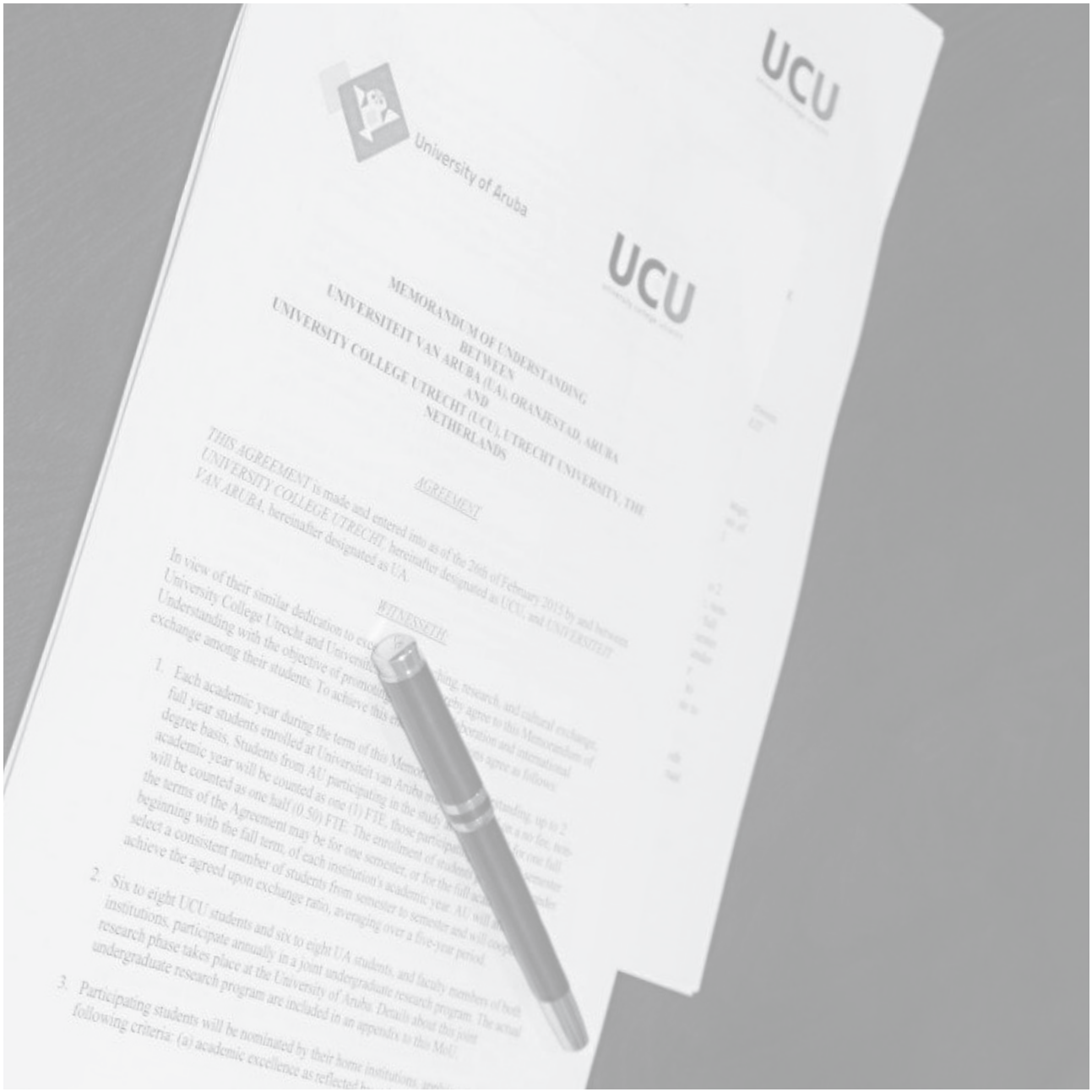
U A U C U

Undergraduate Student Research Exchange *Collected Papers 2015*


University of Aruba
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MEMORANDUM OF UNDERSTANDING
BETWEEN
UNIVERSITEIT VAN ARUBA (UA), ORANJESTAD, ARUBA
AND
UNIVERSITY COLLEGE UTRECHT (UCU), UTRECHT UNIVERSITY, THE NETHERLANDS
AGREEMENT
WITNESSETH:

UAUCU

Undergraduate Student Research Exchange

Collected Papers 2015


University of Aruba


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Undergraduate Student Research Exchange

Collected Papers 2015

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Introduction

In this publication you will find papers and reflections that were written by the ten participants in the UAUCU undergraduate research exchange project 2015, a project that offers students from University College Utrecht (UCU) and the University of Aruba (UA) the opportunity to conduct research in a multidisciplinary international student team. All students, 5 from each university, have submitted papers that reflect the diversity of approaches that the students have followed.

On the following pages you will find papers on linguistics, economic development, communication, nature conservation, renewable energy, law, cultural identity and the influence of tourism. While reading you will notice that the research was in different stages of completion at the time of publication of this book: for some of the participants, the field research is completed but data still need to be interpreted, for some the field research still has to start, and for some, the research and analysis have been completed. Based upon this fieldwork the student will write their bachelor's or master's thesis. The research interests of the students are diverse but show a common interest in sustainable development and it is clear from the final products that the collaboration in the multidisciplinary team has influenced their approach to their research topics.

Every student has written a reflection on his or her experiences during the project that you will find in this book. It is an interesting experience to read the reflections of the participants and to see how strong the collaboration and support has been among the students. These reflections tell you more about the core of this project: it is not only about doing research and about making student research meaningful; it is also about the realization that we can achieve more if we approach problems from several perspectives at the same time, and work together in teams that are multidisciplinary and as such complementary.

Looking back at this first year of the project, one realizes how many people have been involved. It is impossible to name everybody; many people are crucial to the success of a project like this. For everybody who has been part of this project as (guest) lecturer, supervisor, manager, initiator, facilitator, student, interviewee, respondent, guide, coach, or mentor: thank you very much for your support!

Eric Mijts & Jocelyn Ballantyne
Project coordinators UAUCU

The UAUCU undergraduate research exchange program

The UAUCU undergraduate research exchange program started in 2014 as a joint effort between University College Utrecht (UCU) and the University of Aruba (UA). The objective of the collaboration between the two institutes is promoting academic collaboration and international exchange among their students. In the Joint Undergraduate Research project, students from UA and UCU, faculty members of UA and UCU/UU, and other (mainly Aruban) stakeholders work together in annual cycles of joint research about themes and issues that are relevant to Aruban society. The supervision of the students focuses on the development of interdisciplinary and multidisciplinary skills in an intercultural setting. Students are stimulated to work together and to rely on peer-to-peer support and feedback cycles. The program is designed to develop the necessary skills and attitude among participating students. This approach requires mentors and supervisors to work closely together on creating flexible conditions that help and facilitate students to find ways to collaborate and to improve the quality of their work, and on creating a safe environment in which the students can experiment.

Students in Utrecht are prepared during a summer course Caribbean Studies at UCU in June, co-taught by faculty members from UA and UCU. In fall, the Aruban students that take part in the program are recruited, selected and prepared. From mid January until mid April, the students from Utrecht visit Aruba and the students from both UA and UCU conduct their field research. The students have regular joint progress and feedback meetings and the three-months period is closed off with a seminar. After this the students complete their thesis or final papers in May.

In January an academic program is organized that focuses on environmental, social and developmental issues in the Caribbean. During these field trips students are confronted with - sometimes painful - issues that affect small island developing states, success stories and logistical challenges. These field trips are the right time to address the way students can contribute to change as well as for everybody to show who they are and what they are interested in, and to find ways to support each other. Later on during the program the students are gradually challenged and coached to develop their own field trips and to organize their own closing seminar for the project.

In March 2015 UCU an UA have agreed to continue the project for at least three years.

This project was made possible with the financial and logistical support of the Government of Aruba, University College Utrecht and the University of Aruba.

Impression of the project by the dean of University College Utrecht

In February this year I attended a progress meeting, at the University of Aruba (UA), during which both UA students and UCU (University College Utrecht) students presented the progress of their individual research projects. They had been working on those projects since mid January. Although each student was doing an individual project, it became clear that they worked together a lot: helping each other, and brainstorming together about the usual issues of undergraduate research: how to limit the topic, methodological choices, how to gather sufficient data. The student group made it very clear that they do not perceive themselves as consisting of two subgroups: one Aruban and one "Dutch" (although not all UCU participants have Dutch nationality). Support and collaboration networks run criss cross through the group, and the group as a whole expressed a strong sense of unity. The group of students does not want to be addressed as the "UA-UCU" project group, but rather as UAUCU group, without the hyphen.

It is an exciting and formative experience to do undergraduate research: real research that helps to answer questions from partners in the "real world", in which students can practice what they have learned in terms of subject knowledge and research skills. It is even more exciting and formative to do this in a team of students of diverse backgrounds and study programs, in a collaborative spirit. This is exactly what is happening in the UAUCU joint undergraduate research project. This first year of the projects promises to be very successful. I hope that it is the first joint project of its kind of a series of many more years of productive and successful collaboration.

As the Dean of UCU, I want to thank all members of Faculty, both at UA and at UCU, who have given their energy and support to this project of joint undergraduate research!

prof. dr. Rob van der Vaart
Dean University College Utrecht
Honours Dean Utrecht University

Florianne Sollie, University College Utrecht

Only in Aruba…

Conducting my research in Aruba was hard work. However, it's better to work hard in Aruba than anywhere else in the world, if you ask me. During the first few months of 2015, I was allowed to work (and enjoy some free time) in the country where winter doesn't exist, where I tend to be wide awake at 8:00 and tired at 22:00, where the wind hardly ever stops blowing and where you shouldn't want that anyway. Way too hot. The country where people laugh about the concept of 'loitering youth' (doesn't everybody chill outside?) and about fines for inappropriate honking. Honking is never inappropriate. The country where people rent out their garden for parties instead of a room. Where people speak and think in all languages, and where you don't have to worry if you ever forget a word - just pick one from another language and people will understand. The country that manages to be a desert in the middle of tons and tons of water, but where you can still drink the water from the tap. The country where you can feed iguanas in the park, and where you shouldn't ask for an appointment in two months - they will invite you today. You don't have time today? See you tomorrow, then. The country where you don't catch a cold because of the weather, but because of the air conditioning, with which you develop a love-hate relationship because you also want to study or sleep sometimes without your body losing 8 liters of fluid. The country where the speed limit is 80 km/h for all traffic (except maybe for the planes that fly to and fro) and the country that sometimes seems smaller than the giant cruise ships that discharge loads of tourists onto the island every day. The country where 'I'm going to the Chinese' doesn't mean 'I feel like eating soggy noodles', but 'I'm going to the supermarket', and the country that the Netherlands should learn from what a multicultural society really is - and how to manage one in a normal way. The country where information is not on the internet or in any other place you would expect it. But don't you ever worry - your friend's uncle's neighbor will know someone whose cousin-in-law will be more than happy to help you out. The country where people sometimes sing when you wouldn't expect them to… The children on the playground. The bus driver waking up during his first morning ride. The little old lady at the laundromat. The kite surfer who just fell face-down in the water a few meters away. The gardeners in the park. And of course, the girl who did her research on this island and had the opportunity to enjoy all this for three beautiful months.

Language and Education in a Multilingual Society:

Text comprehension and language attitudes among Aruban high school students

F.C. Sollie, April 2015.

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1. Introduction

1.1. Multilingualism

Around 6000 languages are spoken throughout the world. These languages are spoken in only 190 countries, which means that multilingualism is quite a common construct (Shin, 2013). Multilingualism may be defined as "having a repertoire of languages or varieties at one's disposal" (Weber & Horner, 2012). It is common in linguistics to define languages as L1, L2, L3 etc., according to the order in which an individual started to learn the languages or the order from strongest to weakest language competence. This is a bit of a problematic way to portray reality, as boundaries between L1, L2 etc. are not always clear, and L1 in one social context does not have to be L1 in another social context (Weber & Horner, 2012). It is necessary to keep this in mind when considering literature on bilingualism or multilingualism. While noticing this nuance, the terms 'multilingualism' and 'L1/L2/ etc.' will be continued to use in this paper for practical purposes.

The same problem is present for the construct of 'mother tongue' or 'native language'. In some literature mother tongue is defined as the language first acquired by a child, whereas in other literature it is referred to as the preferred language in a multilingual situation (Tulasiewicz & Adams, 1998). For the present study, the concept of 'mother tongue' will not be used. Instead, there will be differentiation between constructs such as 'most important home language', 'best language', or 'preferred language' in several contexts.

Aruba is a multilingual society, and its four main languages are Papiamento, Spanish, English and Dutch. During the census in 2010, 68% of the Aruban population indicated that Papiamento was their most important home language. For 14% of the people this was Spanish, for 7% English and for 6% Dutch (Censo, 2010). It is worth noting that children in Aruba are not exposed to only two languages, but to four languages at the same time. This may mean that not all literature on bilingualism (most literature is on bilingualism as opposed to multilingualism) is applicable to the multilingual situation in Aruba.

1.2. Language and education in Aruba

As a consequence of multilingualism, more than half of the people in the world are taught in another language than their home language (Rymenans & Decoo, 1998). There are several different systems in which this is the case. The system used in Aruba is called *total immersion*, which means that the language of education in all domains, Dutch in this case, is another language than the home language of the students (Beheydt, 2008). It is interesting that in Aruba the home language is often not the dominant language,

Papiamento (for roughly 32% of the people (Censo, 2010)). This means that for many people there is a home language (e.g. Spanish), a second language that is dominant, Papiamento, and a foreign language used in education, Dutch (Beheydt, 2008). For most Aruban teachers, Dutch is a foreign language as well: one that they only learned at school or in courses (Van der Linden-Maduro, 2008).

Despite the use of the total immersion system, students from Aruba who proceed to study in the Netherlands encounter problems because of their low levels of language proficiency in Dutch (Rutgers, 1997). There are several reasons why these levels of proficiency are often low.

