the summer due to activities other than outdoor watering such as driveway cleaning, car washing, and leaving the hose running. Some suggested that a bylaw be put in place prohibiting such types of water uses.

Consider new land development carefully in relation to water availability: The importance of ensuring that there is enough water to support new residential and other land development was brought up in several focus groups. Some comments, made by research participants, were that 'the government should look at the water situation before approving new development' and that 'wells can dry up because of development uphill of existing wells'. Another interesting finding from several research participants was the resentment of conserving water in order to allow more people to move into their community.

3.2 Suggestions: potential future programmes

Incentives and subsidies: A number of research participants indicated interest in rain barrel and low flow showerhead subsidies. These types of programmes can provide positive reinforcement for desired behaviours which inevitably assist those who are conserving water. However, these types of programmes can be costly to the local government, in many cases requiring significant financial resources. The difficulty with incentive and subsidy programmes is that often the desired behaviour is linked to the financial incentive and not to the root of the problem, which in this case is high per capita water consumption [3]. The SCRD piloted a rain barrel incentive programme in the late 1990s without adequate success to merit continuation of the project.

Harness and store storm water drainage: With increasing land development and increasingly impervious surfaces, there is more need for managing storm water. It was suggested by some of the research participants that this water could be saved on-site for purposes other than drinking.

Residential water efficiency assessment: Specific enquiries were made regarding the philosophy of potential programmes. Research into residential water audits was undertaken in the summer of 2005, which was also mentioned to participants to gauge public acceptance of this type of programmes. Staats *et al.* [15] found a residential, door-to-door approach to raise awareness over techniques to have a more environmentally-friendly home has been attempted in many communities,

and found to be successful. When the research participants were asked if they would participate in a water efficiency assessment of their house, most indicated that they would be interested, suggesting that there is a public interest for this type of residential programme which could be spearheaded by a water purveyor like the SCRD. Those not interested in this type of programme felt that this type of effort would be more effective and efficient if directed at high-water consumers such as industrial, institutional, and commercial customers.

Communication: In response to the question 'what is a good method for communicating with the public?' 88% of survey participants indicated that the newspapers are the best, 30% indicated that the pamphlets are a good tool and 24% indicated that all the tools listed (newspaper, open-houses, kiosks, pamphlets, radio, television and individual interaction) were important. This finding supports the multi-approach method of promoting water conservation within a community. Additionally, it was advised by many focus group participants that flyers are generally not effective.

4 CONCLUSIONS AND RECOMMENDATIONS

With water becoming the second most significant global environmental issue, next only to climate change, it is important to fully examine the local context within which water management is being carried out. In order to be effective, water conservation programmes must fit within the local context of the community they are trying to effect.

The findings of this study can be used to inform and improve water conservation initiatives in the Lower Sunshine Coast. The following recommendations, made by survey and focus group participants and extracted from the review of literature on water conservation, should be considered by the local governments of the Lower Sunshine Coast who provide water for their residents as well as other local governments within a similar situational context.

Set an example through local government initiatives: Several focus group sessions related the importance of conservation of water by public utilities. Government workers may not be cognizant of the effect of their actions on public attitudes. However, sprinkling grass in parks excessively (in some cases during rain events), hosing down streets to keep dust down, and letting water run without supervision perplexes would-be conservationists. Government workers should set a high standard by fastidiously employing good water conservation techniques. In the same light, any regulations in place to conserve water should be stringently enforced.

Educate and communicate: People need to be made aware of water conservation issues and subsequent initiatives on the Lower Sunshine Coast before they are able to change their behaviour. Adams [16] and McMakin *et al.* [17] observe that as people generally want to 'do the right thing' it is important that they first be made aware of 'the right thing to do'. Presentations to community groups who are interested in the subject should be undertaken as his may help in building partnerships within the community. Also, instructional seminars for high-water users were brought up in several focus groups as a method to concentrate in action. For example, workshops could focus on people who insist on green grass to achieve their goal using a minimal amount of water.

