

Influential Factors on Media Access in the Panama Canal Watershed

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Abstract: This paper explores the primary factors that influence the access of media (as communication medium or tool) among residents living in the Panama Canal Watershed; which is the area of streams, rivers and lakes that enable the Panama Canal to bring its outstanding services to the global ship transportation. This study aims to identify the factors that make personal media such as poster, book, flyer, brochure and photography apparently more accessible to the residents than mass media (TV, Radio, Newspaper), especially in the Panama Canal Watershed rural communities. National and International agencies working in Panama had placed Environmental Education as one of the top strategies to control the environmental degradation problems existing in the Panama Canal Watershed. However, the access of media through environmental education programs has not been evaluated. A 13 questions pilot survey in five (5) Watershed communities was fundamental for data collection. Four (4) communities from occidental/rural Watershed (71 responders) and one (1) community from oriental semi/urban Watershed (8 responders) participated. Variables included age, gender and occupation. Qualitative data was obtained from interviews with environmental education program designers and secondary data from government statistics. Results pointed community organization as the major factor influencing media access, closely followed by community socio-economical conditions, working schedules of residents, and sense of place. Residents who are not members of any environmental group have less access to environmental knowledge and they were inconsistent about their media source. On the other hand, residents who were active members in environmental projects have better access to media and pointed out environmental organization workshops as their major source for learning.

Keywords: *Panama Canal Watershed, Media, Environmental Education, Rural Area*

1. Introduction:

1.1 Panama Canal's importance and environmental problems.

The Panama Canal is an 80 Km long trench dug (over a period of 10 years) from one ocean to the other in the Republic of Panama, which is strategically located in the narrowest point of Central America. After 88 years of outstanding service, and now under full Panamanian operations, the Panama Canal is still the shortest and cheapest water transportation alternative from the Atlantic to the Pacific and vice versa [1].

The activities and functions of the Panama Canal fully depend on the quantity of water produced by the *Panama Canal Watershed* [2]. Due to environmental Watershed degradation, (caused by deforestation and sedimentation), decreasing water levels are a huge threat to the future of the Panama Canal and to a considerable percentage of the Global Commerce.

“The capability of the remaining Watershed rain forest to control water and soil movements is irreplaceable”[3]. On the other hand, deforestation in the rural Watershed may be not only the result of lack of education, but also the result of subsistence agriculture. As long as rural residents don’t have another alternative for subsistence they will keep migrating to new lands and keep practicing the only agriculture method they know (roza-quema): “grazes and burn”[4].

1.2 Need for this Study and Present Situation of Media

To manage the Panama Canal Environmental Problems, on June 24th, 1992, the Panamanian Legislative Chamber approved law No. 10 in which “Environmental Education becomes a national strategy to conserve and develop national resources and to preserve the environment”[5].

Considering that “Media” selection is a critical step in the environmental education communication process. It is to wonder why, the role of media, as instrument within this national strategy has not been evaluated to this date. After 11 years, media used in environmental education has not been formally identified; there are no Panamanian publications that define, explain or suggest what is the most suitable media or combination of media for environmental education in the Canal Watershed area or any area with environmental problems in Panama. [6]. Little has been research in this topic. Not even the environmental agencies that are presently conducting education programs in Panama have an instruction manual or a document that explain the process or the criteria used in media selection for a particular environmental program. Environmental educators mentioned “the need to document the environmental education process” [7], and said “scientific research should be supported more extensively in Panama” [8]. Generally, the way media is selected in national Environmental Agencies, NGO’s and International Agencies are based on the “personal intuition of the executor or program designer” [9]. Most media used presently have been used repeatedly and unchanged during the last ten years without revisions, evaluation or



Fig.1 Decreasing Water Level in the Panama Canal Watershed is a Huge Threat to the Future of the Panama Canal and to a Considerable Percentage of the Global Commerce.



Fig.2 Grazes and Burn are the Traditional Agricultural Technique Practiced by Watershed Residents.

recommendations for improvements. In addition to the need of research, there are other situations affecting media. For example: the workload that limits the time for discussion of media selection and strategies. Finally, the lack of media specialist makes difficult the preparation of support materials in any format; For a long time in developing countries (and Panama is not the exception), those responsible for creating the messages are also in charge of selecting the media and developing the support materials (posters, photos, pamphlets, etc) [10]. Unfortunately, in Panama, there are very few environmental educators who are also creative visual communication designers.