According to Beheydt (2008), children in Aruba are regularly given the feeling that their home language is inferior and he argues that the psychological effects of this may severely impair learning abilities. Weber & Horner (2012) also discuss possible personal effects of the current situation, focusing on the way of testing. They argue that most language assessments are based on monolingual standards and are therefore unsuitable for multilingual children. They can lead to false diagnoses of language delays or impairment, which in turn may have psychological consequences for the students. Moreover, monolingual assessment in the dominant language reinforces the view that the multilingualism of students is a 'problem' (Weber & Horner, 2012).

The issue of motivation to learn Dutch seems to be another problem in Aruba, and Beheydt (2008) discusses two reasons for this. One is that many children have a negative attitude toward Dutch because learning it is often seen as a foreign and intrusive obligation. The other reason is that even in education Dutch does not always seem to be necessary: in Aruba, a Dutch explanation is often followed by one in Papiamento.

According to Swain (1985, cited in Rymenans & Decoo 1998), it is necessary for learners of a language to test their own language use based on communication with others. Beheydt (2008) explains that this opportunity is minimal in the case of Dutch in Aruba: there is hardly any chance for the children to practice speaking and writing outside the school, because there is hardly any contact with Dutch in non-teaching situations. Already in 1981, a paper appeared by Instituto Lingwistiko Antiano (ILA) stating that Dutch was a 'phantom language' on the islands: an official language that did not function as one. It was described to exist next to the real, 'living' languages: Papiamento and English (Rutgers, 1997).

1.3. The present study

The present study intends to focus on multilingualism rather than bilingualism: all four of Aruba's dominant languages are taken into account. The main research question is: 'How do the different languages influence performance on a reading comprehension test?' In order to answer this question, four groups of students were given the exact same text, but each in another language. Each group read the text in one of the following four languages: Dutch, English, Spanish or Papiamento. Comparisons were made between performance on literal and inferential comprehension, and between two different levels of high school education (MAVO and HAVO-VWO). Students also answered some questions about their language use in several situations and about their attitudes to these languages.

2. Methods and materials

2.1. Materials

2.1.1. Texts

Two texts were used. One was retrieved from the website of a Dutch children's newspaper, and the other from a Dutch 3-VWO school book. Both texts were slightly shortened and simplified in order to make them more understandable for the target group. The texts were about gender-neutral subjects: strange baby names and goldfish. The original Dutch texts were translated into English, Spanish and

Papiamento by native speakers of these languages. Subsequently, they were translated back to Dutch by native speakers of Dutch, in order to control for translation mistakes. In the end, the group of translators, of whom all were proficient in at least two of the four languages, checked all the translations together. Great care was taken to keep the texts as similar as possible with regard to grammatical constructions and style. The same translation procedure was carried out for the test and the questionnaire described below.

2.1.2. Test and questionnaire

The reading comprehension test consisted of six multiple choice questions in the same language as the text. The choice to formulate multiple choice questions was made for practical reasons: they are easy to code and compare (Lee & Schallert, 1997; Cromley & Azevedo, 2007). Three of these questions tested memory, or literal comprehension: the answers could literally be found in the texts. The other three questions tested inferential comprehension. Answering these questions required a deeper understanding of the text. There were four answers to each question for the students to choose from. Answers were either 'right', 'close' or 'wrong'. 'Close' answers contained information from the text, but were not the right answer to the particular question. 'Close' also meant in some cases that it was a plausible answer if one had not read the text. The 'wrong' answers were funny or bizarre answers completely made up by the author, without any information that could be found in the texts.

This reading comprehension test was followed by a small questionnaire with 16 questions about the test itself (e.g. whether they liked the texts, how they think they performed etc.), and questions about language background and attitudes (e.g. 'what is your most important home language', 'which language do you prefer to read in' etc.). This questionnaire was in Dutch for all students, because it turned out to be highly impractical and time consuming to offer them the option to choose a language. The answers to these questions were used to test comparability of the groups, to look for correlations between these variables and performance on the test, and to explore part of the students' language attitudes.

2.2. Participants

Participants were first-year students from four different high schools in Aruba (N=402, 159 male, 234 female), who followed MAVO (N=208) or HAVO-VWO (N=194) education. The choice was made to conduct the experiment with first-year high school students, because of high dropout rates reported in the existing literature (Beheydt, 2008; Pereira, 2008). It was assumed that the dropout rates would be lowest in first grade. The choice for high schools as opposed to primary schools was made in order to be able to differentiate between students from different educational levels.

The schools were located in two cities: Oranjestad and San Nicolaas. The HAVO-VWO school was selected because it was the only option to test VWO students on the island. As far as MAVO schools are concerned, all school boards on the island were contacted and the schools of the ones who responded were selected for the experiment. No participants were excluded. The only potential participants who did not take part, were the ones who were absent on the testing day. Participants who came in late still took the test.

2.3. Procedure

Groups of students were randomly assigned to a reading language. On the testing day, students were informed who the researcher was, and were told that their help was needed for her to be able to get her diploma this year. Subsequently, they were instructed to carefully read the two texts once and then hand them in. Upon handing in the texts, they would receive the test and questionnaire. This choice was made based on a study by Johnston (1984), which revealed that performance improved when readers could not refer back to the text when answering the questions. More

importantly, taking away the text removed bias due to prior knowledge (Johnston, 1984).

It was repeatedly made clear to the students that they would not receive a grade, and that making mistakes was not a problem: the research was as much about what they would understand, as about what they would not. Nonetheless, they were encouraged to do their best and not to leave any questions unanswered. The concept of anonymity was also explained to the students: they were not allowed to write down their name and they were promised that nobody in the school would read their answers.

3. Results

3.1. Overall performance

Performance on the test was analyzed with one-way ANOVAs in two different ways. First, only the right answers were taken into account, as they are in the school system: an answer on a multiple choice test is either right or wrong. Second, 'close' answers were differentiated from wrong answers in order to nuance the results.

When looking at the amount of right answers, there were significant differences between the languages ($F(3, 401)= 14.6$, $p<0.01$). Bonferroni post-hoc tests revealed that students scored highest when they had read the text in English, second in Dutch, third in Papiamento and fourth in Spanish. The differences were significant between English and Dutch ($p<0.05$) and between English and Papiamento ($p<0.01$) and English and Spanish ($p<0.01$). Students scored lowest when they had read the text in Spanish and the differences with Papiamento ($p<0.05$), Dutch ($p<0.01$) and English ($p<0.01$) were all significant. The differences in performance between children who had read in Dutch and in Papiamento, were not significant.

Also taking the 'close' answers into account revealed a slightly different picture. There were still significant differences between the language groups ($F(3, 401)=14.4$, $p<0.01$). Also, the order of the scores did not change: students still performed best in English, second in Dutch, third in Papiamento and fourth in Spanish. Differences between English and Papiamento ($p<0.05$) and English and Spanish ($p<0.01$) were still significant. The difference between English and Dutch however, lost its significance when the data were analyzed this way. Differences between Spanish and the other languages all became significant at the $\alpha=0.01$ level. The difference between Dutch and Papiamento was still not significant.

The difference in results between these two ways of analyzing the data shows that there is not only a difference in right and wrong answers, but that language also influences whether students are ‹close› or completely wrong.

How can this pattern of performance be explained? First of all, considering that in 2012 tourism only accounted for 66.6% of the GDP and 68.0% of total employment of Aruba (Ridderstaat, Croes & Nijkamp, 2014), one can imagine that the use of English on the island has increased. Between 1986 and 2011, on average 63.3 % of tourists have been visitors from the United States of America (Ridderstaat et al., 2014). English also reaches the people in Aruba via modern media. There is no research yet on how often people in Aruba watch English television shows or listen to English music. However, a short assessment of the television channels that are offered with a basic television contract in Aruba, reveals that 54 of the 81 channels are for an English-speaking audience. This is 66.7% of the channels, as opposed to 9.9% for a Spanish speaking audience, 6.2% for a Dutch speaking audience, and 8.7% local Aruban channels (Website Setar, 17-03-2015). This dominance of the English language in Aruba's economy and on Aruban television may be part of the explanation for the relatively high level of English comprehension by the students in the experiment. In other words: English is a language that is very much alive in Aruban society.

Table 1 shows some results of the questionnaire for a clearer view of the role that English and other languages play in the students' lives. It shows that English comes second for most variables, except for favorite to read, where students mentioned English most often, and dominant home language, which was English for the smallest percentage of the students.

Table 1: Roles of the 4 dominant languages in students' lives

	Papiamento	English	Dutch	Spanish
Best language	38.6 %	26.4 %	18.9 %	14.9 %
Home language	48.5 %	11.9 %	19.4 %	17.4 %
Favorite to speak	43.3 %	32.3 %	11.7 %	10.9 %
Favorite to read	10.7 %	47.0 %	35.6 %	6.0 %
Use most with friends	72.6 %	21.4 %	5.2 %	0.5 %

The results for 'home language' in Table 1 may be surprising, due to some considerable differences with the findings of the Censo (2010). See Table 2 for an overview of the differences. The most striking differences are for Dutch and Papiamento: much less students chose Papiamento and many more chose Dutch. This can be explained by the nature of the study sample: only MAVO and HAVO-VWO students were included, not EPB students. It may be very well be the case that Dutch speaking children are overrepresented in the higher levels of education: they have an educational advantage due to higher levels of exposure to the instruction language.

Table 2: Differences between findings of Censo 2010 and the present study: most important home language

	Papiamento	English	Dutch	Spanish
Present study	48.5%	11.9%	19.4%	17.4%
Censo 2010	68 %	7%	6%	14%

3.2. Comparing total scores between MAVO and HAVO-VWO

Scores between MAVO students and HAVO-VWO students differed significantly ($F(1, 401)=22.5$, $p<0.01$). As expected, HAVO-VWO students scored higher than MAVO students. However, the differences were not significant for all languages. For Spanish and Papiamento, there were no significant differences in score between the education level groups. For Dutch and English, differences were significant at the $\alpha=0.01$ level.

The fact that the difference was not significant for Papiamento but that it was for Dutch, is very interesting. Papiamento is the dominant language on the island (and for these students, see Table 1). This may mean that if school materials are offered to these kids in the dominant language, they do equally well. However, if school materials are offered in Dutch, there are suddenly differences in performance on the exact same task. This finding suggests that students with equal abilities in some domains may end up in different educational levels because of a difference in abilities in the language domain. To take this even further, one may argue that the current instruction language prevents students with other talents than language, from exploring and developing these talents at the right level.

3.3. Differentiation between literal and inferential comprehension

There were significant differences in performance for both literal comprehension ($F(3, 401)=15.6$, $p<0.01$) and inferential comprehension ($F(3, 401)=7.0$, $p=<0.01$). Post-hoc tests revealed, however, that the significant differences for literal comprehension only exist between Spanish and the three other languages ($p<0.01$). There were no significant differences for literal comprehension between any of the other languages. The post-hoc results of inferential comprehension, on the other hand, show a similar pattern to students' test performance: there is a significant difference between English and Papiamento

(p<0.01) and English and Spanish (p<0.01), and a non-significant difference between English and Dutch. All other differences were insignificant.

These results suggest that the average level of Spanish of the students is so low, that they have a hard time both understanding the texts and rote learning the content. As far as the other three languages are concerned, literally remembering the texts was not the problem that caused the differences in scores: it was the deeper understanding of the text. As the goals of education obviously reach much further than rote learning (do we not want to equip these children with actual skills and knowledge?), this is an alarming finding - students understand (not memorize, understand) less in the language they are being taught in (Dutch), than in another foreign language: English.

3.4. Correlation between text language and text ratings

Mean rating scores between the two texts did not differ at all: both texts were rated 2.09 ('quite liked it') on average. For text ratings across language groups, a pattern of significance occurs that is similar to performance: students liked the texts significantly more in English than in Papiamento (p<0.05) or Spanish (p<0.01). Texts were also rated higher when they had been read in English than when they had been read in Dutch, but not significantly so. The exact same texts were rated significantly lower by the students who read them in Spanish, than by the ones who read them in English (p<0.01) or Dutch (p<0.01).

These findings show the effect of language from another perspective. Students are more interested in the contents of the text in some languages than in others. In addition, it was found that students performed significantly better on the test when they were allowed to read in their favorite reading language ($F(1, 401)=26.2$, p=0.01). Consult Table 1 for an overview of the students' favorite reading languages.

3.5. Self-reported effect of language on performance

Students indicated on a scale from 1 to 4 how well they thought they had performed on the test. The next question was why they thought they performed this way. The answers were coded according to whether students mentioned language or not, and whether language was considered to have had a positive or negative influence.

Of the students who read in Spanish, 56.8 % indicated that language was a reason for their performance, either positive or negative. This was significantly more than for the other languages ($F(3, 401)=38.4$, p<0.01). 45.3% of the students who read in Spanish recognized that they did not do well because of the language. For English and Papiamento, only low percentages of students thought of language as an influential factor (9.7% and 11.8%, respectively). For Dutch, however, none of the students thought of language this way. From the literature described previously and from the present study, however, it is known that the Dutch language as a language of instruction does influence students' performance. As students are clearly not aware of this influence, they may attribute moments of failure fully to their own competence, whereas in some cases they should – at least in part- be attributed to the linguistic situation.

4. Discussion & Conclusion

The present study has compared students' text comprehension in Dutch, Papiamento, English and Spanish. The results show that English is the reading language in which students understand most of the texts presented to them and that it is the reading language that a majority prefers. Based on these results, some recommendations can be made concerning further research and language policy. The recommendations made below are suggestions based on the existing body of research and the present study. It is important to note that more research is still to be done concerning this topic and the feasibility of the ideas presented below.