a. *Provide easier access to information*: Barriers such as complex and difficult to use websites should be removed. Focus group participants recommended developing online sites similar to the Consumer Association of Canada Guide, which is readily accessible and easy to use.
b. *Appeal to the senses*: Water purveyors should use visually and emotionally stirring tools to make the message more memorable to the public in instilling better water use behaviours. Research participants suggested that humour is an effective tool in changing the behaviour. One idea from a survey participant is a published barometer of water consumption and level of watersheds and

similarly, in a focus group, the idea of a fire hazard sign with something indicating the creek levels and fish hazard would be a good visual tool at Chapman Creek on the highway.

c. *Repeat important messages*: In order that the message is absorbed, constant reminders in a variety of different mediums are recommended. Besides the usual local newspapers, radio and television stations and community boards, ideas generated in focus groups include, a stamp on a paper bag at the liquor store or super market, useful message printed out on the back of the bill, a sign similar to that of a fire hazard sign, indicating the level of the creek and what that means to the fish, etc.
d. *Create a mascot*: In order to focus attention on water conservation initiatives in the Lower Sunshine Coast, it is recommended that a mascot be created: a contest for school kids could be organized to develop an appropriate mascot. The idea of a fish to be a mascot was identified and should be explored, as it would put a face on one species in the ecosystem that might suffer the most when water is not conserved appropriately.
e. *Teach teachers to teach their students*: As stated by Pooley and O'Connor [18], while it is difficult to reach everyone, focusing on those who have influence on the community is a good way to begin. As curriculum content requirements often include teaching environmental stewardship, the topic of water conservation is an excellent way for teachers to meet the curriculum requirements while planting the environmental imperative in students.
f. *Develop community partnerships*: By developing community partnerships by working with people who have similar goals, or who are key water-use players (e.g. land developers, environmental conservation groups, etc.) it is easier to develop a more effective approach.
g. *Give people a reason why they should conserve*: As explained by a member of the focus group, people would conserve water if they felt it was useful to do so. If the public is expected to be more receptive to the governmental initiatives, it is the role of the water purveyor to make this clear to the public. This clarity could be accomplished by publishing a fact sheet summary in the newspapers, on the television and on the radio on a regular basis. It is also necessary to make it as easy as possible to implement the advice provided. Conveying general information on water sources, average household use, and costs to provide potable water could prove to be a useful water conservation strategy.

Introduce new conservation programmes: The new conservation programmes that are discussed with the focus groups include:

a. *Encourage high-water users to conserve*: This type of programme has been developed by SCRD in its 'ICI Water Efficiency Awards Programme' [2]. It is recommended that focus be placed in promoting this programme within the SCRD. A similar type of programme is being used in the City of San Marcos, Texas [19].
b. *Encourage residents to reduce water consumption*: Since this type of programme has already been developed – however, not yet piloted – it is recommended that the 'Residential Water Efficiency Programme' be delivered to interested residents if the resources are available to do so. This type of programme is available in locations such as New York [20].
c. *Require strict water conservation initiatives in new land development or redevelopment projects*: While there are bylaws requiring water-saving devices such as low-flow toilets in new residential development, additional activities can be undertaken to educate people on the water situation in the Lower Sunshine Coast. A similar study in Florida suggested an information package on water be put together for new residents [7]. It is also apparent that a regional growth strategy involving all planning departments and impacted water purveyors for new development should be linked to available water supply [14].

d. *Examine other water uses*: Outdoor water use programmes tend to focus on watering gardens or lawns. However, numerous focus group and survey participants pointed out the water wastage that occurs through different activities such as car washing and driveway cleaning. One campaign in Utah focuses on the different water saving devices, such as a broom to sweep the driveway instead of washing it [21].

Keep the public involved and updated: Public empowerment comes through public involvement that could make a difference within ones' community as well as on an individual or personal level. This could be accomplished in the ways described above and through ideas posited by the research participants including water efficient demonstration homes, community forums, opportunities for gardening enthusiasts to have access to experts knowledgeable in plant water requirements, creating a user-friendly online document that interested residents can consult when exploring the purchase of new energy and water efficient home appliances, presentations to school groups, contests for students and residents, and existing information such as the water efficiency assessment worksheets being made readily available to the public.

This study brought together a variety of local residents with a variety of backgrounds to discuss the issue of water in the Lower Sunshine Coast and raised different concerns about the future water supply. Other communities and local governments interested in water conservation will benefit from the information in this article by understanding the barriers to water conservation and the opportunities to develop community environmental education programmes that could change resident behaviour towards conservation of water and other community resources.

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