1.3 Research Objectives and Hypothesis

The general objectives of this study are: (1) to identify the influential factors on media access in the rural Canal Watershed, (2) to explore what media formats are accessible to the residents in the Watershed and which one is more useful for environmental education in the communities: mass or personal media.

We hypothesize that conventional meetings using (personal) media such as poster, book, flyer, brochure, have more access than mass media (TV, Radio, Newspaper). Therefore we need to find the supporting influential factors. The results of this study will hopefully play an important role in media selection and in the developing of support materials among the environmental program designers in Panama.

2. Methodological Approach

2.1 Research Process

Interviews and observation produced qualitative data and an exploratory pilot survey produce quantitative data. The Exploratory Pilot Survey was conducted in a cross-sectional manner.

From the lack of documentation on media and in order to build this study's background, the starting point was to conduct interviews to the people who are in charge of selecting the media for the workshops they prepare. These interviews helped us to have a panoramic idea about environmental education in the Panama Canal Watershed and also about the media used by them in transmitting knowledge to rural residents. It also helped us to create an instrument, a questionnaire to collect data among members of the communities. The instrument was designed to explore the factors suggested by staff members during the interviews and also to gather other suggestions from residents. It besides ranging 13 questions from 1 to 5 ("from completely disagree" to "completely agree") also had open questions expecting to obtain more qualitative information. It included variables such as age, gender, and occupation. To cover all the impressions from the residents, we also organized small focus groups in 4 of the 5 participating communities. We discussed the same questions from the questionnaire.

2.2 Research Location:

Why rural areas? The answer is because the most important rivers feeding the Panama Canal Watershed are born in and run through rural areas.

Secondary data from The Smithsonian Tropical Research Institute (STRI) and from the Panama Canal Authority (ACP) helped us to identify the rivers and forest area most sensitive to human transformation and migration. We compared wood cover and population maps to identify the prospective research areas. The selected area, as expected, was located among rural communities: The communities of Upper Occidental Watershed, located in Capira district, in the communities of Cacao, where the Trinidad and Ciri Grande rivers run by. These two rivers have an altered hydrologic state, due to the lack of forest in the area, only 18% of wooded cover. On the other hand Boqueron, Pequeni and Chagres river are within a protected area and present a more stable hydrologic state with a wood cover of 98% [11].

2.3 Sample Description:

Rural Watershed Farmers are partially responsible for the sustainable use of the land they own and consequently for the future of the forest and rivers running through their lands. Originally, this pilot was designed to include only 40 residents, strictly land's owner and adults. However, since the character of this pilot was exploratory we included some other members of the community such as teachers, various outside workers and students to grasp their impressions, too. A total of 79 subjects participated, 47 men and 32 women.

2.4 Socio-economical description of the target Area:

El Cauchal, Trinidad de las Minas, El Cacao, Ciri Grandre and Justo Arosemena are the 5 communities participating in the study. The first four belong to the Occidental Panama Canal Watershed (West) area and Justo Arosemena is the only one that belongs to the Oriental Watershed (East). El Cauchal and Ciri Grande are rural communities categorized in table 1 as extremely rural. Because they have extremely difficult access, only 4x4 cars can get there even in the dry season. And during the rainy season, access to these communities is possible only on foot or by horse when the river is not too aggressive. Consequently, electricity, tap water, a primary school, health center, public phone and other basic services are not available. [12]. El Cacao is a rural area but has a great advantage: the asphalt road. It has made possible the installation of electricity, the creation of a Junior Secondary



Fig.3 Research Site is Located in the Occidental Panama Canal Watershed in the Communities of El Cacao.

Research Location Criteria	Areas of Rivers in the Map					
	1	2	3	4	5	6
Wood cover	H	H	M	H	L	L
Population	L	L	H	L	L	L
Transportation	P	P	G	P	P	P
Education	L	L	H	L	L	L

H=high, M=medium, L=low, G=good, P=poor, □ Selected Area

Table1. Criteria for Research Site Selection. Secondary data from the Smithsonian Tropical Research Institute (STRI) and the National Environmental Authority (ANAM).