The existing literature on the linguistic situation in Aruba focuses mainly on two languages: Dutch and Papiamento. The present study shows that this focus has been too narrow, as English has shown to play a large role in both Aruban society and the students' lives. Instead of considering English yet another language to deal with, it should be seen as a gateway to new opportunities for several reasons. First of all, there are many education materials in English that one could choose from. Second, Aruban students like English and, third, they are -already- best at reading in English. Also, English is important to the Aruban economy, considering its focus on tourism from the US. Finally, English gives students the opportunity to study virtually everywhere in the world, including the Netherlands, where English is the language of literature and instruction for many study programs.

Papiamento is also a very important language to the students. A majority prefers to speak Papiamento at home and to their friends, and indicate that this is their best language. As described earlier, it is important for students' feelings of self-worth and identity to value this language, also in the education system. There are, however, very few teaching materials in Papiamento, especially in the Aruban variety of the language, and it would be very expensive to have them developed for such a small population. A solution might be to use teaching materials in another language (for instance in English), but to be less strict about the language that has to be spoken in class. The reality is that Papiamento is used in education, and that it helps the students understand the material better. It would be a much more realistic policy if Papiamento became one of the official languages of instruction in non-language classes, or if schools would officially allow the use of Papiamento in class.

Considering Aruba's ties with, and orientation towards, the Netherlands, Dutch is a language that should not be ceased to be offered in school. It should, however, be taught as a foreign language, not as a mother tongue, because in reality it is a foreign language to most of the students (Beheydt, 2008).

The instruction language has been a subject of debate for a long time already. Aruba is currently struggling with high dropout rates, failure and repetition of classes, and a low general education level of around 70%. Studies that were conducted on these problems have identified Aruba's educational language policy as one of the main causes of these problems (Pereira, 2008). The same problems have been found for students who are taught in a foreign language that is not very much 'alive' in their community elsewhere in the world (Malekela, 2010; Langenhoven, 2010). It is clear that these kinds of policies are detrimental to meaningful learning, and that changes are necessary. The present study has contributed to this body of research with similar findings.

5. Acknowledgements

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Narratives

I waited on the doorstep for a while after knocking for yet another time, but nobody seemed to be home. It is the correct date, time and location, right? My agenda indeed confirms. I take a few steps back to properly see the house in its full glory, as if this would help me verify that I was at the right place. Next to the house, behind a little hash, I noticed three geese walking towards me; a scant comfort. Surprisingly, a man appears around the corner too; he puts his gardening tools in an old wooden cabinet that is standing in the garden behind the house, turns around and smiles; "Bon bini, you must be Sil." I think I am at the right place.

Coffee and empanadas are served and we take a seat on the other side of the house, outside. The delicious smell of our snacks has also drawn the attention of the dogs in the house, while the caged bird sings her songs. The strong wind that rushes through the many trees creates a crackling sound, as if we sit next to a fireplace. I feel at home instantly. His wife politely meets and greets me, then leaves us to it.

What follows is barely an interview; he quickly feels comfortable enough to let me in on his personal life and tells me where he grew and how that was like. He shares the lessons he learned from his parents that he still applies today and his personal view on issues related to Aruban culture, authenticity and tourism. Caught by curiosity, I absorb all the knowledge and experiences he lets out on me. There is nearly no need for me to pose any questions; we simply have a conversation. Halfway through we charge ourselves with another cup of coffee and a piece of plum cake. I slowly become used to the fact that caring is the norm in Aruban society.
We talk some more and touch upon all the issues relevant for my research and beyond. My brain feels enjoyably baked and is eager to take a fresh dip in the sea; afterwards I will write everything down in order to properly recapitulate what I have just learned.

I think the main thing that I have realized from this experience during the past three months and doing this kind of research, is that the concept of narrative and storytelling is extremely important for any identity and culture. Narrating is not only the optimal platform for the exchange of history, norms and values, but also functions to establish and further develop culture and (national) identity. It is based on these stories that define who we are, who we think we are, and how we think. I have greatly enjoyed the stories of my interviewees and of the new friends I have made on this beautiful island. It is through narratives that our similarities and differences became clear; it is through narratives that we built mutual respect for each other and that we have connected so well.

Who Plays What Role to Take the Stage?

The Governance of Staging Authenticity and Commodification of Cultural Heritage in Aruba

S. B. Scholte, April 2015

1. This Study

1.1. Introduction and Statement of Problem

What is Aruba known for internationally? The most common answer would be its white beaches, the blue water, and perhaps the exotic and friendly people. Over the last decades Aruba has promoted these natural assets of the island in order to attract as many visitors as possible and feed the main pillar of its economy: tourism. Also, most events and products on Aruba are meant to entertain and serve the (mainly American) tourists, without using and/or emphasizing local craftsmanship, materials or other relevant cultural elements. From the 1950's onwards, the rapidly increased tourism sector has overshadowed the local and typical Aruban cultural heritage more and more. *"Tourism and the 'American way life' seem to be the new cultural standard for many Arubans and immigrants in this fast changing society. [...] Cultural elements that typify the identity of Aruba's core population for many, such as the close family ties, the districts-orientation and the strong Catholicism, are under pressure of many demands of the labour market and the consumptive lifestyle of big parts of the population"* (Alofs & Merkies, 2001, p. 235). This danger for culture is true for the entire Caribbean, according to Lasten (2010, p. 33): *"Governments, especially in the Caribbean, did not see or predict that culture, nature, and heritage were important funding mechanisms for the economy. Efforts were guided by politics and directed towards hotels in capitals and small manufactured attractions"*.

As Arubans have become aware of the issue of diminishing Aruban heritage and the enormous size of the tourism sector, several projects have been initiated to highlight the Aruban cultural heritage and counter the effects of tourism. Typical, one might even say authentic, Aruban commodities, traditions and events have been commercialized and staged for the public to enjoy. MacCannel (1976) described this phenomenon as the situation in which the tourist attraction sets the stage for the visitors, who make up the audience. These spectators, if successful, are not aware of this setup and experience the act as a real event. Many of these projects have taken into account the large amount of tourists on the island and have specifically focused on this group with regards to the promotion and sales of Aruban heritage. *"[...] Forgotten historical and cultural elements may bring a new dimension of life for the well being of local citizens and the tourism industry. Building new staged-authentic heritage tourist attractions has the potential to diversify the tourism*

offerings of many tourist destinations and especially those of small island nations" (Lasten, 2010, p. 6-7). Moreover, it can create a new and unique 'stamp' of the nation, which can make both locals and visitors aware of the national culture.

Unfortunately, in general it appears to be rather hard to successfully stage and commodify cultural heritage; there exists a continuous search to find a proper balance between authenticity and commercial aspects. If the heritage becomes too commercialized, the supposedly authentic experience is corrupted by the arbitrating factors and is taken out of its local context (MacCannell, 1992). It is argued by many that in those cases *"cultural products are taken out of their context by the tourism industry through which they are left without any value*" (Van Wijk, 2005, p. 20). This can also be the case in Aruba, which could explain why many of these initiatives have failed and only some have been successful.

In order to safeguard (and perhaps even revive) the cultural heritage of Aruba in the future, it is on the one hand useful to know what factors have contributed to the success of various projects and, on the other hand, to be aware of the obstacles that have caused failure of projects in the past. Moreover, it is important to see what actors are involved, what role they take and how they relate to each other.

This research aims to review the success- and failure factors and will, based on these factors and the actors involved, propose a recommendation for future projects of the commodification and staging of Aruban cultural heritage. The intention of the researcher in the current study is to develop a recipe for planning and designing a staged heritage project specifically for Aruba. Like many small island nations in the Caribbean that are known for their attractive sun, sea, and sand, Aruba also has a story to tell beyond this appeal. This recommendation for a successful implementation of staged Aruban heritage is intended to act as a suggestive tool for policy-makers, developers, and researchers in the planning and designing of future staged heritage attractions and products.

1.2. Research Question

Based on the statement of the problem, the main research question is:
How can the success and failure of heritage projects in Aruba be explained and how can the success rate be improved?

In order to answer this main research question properly, several subquestions are posed in order to provide a clear framework of knowledge. The subquestions are the following:

- 1) What are the social, cultural, economic and political conditions in Aruba in which cultural heritage developers design cultural projects for tourism purposes?
- 2) What is the role of project developers, the government, and the cultural heritage community when implementing cultural heritage projects?
- 3) What is the vision of the different actors with regards to the balance between cultural authenticity and the commercialization for tourism?
- 4) Which factors have causes success and which have caused failure in initiating and maintaining heritage projects?

- 5) What recommendation can be made in order to improve the success rate of heritage projects in Aruba?

1.3. Relevance

1.3.1. Academic

In order to effectively add to the already existing literature regarding the topic of cultural heritage, heritage commodification, staging, and nation branding, this paper studies initiators' and stakeholders' view on the factors that are relevant to past failures and successes of various heritage projects on Aruba with regards to tourism. The study of cultural tourism is a rather new academic field, but has already shown to reveal that this type of tourism has great impacts on society and its citizens. This research can add to the already existing knowledge in this field and can be an incentive and inspiration for future studies.

1.3.2. Social

Findings of similar studies in the past have provided directions for (local) policy-makers, planner and developers. As a sense of a national identity can change over time (i.e. identification) through, for example, a big tourism sector or strategies of nation branding, governments and stakeholders can actively alter policies to (re)brand a nation's identity. In particular, results of this paper can add to the success of implementation strategies for cultural heritage projects, which can cause an increase in Aruban's awareness and valuing of local cultural heritage and national pride. Moreover, successful implementation of heritage projects can lead to diversification within the Aruban tourism sector, making Aruba a more distinctive, and thus, attractive destination compared to its current and future competitors.

1.4. Methods

Data has been obtained through semi-structured interviews with relevant initiators, stakeholders, policy-maker or experts with regards to cultural heritage projects in Aruba. They have been divided into three groups, as referred to in sub-question two: project developers, civil servants, and members of the cultural heritage community. A list of the organizations related to the interviews is provided in the next section. The interviews are conducted according to a topic list, which directly follows from the academic literature review (see appendix 1). During the interviews notes were made using a notebook and pen. Consecutively, these conversations were written out digitally. During the interviews, the aim has been to ask questions as open as possible and to steer the interviewee minimally. By posing follow-up questions, the understanding of the content could be confirmed and validity of the information could be guaranteed. In addition, follow-up questions gave the possibility to ask for detailed information concerning specific topics. All interviews have been successful and usually much more information and background was given than expected, which was an enjoyable experience. Based on different angles and perspectives, the researcher has been able to shape a proper vision on the political, economical and social/cultural conditions in Aruba, especially with regards to cultural heritage.

A theoretical framework has been obtained through a literature review of academic papers concerning nation

branding, cultural heritage, staged heritage, tourism, and the social imaginary. Also government programs and reports have been obtained and studied. Information from several (statistical) websites has been used too.

1.5. Interviewees

1.5.1. Cultural Heritage Projects

Archeological Museum (2009 - present)
Art Galleries (various dates)
Artesania (1972 - early 1990's)
Bon Bini Festival (2011 - present)
Caribbean Sea Jazz Festival (2007 - present)
Carubbean Festival (2011 - present)
Casa di Cultura (1958 - present)
Historical Museum (1983 - present)
International Dance Festival (1989 - 1999)
Monuments Fund (1996 - present)
Monuments Bureau (1996 - present)
Terafuse Aruba (2008 - present)
Union di Organisacionnan Cultural Arubano (UNOCA) (1986 - present)
United Nations Educational, Scientific and Cultural Organization (UNESCO) (1987 - present)

1.5.2. Governmental Bodies

Aruban Tourism Authority (ATA)
Directie Cultuur Aruba (DCA)
Ministry of Education
Ministry of Culture and Tourism
Ministry of Economic Affairs
Seyo Nacional pa Artesania Aruba

1.5.3. Cultural Heritage Community

Academics
Artists
Cultural Practitioners Bon Bini Festival
Cultural Practitioners Carubbean Festival
Cultural Practitioners Palm Beach
Teachers of Art

2. Data Collection

2.1. Cultural Heritage, Commercialization and Its Effects

For the sake of simplicity, this study uses the definition of cultural heritage as proposed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which states that the term cultural heritage encompasses several main categories of heritage: 1) tangible cultural heritage, consiting out of movable heritage (e.g. paintings, sculptures), immovable heritage (e.g. monuments, archecological sites), and underwater heritage (e.g. shipwrecks), and 2) intangible heritage (e.g. oral traditions, rituals, performing arts) (UNESCO, 2015).

As this study is considering those cultural heritage projects that have a focus on the tourism market, some complications should be taken into account. The tourism sector, to start with, can transform culture into a commodity that can be consumed by tourists, by selling the experience of visiting the country; culture, in the tourism sector, is truly a product. From this perspective, tourism can be seen as a unique form of consumption (Burns, 1999; Franklin, 2003). Cohen described this as commoditization, the *"process by which things (and activities) come to be evaluated primarily in terms of their exchange value; in a context of trade, thereby becoming goods (and services); developed exchange systems in which the exchange value of things (and activities) is stated in terms of prices from a market"* (Cohen, 1988, p. 380). By providing these typical authentic culture experiences as

commodities to the public, they are (sometimes literally) given a platform to perform, which is called staged authenticity (MacCannell, 1976; Patullo, 2005).

However, the commercialization of these products and events is thought to implicate risks: Cohen (1988) and Lasten (2010) mention that tourism can negatively influence areas of community life through commodification and that commodification is believed to destroy local culture and heritage with a proxy of staged authenticity. On the other hand, several researchers have evidence to believe that commodification and staged authenticity can indeed cause the loss of the original meaning of a cultural product, but at the same time bring about a new meaning (Wu et al, 2014; Brida et al, 2014; Lepp & Harris, 2008; Liu & Var, 1986; Franklin, 2003; Smith, 1989; Van Wijk, 2005).

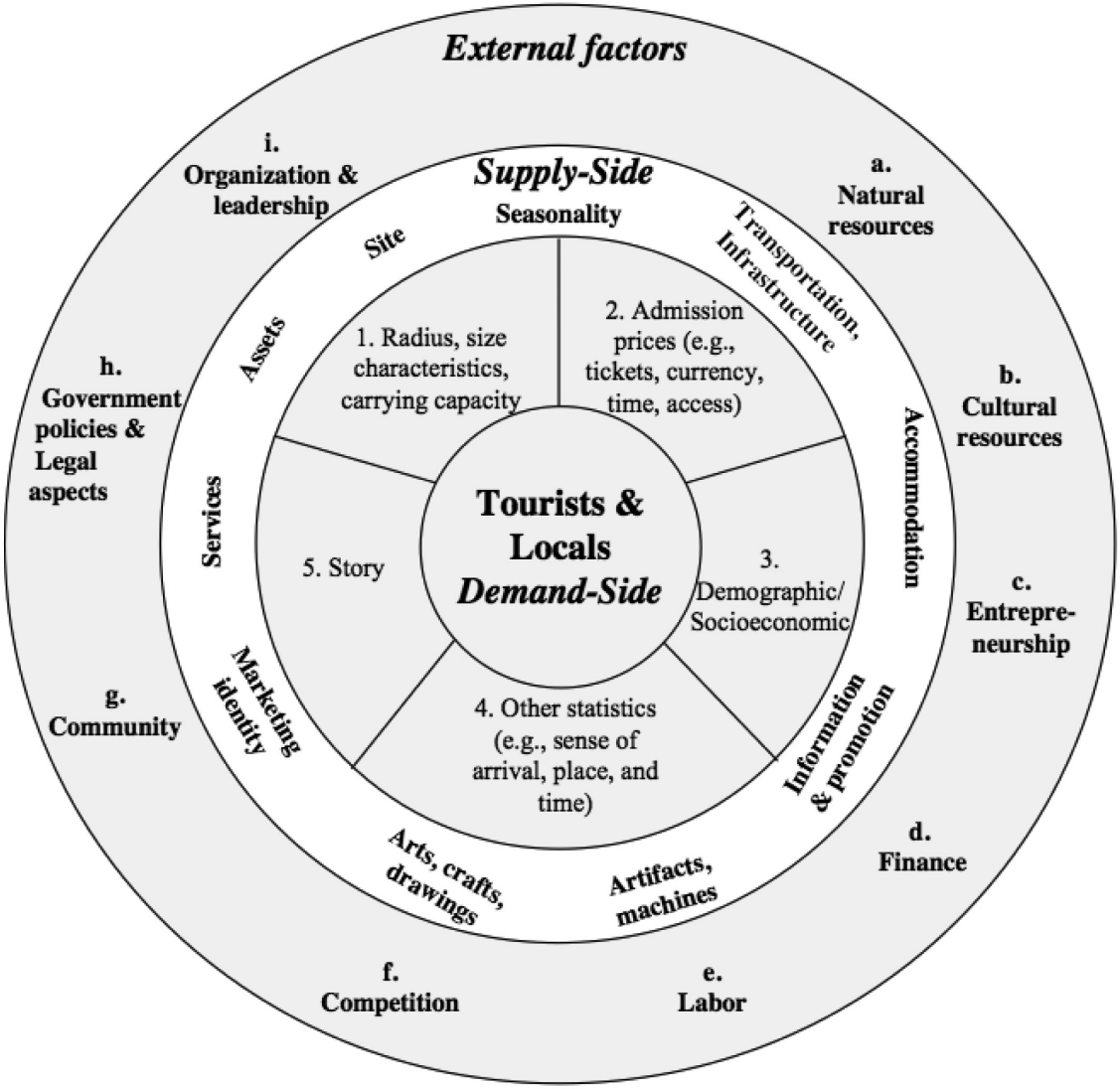
2.2 Governance of Cultural Heritage

2.2.1. Project Developers

In the past, researchers have studied the management of cultural heritage projects and proposed various models that indicate key focus points: Fyall & Garrod (1998) provide five pillars for successful management, focusing on financial and intellectual accessibility and balancing authenticity with needs of visitors; Kaiser & Helber (1978) argue that only structured planning can provide predictability in cultural heritage management and provide a 10-step planning process; McKercher and colleagues (2004) identified four issues in explaining unsuccessful cultural heritage projects related to tourism, indicating that a lack of understanding in marketing and promoting cultural heritage to the tourism sectors were the biggest problems. Carlsen and colleagues (2008) propose nine success factors for cultural heritage managers, which are listed below and provide the base for the qualitative section of this study:

a) *Agreed objectives and clear concepts;*
b) *Financial planning for budgeting, capital raising and price setting;*
c) *Effective marketing strategies based on sound market research;*
d) *Destination and proximity to major markets and visitor flows;*
e) *Human resource management, including paid staff and volunteers;*
f) *Planning for product differentiation, life cycles and value adding;*
g) *Quality and authenticity of products and experiences;*
h) *Engage cultural heritage and tourism expertise in conservation and promotion;*
i) *Design interpretation as an integral part of the heritage tourism experience.*

Results of this study will also be testes upon the model of Lasten (2010), which takes both demand- and supply side into account, but also external factors, such as government policies, competition and financial backing (see image below (Lasten, 2010, p. 77)). By analysing the results of this study, it is possible to determine what factors of Lasten's model seem most relevant for Aruba.


External factors
i. Organization & leadership
a. Natural resources
b. Cultural resources
c. Entrepre-neurship
d. Finance
e. Labor
f. Competition
g. Community
h. Government policies & Legal aspects
Supply-Side
Seasonality
Site
Transportation, Infrastructure
Assets
Accommodation
Services
Marketing identity
Information & promotion
Arts, crafts, drawings
Artifacts, machines
1. Radius, size characteristics, carrying capacity
2. Admission prices (e.g., tickets, currency, time, access)
3. Demographic/ Socioeconomic
4. Other statistics (e.g., sense of arrival, place, and time)
5. Story
Tourists & Locals
Demand-Side

2.2.2. Government and Heritage Community

Although it is important to look at the relevant factors for cultural managers when studying the governance of cultural heritage projects, it is also necessary see what other actors can be involved. It is clear that the government often has a task with regards to policies about culture and national identity, usually performed through a minister. More interestingly, though, is the role of the citizen; as it is a given that culture is created and shaped by an entire population, it seems logical that the 'normal citizen' would have a say in cultural heritage projects.

According to Arnstein (1969), many democratic governments like to argue that they would like citizen participation to be of a high level and idealize the participation of those that are governed. However, Arnstein continues, although it is easy to use terms such as citizen participation or even citizen power, there exist different gradations of citizen participation that go beyond hierarchical top-down and bottom-up strategy models. *"There is a critical difference between going through the empty ritual of participation and having the real power needed to affect the outcome of the process"* (Arnstein, 1969, p. 216). Arnstein created a simplified ladder of citizen participation, consisting of eight different rungs where the first rung represents the least citizen participation and the last the most: 1) manipulation (e.g. advisory sub-committees), 2) therapy (e.g. curing participation), 3) informing (e.g. only top-down communication), 4) consultation (e.g. neighborhood meetings), 5) placation (e.g. committee member without decision power), 6) partnership (joint decision-making bodies), 7) delegated power (e.g. dominant decision-making power for citizens in boards), and 8) citizen control (e.g. citizen-governed programs). The first two rungs fall in the category of nonparticipation, the following three rungs are indicated as degrees of tokenism, and the last three are categorized as degrees of citizen power. Using Arnstein's model of civil participation, one is able to describe the level of participatory governance in a society as a whole or per sector. This study has solely focused on an analysis of the culture sector in Aruba, whereas others have studied the same in, for example, the sustainability sector in Aruba (Spier, 2014)

2.3. Interviews

In this section, all sub-questions as posed in the first chapter will be answered based on the information retrieved during the conducted interviews.

1) Although culture has been overshadowed by the focus on the tourist economy in the past decades, many interviewees and other Arubans seem to realize that their national culture and history needs to be conserved and treasured. All interviewees have stated to be enthusiastic towards the development of culture in Aruba and believe that Arubans have started to value cultural aspects of society more and more in the past years. Also economically, it seems to be a great investment opportunity for Aruba to brand itself not only as a destination for sun, sea and sand, but also for a cultural experience. Specializing itself as a cultural destination within the Caribbean would supply tourists with a wider variety of pull-factors to visit Aruba. Moreover, there seems to be an increasing demand of tourists to enjoy cultural experiences when visiting Aruba as compared to

the past (Croes et al., 2011). The government is aware of this demand and, under the supervision of the current minister, tourism and culture are now united in a ministry for the first time in Aruban history. All in all, it is safe to conclude that social, economic, and political conditions are optimal for the development of cultural heritage projects for tourism purposes. However, the cultural conditions are weak due to the young age of the national culture and the sensitive nature of the topic.

2) The government takes up strong role in the implementation of cultural heritage projects. As the main financer of most projects it can greatly influence the development and shape of the project. Also, although some projects are financially independent, the government is able to fill multiple positions of the board in charge. Especially the minister of culture and tourism seems to have a clear vision of how to combine tourism and culture and what people should be in charge of that. Consequently, project developers and their successes are rather dependent on whether or not its vision fits that of the minister. The cultural heritage community is also aware of this and maintains a cynical approach towards the government with respect to their statements of involving the community in the decision-making process. It seems as if all three groups agree on the fact that the minister is, just like any other minister, eager to leave his mark in Aruban history. This has resulted in poor civil participation according to most project developers and all members of the cultural heritage community, while the government states that efforts to achieve this are being made (e.g. the consultation sessions that the Directie Cultuur Aruba (DCA) has held or the group discussions that have taken place with stakeholders concerning the transformation of San Nicolas into a cultural city).

3) All groups appear to agree on the fact that culture should not be commercialized too much, as this can affect the authenticity negatively. In order for culture to be attractive, most interviewees have argued that civil participation should be high so that the product is not taken out of its context. Although the government aims to stage culture so that it remains authentic, most project developers and members of the cultural heritage community criticize the government for having too much of a commercial approach in balancing culture with tourism. Specifically the current minister is said to think more from the demand perspective of the tourists with regards to commercializing culture; an opinion also shared by most civil servants.

4) One of the main factors leading to success is the high level of creativity; all three groups share this view. It was remarkable that almost all interviewees replied that these creative ideas had high levels of authentic quality as opposed to more commercialized products that one finds more often in Aruba. Also the high amount of creative ideas is a noteworthy factor.

However, it must been said that there are many pitfalls when it comes to the implementation of cultural heritage projects in Aruba. One of the main causes for this, as explained by all interviewees, is that the cultural development in Aruba is very young. There is still a lack of local professionals and experts to provide a solid base for properly organized projects. Some factors that lead to failure can be found in

the lack of financial planning, while others can be found in the low levels of concept quality. In general, this has created a cultural sector that has an absence of professional and constructive criticism, but is dominated by an emotional wiseacre atmosphere (which is also due to the sensitive nature of the topic). In addition, the small-scale of the Aruban society adds to the role egocentrism plays, or at least clearly shines through, in the cultural development and results in a sector that rules out any form of collaboration, which consequently leads to inefficient use of economic factors.

Most interestingly, though, is that the government plays a deciding role in determining the success or failure of most cultural heritage projects. Just like most project developers, the government seems to fall prey for the same egocentrism incentives in generating cultural heritage projects. All interviewees, including all civil servants, have admitted to the fact that your social network and personal ties with policy-makers, specifically those with the minister, are main determinants of success. As one of the interviewees stated, culture has become a political tool.

3. Discussion and Recommendation

All in all, two problems can be identified with regards to the development of cultural heritage projects in Aruba:

1) There seems to be an inconsistent view concerning the role the government takes; whereas the government itself states that the participation of the cultural heritage community is important and actively tries to engage them, community members and project developers both believe that their opinions are not being heard and taken into account when developing policies and plans. Taking the academic literature into account, the government states to involve the community according to rung five (placation) or even six (partnership), however; community members and project developers argue that their participation level should be categorized as rung four (consultation). It is clear that forms of tokenism from the government towards other actors involved in the development of cultural heritage are present.

2) The strong presence of egocentrism among all actors in the cultural heritage sector in Aruba, which is presumably the result of a form of nationalistic pride, creates the absence of any form of collaboration. Especially the political short-term thinking stimulates this environment; although four years is short to properly develop an impressive and successful cultural heritage project, ministers in charge only have that time before the next national elections take place. Due to the fact that every minister seems to try putting his or her mark on Aruban society within this period of time, those that are active in the cultural sector are extremely dependent on the minister's view. This, taking into account that most cultural projects need a longer time to develop, works counteractive with regards to what tourists demand, stakeholders long for and the minister of culture states to achieve (i.e. sustainable culture in Aruba).

Thus, in order to answer sub-question number five, we can state that neither the top-down approach, nor the bottom-up approach, as described by Lasten (2010), can work in Aruba: the top-down approach leaves no room for civil participation, which is necessary for culture to remain authentic (especially for the young culture of Aruba), whereas the bottom-up approach produces low-quality

projects due to several factors causing its failure.
Logically, then, the solution lies in between these two extreme forms of governance. In order for the government, and specifically the minister, to achieve their goals related to culture and tourism, it seems obvious to propose a golden balance in offering the cultural heritage community a framework of aims and policies together on the one hand, while increasing civil participation through providing a platform for discussion that has some form of decision-making power (i.e. beyond tokenism).

In addition, it seems wise to install a committee or council of local experts and professionals in the cultural field that can provide, solicited or unsolicited, advice to the government with regards to anything in the sector. Moreover, it is recommendable to put more effort into the transparency and promotion towards the public, highlighting the active efforts that the government makes to improve and increase civil participation in the sector. This could partially solve the rather cynical perspective most Arubans seem to take concerning this issue. Finally, it is advisable to keep the efforts of the government regarding education and documentation running; in the short-run, but especially in the long run this can greatly increase awareness and value of the Aruban culture for locals.