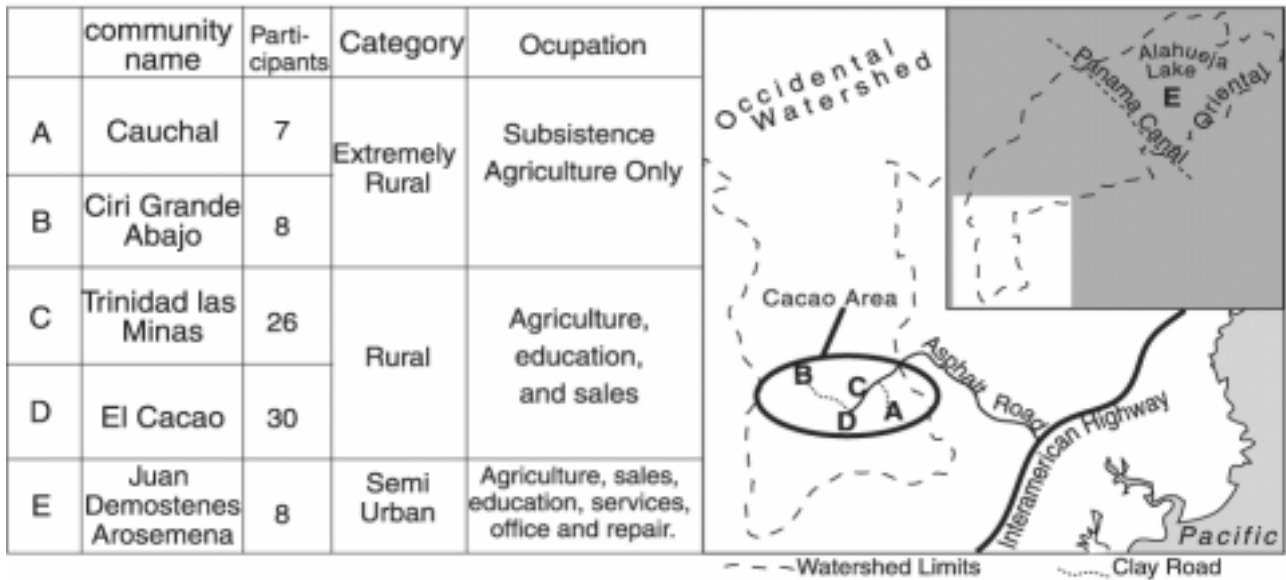


Fig.4 Communities Location in the Panama Canal Watershed, Total of Responders and Occupations by Areas.

School and the establishment of a Health Center that offers daily treatment to common illnesses. Trinidad Las Minas is located by way of the access road to El Cacao. Therefore, it receives its direct benefits such as: electricity (in houses close to the asphalt road) and accessibility to public transportation [13]. Juan Demostenes Arosemena, in the Oriental Watershed is a semi urban community. It has almost all the services that any urban city has: electricity, tap water, primary and full secondary schools, churches, health center, public and private transportation, internet, cable access, etc. Other urban needs, such as, universities, large hospitals and large shopping centers are supplied by the closeness to Panama's main urban cities: Panama City and Colon.

3. Results and Discussions

Four factors were found affecting media access in the rural communities of the Panama Canal Watershed: (1) community organization factor, (2) social and economical conditions factor, (3) resident's schedule factor and, (4) sense of play factor. They are not directly related to aspects of media such as: readability, color, speed, spacing, clearness, tone, leading, etc. They are conditions that make possible or not media access to residents, especially in the rural communities. These factors are intrinsically related among themselves.

3.1 Community Organization Factor:

It is the ability of a community to work together, plan and develop activities to achieve goals. These activities may be led by a variety of agencies carrying different messages. They may also use different media to convey them. In the same way, community organization is the minimum requirement to consider a community as beneficiary for an environmental project. Considering that Environmental programs with "the projects" are the main source of environmental education in rural Watershed, especially in the Occidental area [14], then, media access depends directly on the level of organization present in the community making possible to attract projects, which are the main source of media exposure to the rural farmers. In other words, if there is no project, there is

no media focused in environmental education in the communities. The more experience they have working together, the better chances they have in obtaining a project. Two international organization staff members commented: "...residents have to organize their community, otherwise it is difficult to bring any project there" [15], "...we are working with the same communities that Panama Canal Authority (ACP) chose for their Selective Reforestation Project because those communities have experience working together and that experience almost guarantees the success of any environmental education program" [16].