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Appendix 1

Introduction
- Personal introduction
- Goal of the interview
- Explanation of goal of material

Personal Data
- Man/Woman
- Age
- Married/Single/Cohabiting
- Nationality/Ethnic background
- Education
- Occupation

Heritage Project
- Open questions regarding the history of the project.
    - Can you describe the development and history from the initial idea of the heritage project until its actual realization?
    - What specific steps were taken in this process?
- Direct analysis with regards to the 10-step structure as proposed by Kaiser & Helber (1978).
    - Can we tick off all steps of the structure or are several steps skipped/missing?
- Closed directed questions concerning the missing steps or missing information.
    - Did any market and resource analysis take place during the process of realizing the heritage project?
    - Was the plan approved by, for example, the government?

Contributing Factors
- Closed questions based on the project's history with regards to contributing factors detrimental to the project's success or failure.
- Goal is to categorize these factors according to the five key factors as proposed by Carlsen and colleagues (2008).
    - In what way has the market been analyzed and what tools/information were used?
    - How was a proper understanding of the market demand and supply created?
- Closed questions that specifically lead to categorizing success and/or failure factors to on of the elements of the detailed list of key factors as proposed by Carlsen and colleagues (2008).
    - Is it indeed true that there has been disagreement with regards to the objectives and concepts of the heritage project?
    - Were/are there more part-time or full-time staff member (or perhaps volunteers) and can you specify the way the staff was managed?

Nation Branding and Identity
- Open questions connecting to the academic literature regarding the national identification, the social imaginary, and nation branding.
- Goal is to investigate how these initiators/stakeholders believe their heritage projects affect these phenomena.
    - Does this heritage project have a social or economic effect? If so, how?
    - Has this project contributed to revive or alter the brand of Aruba? If so, how? If not, how could this be done in the future?

Kimberly van Loon - University of Aruba

The project group has been a collaboration of the group internally, as well as external collaboration with local individuals on Aruba and lecturers from the Netherlands, all with the same purpose in mind; contribute to Aruba's knowledge database and hopefully contributing to the greater good of the Island. I am grateful for being part of the UA-UCU exchange research collaboration project. It has been an unforgettable and enriching experience, especially resulting from the different disciplinary backgrounds of the project members. Additionally, the project has complimented my thesis development trajectory by keeping me motivated and it has also given me extra deadlines to keep me on track.

It was heart-warming to receive support for research from the local organizations and all individuals who were involved in one way or another. In the same trend, I found it pleasant to see sincere interest to conduct research on our little paradise called Aruba, from students who have previously never lived here before. The feeling I got was as follows: we put our differences aside, respected each other's cultures, gave each other the respect and time to voice our thoughts and opinions and magic happened. Even if our research may seem insignificant to some, each research is important and means a tremendous amount to us.

This experience has taught me the importance of investing time in the preparations for conducting research, in this case, research for a bachelor thesis. I have also learned so many things from each individual who has been involved in this project – from planning, networking, sharing our personal values and openly discussing our challenges in conducting research. We have bonded as a group and I for one have developed as an individual, academically and personally. I have become more hopeful that Aruba is on the verge of positive change. There are so many individual initiatives to improve our waste management, energy consumption, restore our ecosystems, preserve our culture, improve communication in organizations, implement environmental policies and be conscious of the role language plays in our every day lives, especially so relating to youngsters.

An important, personal lesson that I will take from this collaboration is that theory does not always translate well into reality. Before commencing on this research collaboration, I wrote my research proposal and started making a general planning of what needed to be done by when. Unfortunately, the writing process got delayed a bit, as did the scheduling of interviews. As a result of this, the research will be concluded after the initial set date. However, this should not be experienced as a major set back, rather as a minor challenge and moment to show patience, perseverance and determination. This lesson may also serve as a lesson for others – preparation, research and analysis take dedication and time.

Perceptions of internal communication, as experienced by employees within the healthcare sector

Organizational Communication; Internal Communication

Kimberly van Loon, April 2015

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I would hereby like to express my gratitude to all the lecturers and supervisors from the University of Aruba, as well as, University College Utrecht who were involved in the UA-UCU exchange research collaboration. If it were not for them, writing a thesis proposal would be much more difficult and this project would not have been possible.

I would also like to thank each member of the UA-UCU research group for their individual contributions, moral support, memories and friendship. It was each of you who made this experience what it has been and you have left a lasting impression on me.

Lastly, gratitude goes out to the health care center that agreed to confide in me and let me conduct research in their organization. Their support for my thesis research has been essential.

There is no need to mention names for you know who you are. I remain eternally grateful for your support,

Kimberly van Loon

1. Introduction

Communication is a central concept in all human relations and also in organizations as human beings operate them. Employees in organizations often communicate using specific work-related terms and communication styles and methods in order to communicate as efficiently as possible. This paper focuses on internal communication, specifically vertical- and horizontal communication. The aim of the research is to uncover how employees of all levels in an Aruban healthcare organization perceive the vertical and horizontal communication. In this paper I describe the theoretical backgrounds, the research design and the expected results for this project.

The motive for researching vertical and horizontal communication within a healthcare center is the importance of the good functioning of a healthcare center in any society. An analysis will be made to compare the perception of managers with the perceptions of the employees in the operational core. The perceptions are defined as attitudes or opinions about a subject or occurrence (Burleson, 2014). The aim is to find out if their perceptions of internal communication are similar or differing between the hierarchical positions and the possible reasons for this. The results of this research will be valuable to the health care center, because communication is an essential part of service and care. Internal communication enables the health care center to share important information with internal members of the organization and serves as a factor contributing to sustainability of the organization,

providing a high level of care, service and internal functioning and accessibility.

Vertical communication refers to predominantly formal communication between top-management (strategic-apex) and other employees (operational core), meaning top-down and bottom-up directions of communication. The strategic apex of the health care center can be divided into the managers and the operational core. The operational core of the health care center can be divided into several functions, both supportive and core staff such as doctors and caregivers. In contrast, horizontal communication refers to informal communication between employees on the same level of the organizational structure. Additionally, there are many different aspects, which influence (organizational) communication such as: culture, language, social and organizational structures (Gaur, 2006).

The following central research question has been formulated in order to unveil the general perception of internal communication within the health care center, as experienced by managers and employees of the operational core. The central research question is: "***How is the internal communication (vertical and horizontal) of the researched health care center perceived by managers and employees of the operational core?"***

The relevance of this research paper is its added knowledge regarding the perception of vertical and horizontal communication within a health care center situated in the Aruban context, in consideration with the influence the cultural background of employees may have on individual perceptions of internal communication within the health care center. Furthermore, this research will contribute to the further development of knowledge, specifically relating to the Aruban context and with regard to local (healthcare) organizations that may benefit from the research results. This paper also highlights the ambiguity of internal communication and the importance of having an overview on the perception of employees on different organizational positions, regarding internal communication. Ambiguity refers to the existence of differing and sometimes conflicting interpretations of an issue or topic (Miller, 2012).

Culture is especially relevant for this research due to the diverse population of Aruba. Aruba has a population of 106,795, which is made up of several nationalities and cultures (CBS Aruba, 2014). There are many different cultures, ethnicities, men and women in various organizational positions and employees with different levels of education working together. Effective and clear communication between the employees is critical in order to correctly fulfill their functions but also to be sensitive to different cultures, avoid conflict and gender related issues such as harassment or discrimination (Miller, 2012).

2. Theoretical Perspective

A broad scope of research has previously been conducted on many aspects of organizational communication. There are many different perspectives to analyze organizational communication and factors, which are interlinked with and influence communication (Gaur, 2006). Such aspects are: culture, type of communication, direction of communication, and communication instruments (Cote, 2013; Miller, 2012; Postmes et al., 2001). The scope of this research will limit itself to the vertical and horizontal directions of communication, which are linked to numerous concepts that influence and shape organizational communication. Besides the main topic of vertical and horizontal communication other aspects related to (internal) communication are important to mention such as gender-stereotypes. However, gender-stereotypes will not specifically be discussed due to the time constraint of the research, complexity and depth needed for such a research with a broad research scope. The research does acknowledge that many aspects, other than those covered by this research, may also contribute to the perception of communication within the healthcare center. This chapter elaborates on theories regarding four important concepts for this research, namely, organizational communication, internal communication, communication instruments and culture.

2.1. *Organizational Communication*

The theoretical model for this research is based on previous researches conducted on internal communication within organizations, namely related to vertical and horizontal communication. According to Unger, Macq, Bredo & Boelear (2000), the structural configuration originating from Mintzberg's typology theory that is most suitable for a hospital, ministry of health or a health care center is the divisionalized adhocracy. The explanation for this is that the divisionalized adhocracy enables the organization to be effective, efficient, holistic, accessible, acceptable and continuous. However, after contextualizing the literature, the chosen health care organization can be identified as being a mix of two structural configurations, namely, the professional bureaucracy and the operational adhocracy. The reason for this is that the operational core is pivotal in both structures. As this healthcare organization has a somewhat complex organizational structure and thus hierarchy, it might be helpful to do a simple network analysis to see how accessible it is for employees to communicate with each other, regardless of the position in the hierarchy.

Network analysis knows three types of network measures: relationships, position of individuals and the characteristics of an entire communication network such as density and centralization (Zwijze-Koning & de Jong, 2014). These links are believed to relate to strengths and weaknesses of communication, however they have received minimal attention in past researches. The network results may uncover communication problems that employees do not individually see as a problem on their individual level. Self reported evaluations enable the research to reach greater depths and uncover underlying issues or causes for communication problems such as low density in a communication network.

2.2. Internal Communication

Communication and culture are key elements of every organization even though they are not always recognized as such (Bisel, Missersmit & Keyton, 2010). Bisel et. al.(2010) argue that discourse possesses culturing properties and that, as a result, culture is always in a state of becoming and is never fixed. This is termed as 'culturing'. The gyroscope metaphor presented by Bisel et. al. (2010) views organizational culture as having different relationships and perspectives relating to different people, positions or organizations, the influence of culture over discourse, vice versa or simultaneously. The culture, created by the sum of organizational procedures and policies, enables and constrains the communicative action of organizational members.

Internal communication within an organization can manifest in either upward or downward directions of communication. Downward communication (also known as top-down) is understood as information that goes from superior to subordinate, whereas upward communication flows the other way around, from subordinate to superior (Hitt et. al., 2011). There are numerous communication channels for both top-down and bottom-up communication, namely, meetings, attitude surveys, participation in decision making et cetera (Hitt et. al., 2011). Previous research has demonstrated that vertical communication is more strongly related to organizational and professional identification, as opposed to horizontal communication within organizations (Bartels et al., 2006; Postmes, Tanis, & de Wit, 2001).

2.3. Communication Instruments

Communication instruments can be understood as communication technologies and / or communication strategies used in organizations to improve communication, conflict solving and decision-making processes (Hitt et. al., 2011). New technologies such as email, Powerpoint and online conference calls have become central means of communication in organizations, impacting on key organizational processes and communication structures (Tietze, Cohen, Musson, 2003, Miller, 2012). These communication technologies supplements and enhance face-to-face communication, however it does not substitute it or is superior to personal communication. Rather, Internet, organizational websites, email and mobile phones enable spatial and temporal flexibility in organizations,

information can be sent now, and read later. However, organizations still widely use formal written texts such as reports, documents, notices and also personal texts such as memos, notes and letters (Hitt et. al., 2011). Electronic communication facilitates the building of new communicative practices, new rules of interaction, as a result of easy, fast and globally accessible communication. Emails can be used both for formal and informal communication, depending on the purpose and receiver of the information in the email and the use of language and titles in the content of the email.

2.4. Culture

Aspects of an organization's culture will gradually become evident through observation as patterns of interaction between individuals, the use of language, topics of conversation and daily routines become visible to the researcher (Morgan, 2006).

Culture is believed to consist of several aspects such as: social roles (gender roles and sexual division of labor), behavior, values, norms, religious beliefs, traditions, communication and language (Hitt, Miller & Colella, 2011). Furthermore, culture can be interpreted as something an organization has and also as something an organization is. Behavior and communication in organizations is part of the organizational culture (Miller, 2012). Culture can thus influence behavior and communication of employees.

3. Research Design

Research Designs explicitly present what the research objective is and what research steps need to be taken in order to realize the objective (Verschuren & Doorewaard, 2007). This chapter presents the operationalization of the theoretical framework. After choosing the research topic, perceptions of internal communication in an organization, a literature review was conducted in order to gather relevant literature and theories regarding internal communication in an organization. Relevant topics that emerged were; organizational communication, communication instruments and culture, along with other elements relevant to internal communication, but less relevant to the research at hand. After writing a research proposal and making a topic list that would assist as a guideline for **semi-structured interviews, two pilot interviews** were conducted in order to test the average length an interview would take, comprehension of the topics and experience of the interview.

3.1. Respondents

The respondents that will be interviewed are employees on management level and also employees of the operational core of the chosen health care center. This research will focus on certain departments, rather than the whole organization, because of their key role in (internal) communication of the health care center, but also on request from the health care center itself. A total of thirty-two (32) respondents will be interviewed for this research. This number will be evenly distributed between the strategic apex, also known as the heads of department or managers as well as the employees of the operational core, also known as the line staff of an organization. All the respondents of this research will be fully informed regarding the educational purpose and methodology of this research. The interviews will take place during work hours and are expected to take between 30 to maximum 45 minutes. The respondents are encouraged to ask questions concerning the research before and after every interview. The information and consent of respondents will both be stated verbally. The identity of each participant will be kept anonymous in the research results. However, a personal record of the identities will be archived by the researcher in order to keep a concise record of the interviews.