After collecting comments about media access in the communities from environmental organizations point of view, we needed to find out, the residents opinions about the origin of their media source and the community's motivation to access environmental informative media. We asked rural residents about the "importance" to be organized in the community. The majority "completely agreed" in the importance to have an organized community. We also asked them from where they learn about conservation. They said: "from the projects". Even more, they understand the minimum requirement from the Environmental Agencies. They said: "by working together they can achieve goals faster and easier with the help from the project". When a community organizes (in general), the objectives are basically the same. They said "they work together for" progress (43%), conservation (12%) and interchange of ideas (5%). Notice that conservation only represents 12% of the answers in Fig. 5. This may be discouraging for prospective project in the areas. But when we asked again about specific goals for community organization they placed in the first place water (38%), flora and fauna (22%), followed by income (14%), reforestation (11%). When adding the percentages of water, flora, fauna and reforestation, which are within the category of conservation, 71% becomes the new percentage for conservation that was only 12% in fig. 5. From comparison of figures 5 and 6, we could suggest that for subsistence farmers, conservation is synonym of progress. On the other hand, one goal was almost completely forgotten by the residents: water for the Panama Canal. Interpretation to this result can take two routes: residents either consider water for the Canal an obvious-simultaneous achieved goal or they have no concern about Canal's water needs.

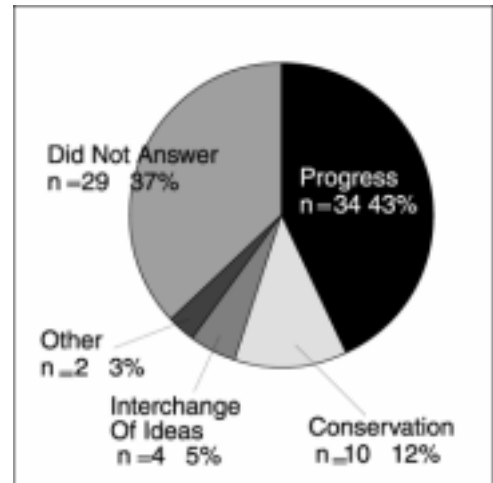


Fig.5 Objectives for Community Organization. Progress (43%) Seems More Important than Conservation (12%)

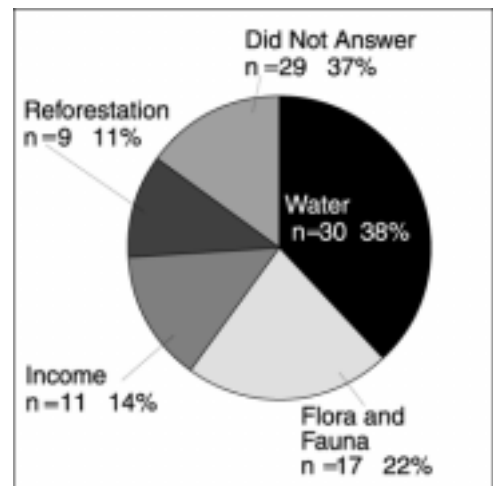


Fig.6 Specific Goals for Community Organization. Progress (43%) Seems to be Synonymous of Conservation (71%).

The best example to support the transcendence of the community organization factor is precisely in the Cacao area with the success of PROCCAPA, which is a project co-administered by the National Environmental Authority (ANAM) and Japan International Cooperation Agency (JICA). The Rural Participatory Diagnostic (DRP in Spanish) was used to identify the community environmental problems from the farmer's point of view and with their full participation. This methodology, fairly new in Panama, also uses personal printed media (5x7 white and color cards, role manila and markers) to create with the resident's participation several visual tools such as: Community Map, Transect Map, Community's History, Venn's Diagram, Agro Calendar and the Problem's Tree which later are re-enforced in the demonstrative community plot. "The creation of these visual tools, (JICA's project coordinator said), by the own residents gives them a forum for the exchange of ideas and environmental information, informs rural people about better techniques for sustainable agriculture, supports the introduction of income-generation activities and foster gender equality" [17].