3.2. Instruments

The research discussed in this paper is of qualitative nature. Qualitative research gives insightful and rich data, which enables the research to find meaning or analyze perceptions (Silverman, 2010). The research instruments that will be

applied during this research are semi-structured interviews, observation and a case study of the health care center; analysis will be conducted on the perceptions of internal communication and modes of communication between staff within the health care center in order to analyze both formal and informal communication.
This thesis applies two methods for studying communication in organizational systems, namely, a simplistic approach to the network analysis (Miller, 2012,p 73) & a case study (Miller, 2012, p. 77) of an organization in the healthcare sector in Aruba. This research mainly applies the case study method to the healthcare center in question. A case study approach suggests that the richest understanding of organizational systems can be obtained by closely observing specific organizations dealing with specific issues. By collecting a variety of data through observation, interviews, questionnaires and archives, the analyst can come to a more finely grained understanding of how and why organizational systems develops and behaves as it does (Miller, 2012). This research will conduct semi-structured interviews and conduct a basic network analysis and observe while interviewing. In doing so, the variety of data will hopefully contribute to more abundant and explanatory research results.

The semi-structured interviews will be conducted with staff of the strategic apex and with staff in the operating core of the health care center in order to get a more representative general perception of how the internal communication is experienced by its employees. By interviewing employees on all level of the organization, from management to operational level workers, I will be able to compare different perceptions and safeguard that the perceptions of both upper and lower level employees are fairly represented in the results of this research.

3.3. Procedure

The interview results will be compared with each other and with the literature review in order to draw similarities and differences between perspectives in order to conclude how vertical and horizontal communication can be described within the health care center. The data will be collected through thirtytwo (32) semi-structured interviews, which will be held during work hours as has been permitted by the health care center. The interviews will be recorded if the respondents grant permission. This is to ensure that no valuable data will be lost. The respondents will be interviewed individually, in order to diminish the possibility of censorship and to create a pleasant environment for the interview. Respondents voluntarily accepted to participate in the research. No material compensation was provided. All interviews and respondents will be kept anonymous in the thesis.

3.4. Analysis

The analysis of the research results will be conducted with the use of three instruments; thematic analysis (Braun & Clarke, 20016), observational analysis and a simple network analysis (Leavitt & Bahrami, 1989).

4. Expected Results

The main findings of the research are expected to be that perceptions of internal communication within the chosen health care center will differ between the managers and employees of the operational core. Furthermore, perceptions regarding vertical communication are also expected to differ from perceptions of horizontal communication. These expectations are based on different aspects which influence perception such as used communication instruments, formal versus informal communication and working relationships between different cultures. According to the two pilot interviews, it is also expected that communication instruments have positive and negative aspects to it, due to aspects such as lack of personal contact, busy schedules and room for personal interpretation. Perceptions regarding internal communication seem to be linked to the relationship with your colleague and the use of language and appropriate communication instruments.
It is advisable that further research to be conducted on (internal) communication in the health care sector in order to build data and create a general overview of the current situation; strengths and weaknesses of communication within the health care sector.

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Geneida Geerman - University of Aruba

I have joined this research program because I wanted to be more engaged in my thesis research, be proactive and motivated to meet deadlines. Furthermore, I saw the opportunity to participate with students from UCU to broaden my network as well as my knowledge. It is always nice to meet students that share the same passion and vision as you do. We all would like to see a change in the Aruban society and mentality as well worldwide where it can be applied.

Students from the UCU were very welcoming and friendly. Neither of us had the impression that we were different due to cultural differences. We collaborated very well with each other and the communication among us was very good.

As a student of Aruba, we provided the UCU students with information on the island regarding their topic or just for leisure. We also exchanged ideas on each other's subject of research and gave constructive feedback at what should or could be done differently for the research.

Besides providing each other with support and assistance towards our research, field trips were also organized. Even though I am a local, there were a few field trips that got my attention and were eye opening, starting with a morning sail. Our destination was to sail across the coast line from Renaissance till the land fill and back. The captain gave us a brief explanation on the importance of healthy growing mangroves and the importance of keeping the water clean. Keeping the water clean would make the growth of mangroves stronger so it can continuously protect the eco-environment.

It was very heartbreaking to hear that this is not a very important topic on the agenda of the government and no specific action is being done to help keep our water clean. Besides this, there is the problem of the land fill that is constantly on fire and the wind that is blowing all the garbage - especially the plastic bags and containers - in the water. Not only is the water being contaminated, but the mangroves as well. Many of the plastic bags that are being blown away will be caught by the mangroves, especially at the roots, which will hinder the growth of the mangroves. It is so sad to see all this kind of pollution and no action being done what so ever. It was an eye opening experience for me as a young future professional to see the importance of such a matter to enforce more professionals so together we can help make a difference and provide a "One Happy Island" as it's being promoted. The community needs to be more aware and educated on this matter. To become green, I feel and think that we would need to start at the core of the problem first. Another field trip that was an eye opening experience was of Stichting Rancho. I really felt the love that was being portrayed by this very enthusiastic volunteer that wants a better quality of life and living for the community of Rancho. I feel that more needs to be done to help out foundations that really want to bring a change as something positive for the image of the community and its people as a whole.

Internal communication of sustainable development within the hotel sector

Organizational Communication, Internal Communication and Sustainable Development

Ms. Geneida G. Geerman, April 2015

Introduction

This research will examine the importance of organizational communication towards sustainable development in the hotel industry in Aruba. In this paper I present the theoretical framework and the research design for this project.

Sustainability is a topic that has become prominent on Aruba during the past few years, because it raises concern about the future of the country as a whole. Because it raised concerns, hotels have associated themselves with international certified programs that are aimed to reduce waste production and energy usage. There are several hotels in Aruba that have international certified programs that are recognized worldwide.

The motive for doing research on internal communication within the hotel sector is because I did an internship in a hotel in the first semester of third year of my bachelor study of Organization, Governance & Management at the University of Aruba, and was curious about the communication strategies that were used by the managers and/or stakeholders to communicate an international certified standard with its employees, which is the International Organization Standardization, also known as the ISO 14001.

The main topic of this paper is internal communication, specifically vertical communication within the Aruban hotel sector. This paper discusses research regarding vertical communication within a particular hotel. The aim of the research is to uncover how employees in the core of the organization perceive the vertical communication of the sustainable development of the ISO 14001 within the resort as well as the organizational culture within the resort.

In order to uncover the perception of employees regarding vertical communication with regards to the ISO 14001, I have formulated the following central research question: ***"What is the internal communication strategy in the implementation process of the Sustainability policy within a particular resort and what are possible recommendations for improvement?"***

The following sub-questions were formulated in order to assist answering the central research question:

1. How was the policy of Sustainability developed?
2. How was the policy implemented and communicated amongst employees, associates, and board members within the company?
3. How did the various actors react to the plans in terms of awareness, ownership and involvement?
4. What has been the practical contribution of the actors involved in the execution of the policy?

5. Did the policy have an effect on the guests in the hotel according to the actors involved?

The relevance of this research paper is that it adds knowledge on vertical communication, communication strategies and effective communication in organizations, in this case in a hotel, which could be used as a basis of knowledge, improvements and thus for further research.

Also, this paper highlights the uncertainty of communication and the importance of good communication in order to achieve organizational goals. Moreover, this research will contribute to the building of knowledge in relation to the Aruban context and with regard to local organizations whether it's the hotel industry or not who may benefit from the research results.

What is the International Organization for Standardization (ISO)?

The certification program called International Organization for Standardization, also known as the ISO, is an independent, non-governmental membership organization and the world's largest developer of voluntary International Standards.
According to International Organization for Standardization (2014), the history of ISO began in 1946 when representatives from 25 nations met in London at the Institute of Civil Engineers, where they decided simultaneously to create a new international organization. This new organization objective is to "facilitate the international coordination and unification of industrial standards". This new organization better known as ISO officially started their operations in February 1947.
From the time when ISO started their operations, they have published more than 19.500 International Standards, which covers nearly all features of expertise and industrial. These days, the organization of ISO have a total of 165 members from different countries and a total of 3.368 of technical groups who takes care of standard development. In Geneva, Switzerland is where the central secretariat of ISO is located, where they have a staff who works full time which total around 150 employees.
The ISO have benefits in three different areas which are; technological, economic and societal. These benefits aids to blend technical conditions of products and services making efficiency in the industry and to break down obstacles to international trades. Additionally, the ISO aids to assure users that products are good, efficient and safe for the environment.
ISO has strategic tools and guidelines to support businesses confront most demands of the challenging modern industry world. All these tools and guidelines ensure efficiency, increase productivity and in accessing new markets for the operation of businesses.
Some of the benefits include; reduction of negative impacts on the environment, improve participation and reasonable advantages, break down obstacles for trade and opening other global markets, increase customer satisfaction and sales as well improve quality and saving costs.

Theoretical Perspective

The theoretical model for this research is based on previous researches conducted on horizontal communication and vertical communication which would be strongly related to organizational commitment based on social identity approach that focuses on commitment and identification. According to Postmes, Tanis, & de Wit (2001), vertical communication is strongly related to strategic information and communication with management. The explanation for this is that vertical communication occurs up and down the hierarchy, where employees receive information about the organization strategy and/or goal and where employees as bottom up, to give suggestion and/or feedback to the management. However, horizontal and vertical communication occurs in any organization, prior research shows that vertical communication is an important predictor of commitment than horizontal communication.

Based on previous researches, it is known that employees employed at an organization with poor organizational commitment would feel the need to find another job

as opposed to employees with a high organizational commitment. It also suggested that employees with a high organizational commitment are more likely to invest in their organization.
For organizations, this speaks to the importance of identification as well commitment. Literature indicates that the bond between individual and the organization through commitment would be affective.

Organizational Communication

According to Boessenkool (2006), the concept of organizational development offers an understanding of the impact that communication (or lack of communication) can have on major processes and developments in organizational settings. Success and failure are being linked to the leader's vision, to the unity and collectivity on the work floor, and to the degree to which organizations are able to adapt to changing circumstances.
According to Hitt, Collela and Miller (2011), there are three direction of organizational communication which are top-down and bottom-up communication that can be understood as the vertical communication between the strategic apex and the operational core and horizontal communication that can be understood as individual at the same level communicating with each other. As acknowledged above, this study will concentrate solely on internal communication vertically in the hierarchy of the organization.

Vertical communication is either downward, from managers to operational core or upward which is from operational core to managers (Hitt et al. 2011).
Interpersonal communication has two types, which are formal and informal. The type of flow of vertical communication is formal, where the flow of communication take place from to manager to the operational core and according to the organizational agreements (Hitt et al. 2011).

Organizational Culture

To achieve overall performance, an appropriate culture is required. First, culture would need to be defined. What is culture? According to Deal and Kennedy (1982), they describe culture as "the way we do things around here". Culture can be defined as a product as well as a process. If it's a product, it is knowledge added from experience. And if it's a process, it is how the organization personnel become teachers to those who are new to the organization, to teach newcomers the old ways (Bolman & Deal, 2008). According to Hitt et al. (2011), the values shared by the organization are called organizational culture. The values that are being shared among the organization are those that become the norms that govern organizational behavior. According to Hitt et al. (2011), values are "abstract ideals that relate to proper life goals and methods for reaching those goals". Thus, can be concluded that culture within an organizational structure can either be positive or negative and can be self-reinforced and tough to change. It is believed that, the longer a culture is maintained, the stronger it becomes of its self-reinforcing nature.

According to Hitt et al. (2011), not only critical values are being covered, but also some important behaviors. The culture of an organization can also affect the ability to solve problems and to create and/or bring change. If the culture is of open communication, it can also solve conflict within the organization. An organizational cultures have four types of layers which are: values and norms; rituals; heroes and anti-heroes; and symbols (Michels, 2000).

Research Design

Respondents

The respondents that will be interviewed will be employees on managerial level and also other operational level of the resort. Some departments of the organization will be held accountable for their role in internal communication. The relevant departments are: the executive office, which entails the General Manager, the Human Resources department and the Accounting Department. Besides the General Manager and the other two departments,

interviewed would be held with the Quality Assurance staff/personnel, Managers of the departments that are more related with waste and energy consumption.
The managers of the operational core are those of the Maintenance Department, Housekeeping Department and Grounds Department. Among managers, operational core employees of the three above mentioned departments will be interviewed as well to determine the internal communication within the organization. Approximately, 20 respondents will be interviewed between the strategic apex, which are managers or heads of department of the organization and the operational core employees.

The respondents will be fully informed regarding the purpose of the research and the methodology used to analyze the research. The interviews will take place during work hours and are expected to take no longer than 30 minutes per respondents. Respondents will be encouraged to ask any type of questions regarding the research before or after the interview. Both the information and consensus of respondents will be stated verbally. The identity of each individual will be kept anonymous in the research results. However, personal record of the identities will be archived in order to keep a brief record of each interviews.

Instruments

The research would be qualitative. According to Silverman (2010) & Bryman (2008), qualitative research gives understanding and rich data which enables the research to find meaning or analyze opinions. The instruments that will be used are, semi-structured interviews, observations, and analysis of interactions and modes of communication both formal and informal. The staff of strategic apex and those on the operating core will be interviewed to have both perception of how the organizational communication is experienced within the organization. Moreover, to fairly have both upper and lower level results.

Thus, interviewing employees on different levels will add profundity into the interview findings and into certain aspects, which might influence the experience of employees on the different level of the organization.

The interview results will be compared with one another together with the literature review in order to draw similarities and differences between perspectives in order to conclude how vertical communication can be described within the organization. To analyze similarities and differences, thematic analysis will be used to do so (Braun & Clarke, 20016). Thematic analysis is a method for categorizing, examining and report patterns (=themes) within data that are important for the description of communication. For thematic analysis, a inductive analysis will be used, which is 'bottom-up' and the coding of data can be done without trying to fit it to any existing coding frame. All the analysis within thematic is data driven. Doing thematic analysis can be conducted in six phases, which are: familiarization with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes and producing the final report.
In this manner, the perceptions of vertical communication can be analyzed. The dependent variable is thus vertical communication and the independent variable is the perception of employees.