3.2 Social and Economical Condition Factor:

It is the group of communal characteristics and (basic) services capabilities, which empower members in a community to work together in spite of distance, personal differences and geographical adversity. These characteristics and capabilities represent the physical, tangible obstacle or likelihood to media access in a rural community. It is associated with media access in a physically direct way. For example, the community must have at least clay road, a send or waterway to transport environmental education staff and the materials to be used for the workshops. Usually, personal printed media because there is no electricity in most of the rural communities in the Watershed. Another example is the availability of a gathering place with at least a roof and drinking water. Economical conditions also determine the education level in the community and the residents' abilities to use or respond to a certain Media. For example, the written instrument for this pilot was more difficult to use in Ciri Grande and Cauchal (extremely rural). When we asked, if they wanted to answer the questions written or verbally, they preferred verbally, especially residents older than 45 years old. Many would say: "I don't like to write much",



Fig.7 Problem Tree, a Personal Printed Media Elaborated with the Participation of Community Residents. Japan International Cooperation Agency (JICA) and National Environmental Authority (ANAM).



Fig.8 In the Community Demonstrative Plot, Residents Apply the Knowledge Received During Workshops.

“I take too long to write”, “I know how to write and read but ...” This may explain why the number of residents who did not answer open questions was very high, (Fig. 5, for example). The ones that did write the answers in the communities of El Cauchal, Ciri Grande and Trinidad de las Minas took between 30 to 45 minutes. Residents from el Cacao and Juan Demostenes Arosemena took between 15 to 20 minutes. This has a great importance related to media. One workshop for example, may not have positive results if the media selected requires writing from the residents’ part in those communities where they don’t practice writing communication very often.

In another dimension of the Social and Economical Condition factor, Juan Demostenes Arosemena, which is a semi-urban community, is the only one that never meets for community’s needs. El Cacao, which is rural but has already all the basic services meet less regular than before. From these findings, we then suggest that *development of social economical conditions in the rural communities reflects an inversed proportional relationship to community organization*. Once the main goals of road construction, drinking water and centers for basic services are achieved, the need for community organization diminishes and the dependency on the projects for “progress” or conservation, too.

3.3 Community Schedules Factor:

It is the combination of family, agro and social activities schemes shared by members of a community; some of these schemes are inherit by traditions and some of them are conditioned by natural elements, especially the rainy and dry seasons. Media access to residents depends and is possible in the way that they do not interfere with these community activities schemes. This is a factor to be considered in special by broadcasted media coordinators and workshop schedule’s planners. In the rural areas radio is undoubtedly one of the main sources for information and entertainment. We found that the majority of the responders (85%) do listen to radio at least one hour a day. But unfortunately, this fact probably imagined or known by radio station managers is not taken

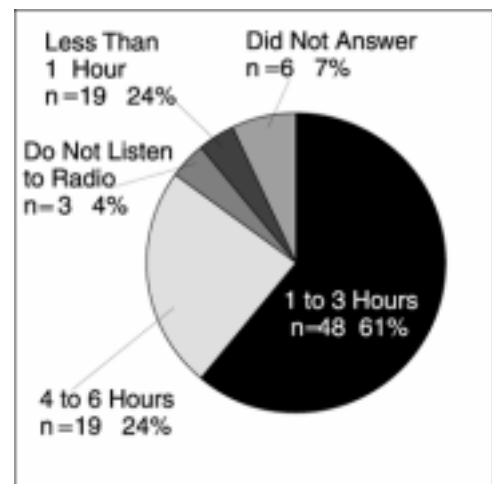


Fig.9 Even Though 85% of the Residents Listen to Radio at Least One Hour Daily, Regular programs do not Have Environmental Content.

advantage of with environmental education purposes. We could not identify any radio station (AM or FM) that broadcast in a regular space for environmental education issues. Most radio stations broadcast environmental matters only within “news” format when something they consider relevant happen. This does not happen in a regular-daily basis and not all the time the environmental news are concerned to the Panama Canal Watershed. We asked Gladys Valdez, staff from the National Environmental Authority (in Chorrera City, West of Panama City, close to the research site) why as “accessible” as radio is among rural residents; it is not used as environmental media? She answered: “we can not afford I, all mass media are out of our budget possibilities” [18]. But even if they do, even if an environmental education radio program is broadcast every day, in the most convenient

“schedule for the rural communities”, specialized in environmental conservation, then we wonder about its benefits, because it misses a very important aspect in the environmental education philosophy: the supervised practice [19]. Another importance of the community schedule factor is that most of the rural residents who live in communities with difficult access do not practice another income generating activity, only agriculture. Therefore, in order to guarantee attendance, plot cleaning, planting, recollection and other agricultural schedule should be considered by all workshops planners.

3.4 Sense of Place Factor:

This factor influences the residents’ motivation to participate in any project’s workshop and consequently to access their available Media. Supported mainly by secondary, historical data and by reports from Panamanian environmental agencies, exploration of this (not so obvious) factor can help Media developers to target the resident’s motivation. Authors state that, “recently, sense of place has been integrated into Environmental Education (EE) because, it is assumed that a person with a well-developed sense of place will act responsibly to protect the environment in that place” [20]. Residents need to feel identify with the Watershed in order to protect it. Around 50 years ago, the Panama Canal Watershed used to be a dense rain forest with a population a little over 20, 000 people [21]. This population augmented more than five times over the last 50 years, been migration a powerful fuel for this growth. Heckadon (1984) explains that after the construction of the Panama Canal, farmers from the “interior” migrated to the West and North of Panama City, looking for cheap, land to practice agriculture and stockbreeding [22]. Unfortunately, stockbreeding in Panama utilizes great extension of open lands (needing the forest to be cut). And Watershed lands are not suitable for agriculture, seriously intensifying the dependency of this growing population over their surrounding forest for subsistence. As a result, the environmental repercussions are usually negatives: forest destruction, land degradation, migration (again) and for instance lack or weakening of the sense of place factor. Henri F. Pittier, a scientist from the Smithsonian, wrote 92 years ago, about land condition in the Trinidad and Ciri Grande Rivers’ (Cacao area): “We climb 30 miles crossing some of the new swamps in the upper Gatun and other 10 between high ravines and flat forests where the most abundant of all trees is the Gray Pioria Copaifera, one of the most certain indicators of bad land in this region”[23].

In general *age and gender* had no significant difference in the resident’s answers. *Occupation* did mark a difference, especially in the sense of place factor. For example: teachers working in the secondary school were not residing in el Cacao. They did not feel the environmental problems related to them as much as the subsistence farmers. The same situation was noticed in the Justo Arosemena residents who perform various works other than agriculture. They have jobs in Colon and Panama City. Even though they live in the Watershed area they do not feel part of the environmental problems: “you should go to interview the Indians and the farmers close to the rivers, they are the one cutting all tress”.

4. Conclusions:

First, community organization is the main influential factor on media access in the Panama Canal Watershed because it is the first condition from environmental organizations to consider a community as beneficiary of an environmental project. Environmental projects are the main source of media in the communities.

Second, community's socio-economical condition is the factor that represents the physical aspects that make possible Media access in the communities. For example: road or waterway access and a gathering place.

Third, resident's schedule is a factor generally overlooked. Even though a large percentage of the rural communities listen to radio at least one hour per day, none of the Panamanian Radio Stations broadcast an environmental program regularly.

Finally, land productivity's improvement through environmental education projects fortifies the resident's identification with the Watershed and the sense of place factor, augmenting the resident's motivation to participate in project and consequently to access the available media.

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6. Appendix

6.1 Working definitions:

Media: medium, a tool for information transmission in mass or personal communication: Ex: radio, CD, pamphlet, magazine, etc.

Personal Media: medium or tool for real time communication, used individually or by small groups: Ex: pamphlet, video, Internet, poster, book, etc.

Oriental and Occidental Watershed: Two main areas that compose the Panama Canal Watershed. The Canal itself divides them into East (Oriental) and West (Occidental Watershed). Panama City and Colon are in the Oriental Watershed which is more urban than the Occidental.

Rural Watershed Area: geographic area with difficult access, a few only or none basic services (primary school, tap water, health center, electricity, etc) or the majority of their residents earn less than \$100 dollars a month.

Media Access: is the capability of media to reach its target. In rural communities the media access can be conditioned by several influential factors.

Influential Factors: are situations and conditions that augment or decrease the possibilities of an expected outcome.