Procedure

The research focus will be on the methods of communication, the content of the communication and the perception of employees of this communication. This will be done in order to compare the answers of employees on different organizational levels and see if there exists a generally differing or similar perspective regarding the vertical communication within the organization.

The respondents will be informed verbally as well by stating the expectations of the research, and that all information will be kept anonymous within this research since the interviews will be recorded. The importance of the recording is to analyze the data in a further stadium

of the research and to be more accurate about the information given by the respondent. The respondents are also informed that the tapes would be destroyed after writing the research and only the written version of the information without names would be preserved. No material compensation would be provided. The names of the respondents will not be recorded and will be kept anonymous.

Expected Results

The main finding of this research is expected to be that vertical communication within the resort will differ based on different aspects such as the different cultures within the organization, methods and forms of communication. Furthermore, it is expected that the strategic apex will have a different perception than the operational core of the vertical communication present within the organization

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Ogieny Sharon Meijer- University of Aruba

Description

As a fourth year student at the University of Aruba (UA) at the Faculty for Accounting, Finance and Marketing (FEF), I am conducting my thesis research in order to graduate. Moreover, I was invited to represent FEF and participate simultaneously in the 'Honors Program' of the University College Utrecht (UCU) to be held for the first time in collaboration with UA through scientific research, together with other nine students from different disciplines, aiming to serve and benefit Aruba. Consequently, to combine both research, the Department of Economic Affairs, Commerce & Industry of Aruba (DEACI) granted me the opportunity to conduct both research in the department of Foreign Economic Relations and IDEA.

Therefore my final thesis will entail both qualitative and quantitative research, whereas the paper for the UA-UCU research entails preliminary results of only the qualitative research. The topic chosen is Sustainable practices of Aruban SMEs (small and medium enterprises) and their influence on the economy. As sustainability is a relatively new term, a better comprehension that best matched the Aruban SMEs circumstances was essential. Moreover, sustainable practices had to be defined as well as economic indicators in order to measure the influence that Aruban SMEs had on the economy. To achieve the latter, extensive secondary research was conducted to measure the influence of SMEs on the economy. Additionally, in-depth interviews with both, Aruban experts (each in their corresponding fields) and semi-structured individual in- depth interviews with owners/ directors of SMEs representing each sector of the business market. The premise was to obtain the SMEs perception, willingness, views, beliefs, opinions and motivations regarding this topic.

Interpretation

The challenge for this research was the absence of existing published academic material on this subject, especially for the Aruban context or the Caribbean in general. Moreover, secondary data needed to be recoded and correlated as the information, files and databases provided by the Chamber of Commerce, Central Bureau of Statistics, Social Security Bank and Department of Labour and Research needed to be categorized for the purpose of this research. This process was more time consuming than expected as the results are unique and have been conducted for the first time. Furthermore, I had to take into consideration the different ambiguities that were distinctive for each business sector and their economic activities in order to create a holistic interpretation for my final thesis while on the other hand obtaining more focused and significant data for the UA-UCU paper to deduce preliminary results.

This research conducted till now proved to be challenging and therefore more stimulating and exciting as it has no precedence. Moreover, it's a satisfaction and honor to know that I could contribute and serve my island in this manner. Furthermore, I got the opportunity to meet nine other remarkable students that are also passionate about doing research. It was truly enjoyable to share different points of view while doing group discussions/ review. This was a memorable experience and I feel fortunate to have had the privilege to be part of.

Outcome

I would have liked to present more comprehensive and complete results in the UA-UCU paper. Nonetheless, as this research is still ongoing, I could present only preliminary results of one section of my final thesis. I would have liked also to get to know the other students better, as we were busy conducting research and my busy schedule hampered me in attending all of the social activities with them. Even so, this has been a rewarding experience and hope for this 'Honor Program' to continue from many years to provide other students with the selfsame experience.

Sustainable practices of Aruban SMEs and their influence on the economy.

Ogieny Sharon Meijer, April 2015

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Abstract

There is not much attention being paid to the contribution that the Aruban Small and Medium Enterprises (SMEs) have on the economy and in turn could have on sustainability. Therefore, the objective of this research study is to establish through qualitative research[1]: the influence that SMEs have on the Aruban economy (through secondary research) and the perception of sustainable practices on the SMEs' business performance in the Aruban context (qualitative research). To accomplish the aforementioned, preliminary in-depth interviews were conducted with Aruban experts and with owners/ directors of SMEs representing each sector to obtain their perception of sustainable practices. SMEs (excl. micro enterprises) comprise 83.4% of Active Companies, 55.9% of FTE's and 47.9% of total wages paid, while contributing 48% to the GDP. If we consider the Triple P's in business being: people, planet and profit, the Aruban SMEs identify sustainability more in terms of profitability. Furthermore, the majority of owners/ directors think that innovations do influence sustainability and that the latter has negative influence on business' financials. Likewise, owners/ directors think that environmental management practices are necessary but not without legislation. Finally, the majority of owner/director believe that sustainable SMEs have a positive impact on the economy.

1 Qualitative research is a method of inquiry employed in many different academic disciplines, and is designed to reveal a target audience's range of behavior, thoughts, opinions and the perceptions that drive it with reference to specific topics or issues. Qualitative researchers aim to gather an in-depth understanding of human behavior, thoughts, opinions and the reasons that govern them.

Introduction

Despite being a relatively new term, 'sustainability' has already been much overused and misinterpreted. Achieving sustainability requires a sustainable development, which was most famously defined as: *"the ability to meet our needs without compromising the ability of future generations to meet theirs"* (World Commission on Environment and Development, 1987). Nonetheless, sustainable development and sustainability itself entail much more, amongst which, collective values and related choices. Therefore, becoming a political issue, almost certainly the supreme global political issue of this century. Since values, politics and the understanding of 'the earth' and its systems will keep evolving, notions of what is sustainable will never be static, making it possible to be approached in many different, and equally legitimate, ways (Prugh & Assadourian, 2003).

Aruba relies on a definition of sustainable prosperity from the World Watch Institute: *"Sustainable prosperity is a result of sustainable development that enables all human beings to live with their basic needs met, with their dignity acknowledged, and with abundant opportunity to pursue lives of satisfaction and happiness, all without risk of denying others in the present and the future the ability to do the same"* (Government of Aruba, 2014).

As aforementioned, sustainability is a global political issue, which has not been ignored by the Aruban government. The government's main focus is environmental sustainability, in particular renewable energy being the

100% sustainable energy target for 2020, "Green Aruba", with the assistance of Carbon War Room as partner (Government of Aruba, 2015). Additionally, there are plans to create a world-class walk-able destination for tourists and residents; to provide incentives for household retrofit and commercial energy efficiency; implement a sustainable approach to smart growth in the tourism sector to create an inspirational holiday destination; and to create an agriculture sector in Aruba that makes the best use of water resources (Government of Aruba, 2014). Regarding social economic progress based on sustainable growth, the government wants to achieve tangible evidence through "Bo Aruba" (your Aruba) and "Bo Bario" (your neighborhood) initiatives and by developing a "Third Pillar", where the island will become a robust gateway "Green Gateway" between Latin America, the United States and the European Union for commerce and investments (Government of Aruba, 2014).

Although, the Aruban government has various plans, projects and initiatives to guide Aruba on a sustainable pathway, not much attention is being paid to the contribution that the Aruban Small and Medium Enterprises (SME's) could have on further adding to this sustainable governance. While individually SME's may have relatively small social, environmental and financial impacts, nonetheless, cumulatively their impact is significant. Therefore, it is imperative that the government includes SME's in their sustainable programs and to think of them beyond the interests of a single economic entity, but to also consider more holistically the activities that these businesses engage in and how they affect the ecological and social contexts of Aruba.

This holistic view of SME's goes beyond environmentally related strategies and practices. It includes amongst others their social impact, innovation orientation and family influence, the latter especially as Aruba has a significant number of family businesses; family influence has to be considered.

Therefore, the objective of this research study is to establish through qualitative research: the influence of SMEs on the Aruban economy and the perception of sustainable practices on the SMEs' business performance in the Aruban context.

Consequently, qualitative research will be conducted through in-depth interviews with both Aruban experts in their respective fields and with owners/ directors representing each sector of the Aruban business community.

To achieve the aforementioned objectives, the research questions will be as follows:

Central Research question: What is the influence of sustainable practices on SME business performance by uncovering their perception of sustainability as well as their contribution to the Aruban economy?

1. *Sub-questions:*

2. How do SME's contribute to the Aruban economy based on their size, number of active companies, full time equivalent employees (FTEs), wages and consequently GDP?

3. How do owners/directors of SMEs describe sustainability?

4. What is the perception of business' owners/ directors regarding sustainable practices and business financials?

5. How do Aruban SMEs assess their social impact?

6. What do Aruban SMEs think of environmental management practices?

7. How is the influence of innovation on sustainable practices being perceived by Aruban SMEs?

What is the opinion of owners/directors of Aruban SMEs regarding a sustainable SME and its influence on the Aruban economy?

Hence, this paper will start by giving an introduction, followed by research relevance, literature review, methodology, results and discussions and lastly the conclusion and recommendations.

Relevance

The government of Aruba strives to successfully meet the challenges of the global economy on new terms. The approach has been comprehensive and inclusive of all sectors of society to ensure the milestones regarding sustainability since 2009 (Government of Aruba, 2015). As the concept of sustainability is taken seriously, Aruba's clean and green image may be easily tarnished by inappropriate business activities.

In the last five years, the government has envisioned sustainable prosperity through various investments, programs, plans and partnerships. However, at present, there is no research being done to assess how 'sustainable' Aruban businesses (in particularly SME's) currently are, the influence of sustainable practices on their business performance and the influence thereof on the Aruban economy. Furthermore, there is an insufficiency on academic information in this context for the Caribbean in general.

Moreover, vital and sensitive information available regarding the amount of active businesses, amount of employees per sector and economic performance indicators like working capital, assets and turnover are partitioned between various government departments, which at the moment hinders the illustration of the complete picture of the Aruban SME's.

Therefore, this research is relevant as it will aim to describe the influence of SMEs on the Aruban economy as well as to uncover the perception, willingness, views, beliefs, opinions and motivations regarding sustainable practices of SME business performance, which results would be beneficial and valuable for the government, business support organizations and businesspeople in general.

Literature Review

Hu (2010) states that SME's (enterprises having 99 employees or less) are beneficial to economic growth in terms of their share of the number of firms, employment and production value (a measure of output). This due to their pursuit of economic progress, where developing countries have generally come to recognize that the SME sector may well be the main driving force for growth. Due to the latter, besides the traditional measures of economic and operating performances, research of Borga et al. (2009) showed that the recent evolution of the economic and social context has led enterprises to consider and assess corporate environmental and social impacts as well, leading to the international debate on the advantages given by the business' adoption of socially responsible behavior and consequently sustainability.

From this point of view, for any country, including Aruba, sustainability is more than environmental practices and job creation. Sustainability is demonstrating that a properly defined comprehensive measure of wealth is maintained through time, capturing not only reproducible and human capital but also natural capital, health improvements and technological change (Arrow et al., 2012). Likewise, when applying this concept to SME's, sustainability entails besides their environmental management practices, their social impact, innovation orientation and family influence regarding company culture and social pressures (Uhlaner et al, 2012).

According to Borga et al. (2009), first level indicators compiled from various existing sustainability reporting guidelines and simplified to better represent the condition of smaller enterprises and divided into four main sections (company identity; economic impact; social impact; environmental impact) include amongst others: role in society and future commitments, economic performance indicators (like working capital and assets, turnover and net results), number of employees, health and safety in

workplace, employee training, description of training events towards local community, environmental policy and program, criteria for minimization of environmental impact when designing products and choosing materials, existing policies/instruments for minimizing energy consumption, existing policies/instruments for minimizing water consumption, existing policies/instruments for minimizing dangerous emissions, existing policies for recycling and minimizing waste and existing policies for reducing and re-using packaging wastes.

Furthermore, innovation processes towards sustainable development have received increasing attention in academic literature. Companies with sustainability integrated in their orientation and innovation processes show value creation (Bos-Brouwers, 2010). Sustainable innovation can be defined as the renewal or improvement of products, services and processes that not only deliver an improved economic performance, but also enable an enhanced environmental and social performance, in both the short and long term (von Weizsäcker *et al.*, 1997; Biondi and Iraldo, 2002; Alakeson and Sherwin, 2004). In this day and age, sustainable innovation has become the focal point to deliver evidence for the commitments of companies to the Triple (P) Bottom Line (Bos-Brouwers, 2010). Triple P's in business being; people, planet and profit (Elkington, 1997).

Finally, knowledge capability is essential if businesses want to develop and incorporate sustainability in their strategies as knowledge has been defined as the source of all economic powers (Toffer, 1990). Hence, applying this to sustainability; the objective of companies should be to become "learning organizations" that acquire, create and efficiently transfer knowledge in an effective way within the company, and alter their activities so as to reflect new knowledge and new abilities (Garvin, 1998). Similarly, Bolis et al. (2012) concludes that knowledge originates in people. Therefore, to ensure full sustainability it is necessary for companies to take responsibility for internal social aspects as well.

Methodology

Research strategy

- Desk research was conducted on international SMEs as well as by means of the Department of Economic Affairs, Commerce & Industry's (DEACI) annual reports and other government reports as for instance:

- Attaining Social Economic Progress: Based on smarth sustainable growth (Government of Aruba, 2014);

- The Creation of Sustainable Prosperity in Aruba: Aruba and the Vision of Prime Minister Mike Eman (Government of Aruba, 2014);

- 2020 Vision Aruba: Green Deck (Government of Aruba, 2015);

- Smart Growth Pathways: Building a Green Platform for Sustainable Aruba (McMahon et al., 2013);

Micro Small & Medium Enterprises Center: Support to stimulate innovative entrepreneurship through the MSME Center (Dijkhoff-Pita & Kort, 2011).

Nonetheless, there appears to be a dearth of existing published academic material on this subject for the Aruban context or the Caribbean in general. Therefore, data gathered through desk research of international SMEs, needed to be verified and corroborated to fit the Aruban context and in light hereof the best course of action was to approach Aruban experts from different specializations as better comprehension was required concerning the term 'sustainability' that best matched the Aruban SME's circumstances. Moreover, sustainable practices had to be defined as well as economic indicators in order to measure the influence that Aruban SMEs had on the economy. Therefore, semi-structured individual in-depth interviews were conducted with various Aruban

experts, while others provided vital information, files or databases necessary to calculate the aforementioned influence on the economy. These experts were as follows: Ms. Sonja Velthuizen (Chamber of Commerce), Mr. Herry Koolman and Mr. Jose Hernandez (Central Bureau of Statistics), Mr. Gino Croes (Social Security Bank), Ms. Yvonne Lee-Perez (Department of Labour and Research), Mr. Edward Erasmus and Ms. Lucia White (Free Zone Aruba), Mr. Jorge Ridderstaat and Mr. Rendell de Kort (Central Bank of Aruba), Mr. Ryan Peterson (University of Aruba), Ms. Marielsa Arends-Croes and Ms. Mendy Steenken-Wever (MGM Source).

- Subsequently, the recommendations and suggestions obtained were incorporated in a semi-structured questionnaire utilized for the succeeding in-depth interviews with 14 businesses' owners/ directors representing each of the Aruban sectors. From each sector, one random owner/ director was selected of businesses having 99 employees or less. The sectors are based on the Aruban Standard Industrial Classification of all Economic Activities; ISIC- Aruba[2] (CBS, 2007), being as follows:

- A. Agriculture, hunting and forestry
- B. Fishing
- C. Mining, and quarrying
- D. Manufacturing
- E. Electricity, gas and water supply
- F. Construction
- G. Wholesale and retail trade
- H. Hotels and restaurants
- I. Transport, storage and communications
- J. Financial intermediation
- K. Real estate, renting and business activities
- M. Education
- N. Health and social work

O. Other community, social and personal service activities

Delimitation of the research

I should make clear that information, files or databases provided to calculate the influence of SMEs on the Aruban economy are based on secondary data that was correlated and recoded to comply with the required criteria and variables. Moreover, due to privacy and sensitive data, in certain cases, summarized materials by business branches were supplied. Additionally, due to the nature and small scale of qualitative research, no claims of generalization to the wider population can be made through this study based on the in-depth interviews of the SMEs' owner/ directors.

Participants profile and selection

The owners/ directors (interviewees) were selected randomly from over 4000 businesses categorized in 14 sectors. From each sector, 3 candidates were randomly picked, where one was selected, based on availability, and called to schedule a meeting, this resulted in a representation of the 14 Aruban sectors. Their employees varied from (sole proprietor) 0 to 80 employees. Regarding gender, the interviewees consisted of 8 Males and 6 Females. Furthermore, the operating period ranged from 3 months to 75 years.

- Although, the owners/ directors were selected randomly, they needed to comply with the following criteria:

2 The ISIC Aruba does not differ a lot from the ISIC, revision 3 of the United Nations. Aruba is predominantly a service industry country. For this reason more classes were added at the four digit level in the service activities.

- Must be18 years or above;
- Must not be a public administration or defense (no government participation);
- Their businesses must have 99 employees or less;
- Each owner/ director must represent one sector;

The selected group must consist of both genders (male and female).

Research ethics

Individual face-to-face interviews were conducted to owners/ directors who upon invitation would participate voluntarily. Furthermore, they were informed that there were no right or wrong answers and no consequences for refusing to take part in the study or to answer a specific question. Furthermore, participants were informed that the interviews would be recorded. Nonetheless, their identity and company will remain anonymous and confidential as they were coded by sector. To provide a similar protection to the experts whose names were mentioned, their information, suggestions and recommendations are presented as a single summarization.

Data collection and process

Individual face-to-face interviews were conducted at a convenient venue chosen by interviewee, which could be their office, home or any other central place. The interview sessions were recorded and lasted between 30 minutes and 2 hours. A semi-structured questionnaire was prepared to guarantee that all relevant topics were covered. However, it was still possible to explore, probe and ask further questions that deemed interesting or relevant.

To analyze the data, transcripts were made from each interview with owner/directors utilizing AudioNote (Notepad and Voice Recorder). Accordingly, this data was transferred to MAXQDA 11 Software to be coded and analyzed. These codes were categorized for thematic summarization. Correspondingly, these themes were further distributed among the sub-questions in order to answer the main research question.

Results and Discussions

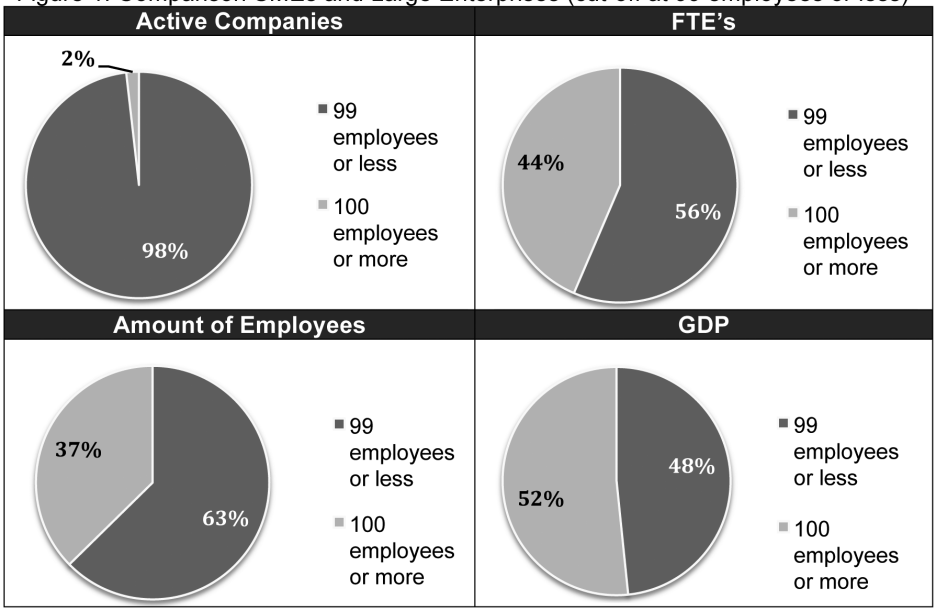
Aruban SMEs and their influence on the economy
Aruban experts were interviewed to gather data necessary to measure the influence on the economy and to acquire better comprehension regarding sustainability and sustainable practices on the island. Data provided from the aforementioned experts and government departments being Chamber of Commerce, Social Security Bank, Department of Labour and Research and Central Bureau of Statistics were correlated, recoded and categorized by ISIC- Aruba to analyze and measure the influence that SMEs have on the Aruban economy. From the most recent available data and interview with experts, the major influence indicators concurred to be: SMEs size, number of employees, full time equivalent employees (FTEs), wages and GDP, *see Table 1*.
As can be derived from *Table 1*, SMEs (excl. micro

Table 1: SMEs influence on the Aruban economy

Enterprises (CBS, 2010)	Employees	Active Companies		FTE's		Wages	
Micro	0-1	485	14.8%	225	0.5%	11,263,034.41	0.5%
Small	2-9	2,130	65.0%	6,721	15.2%	290,432,403.04	13.2%
Medium	10-49	499	15.2%	10,684	24.2%	453,759,312.12	20.6%
Medium-large	50-99	104	3.2%	7,278	16.5%	312,469,857.88	14.2%
Large	≥ 100	59	1.8%	19,225	43.6%	1,139,770,094.86	51.6%
Total		**3,277**	**100 %**	**44,133**	**100 %**	**2,207,694,702**	**100 %**

enterprises) comprise 83.4% of Active Companies, 55.9% of FTE's and 47.9% of total Wages paid. Moreover, if we make the comparison using large enterprises as the cut-off point, this would result in a contribution by the smaller enterprises of 48% to the GDP, while covering 98% of Active companies, 56% of FTE's and 63% of all Employees, *see Figure 1*:

Figure 1: Comparison SMEs and Large Enterprises (cut-off at 99 employees or less)



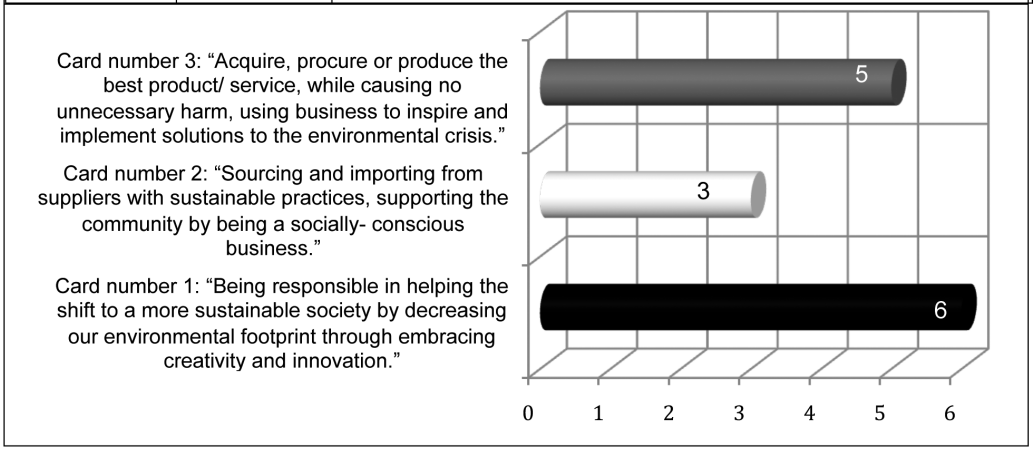
Furthermore, interviews from these selfsame experts coincided in various elements that would help describe sustainability and sustainable practices. Although, sustainability is a broader term than presented in this paper, nevertheless it was concurred that the term "sustainability" for the Aruban context would be understood by mainstream, having the following rudiments: continued growth and innovation (e.g. financials; turnover, cost of doing business); protection of the environment (e.g. absence of pollution, depletion of natural resources, waste production, water & energy consumption); taking care of employees (e.g. through; education (work-environment etc.); supporting the local community (e.g. through donation of time, money or resources and investing in local products and services). Additionally, sustainable practices should entail: business performance, assessments of social impact, innovation and environmental program and practices.

Aruban SMEs description of sustainability

The aforementioned elements were incorporated in the questionnaire, where owners/directors of SMEs were asked how they would describe sustainability through the choosing between three cards and/ or own description, see results in *Figure 2*.

Figure 2: Interviewees description categorized in themes and cards chosen

Themes:	Times mentioned:	Relevant quotations as an illustration:
Profit	7	"because the sales dropped, then, what is over is not enough to cover the expenses and therefore not sustainable"
Environment	5	"Sustainability is developing activities, geared toward improving the wellbeing of a country, but it has to be in balance between social economic and environmental factors"
Lifestyle	3	"It's a way of living…start at home; cut plastics, be aware of what you are buying, what you are using, you know, what are you cleaning your house with."
Natural Resources	2	"Sustainability is for me using our natural resources for a long term"
Recycling	2	"Other factors such as recycling"
People	2	"Sustainability is developing activities, geared toward improving the wellbeing of a country, but it has to be in balance between social economic and environmental factors"
Chemicals	1	"we have changed everything that we used to use for fertilizers and herbicides that were not organic or user friendly or sustainable"

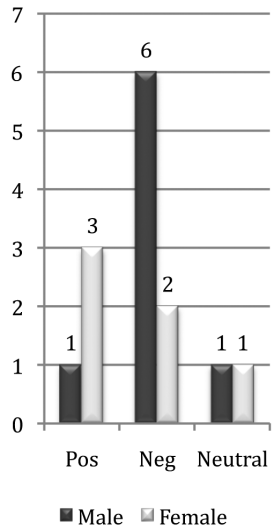


Aruban SMEs and sustainable practices

Business financials

The perceptions business' owners/ directors have regarding sustainable practices and business financials are illustrated below, *see Figure 3*. The majority of interviewees (8 from the 14) perceive sustainable practices as having a negative influence on their business financials as sustainable changes or practices demands according to them and their capacity, a significant investment. Moreover, even if they would like to become more sustainable, there is no financial institution, fund or subsidies that facilitates or aid in mitigating these initial costs.

Figure 3: Positive/ negative perception of sustainable practices and business financials

Positive Influence:	Negative Influence:	Perception Chart:
"once you go green, or you're going to the sustainability ecotourism, it's gonna eat from your profit. But again then, it's come back to sustainability; you keep on sustaining it for many years to come. It's not only a year, two years, it's looking at the whole concept." "Operational costs can decrease then the prices can drop and the market can provide a better quality."	"you have to be aware that there are problems….the biggest challenge is people" "policies could have an enormous impact on the business financials, as it requires almost a complete transformation of standard business procedures, and also significant investments." "You have to invest too much in the beginning without the certainty of getting it back, and still you have to ask yourself if you can breakeven." "It's impossible at this time do to the technical challenges as well as the costs." "Probably, because sustainability comes with a price and so it might be that your product will become more expensive"	

Social impact

Aruban SMEs assess their social impact through the following compilation: customer's education of sustainable products, quality products (food) for tourists, no use of chemicals, through the products recycled it is measured on how much product is not going to the landfill, good balance between care for business results and care for its workers, safe working environment by continual training and dedication to safe practices, provide employees with a secure income over the long run, programs in place which helps charitable organizations, sponsoring of environmental activities, placing garbage cans around the island, sponsoring beach cleaning, affordable prices, customer complain lines, and donation of time and resources to charitable organizations.

Environmental management practices

Aruban SMEs think that environmental management practices are necessary but not without legislation. Moreover, interviewees think that there are no organizations on the island that could go out and certify the SME, provide it with assistance and help it go through the process. Furthermore, it is believed that the use of more LPG in Aruba's industries would greatly reduce the negative impact on the environment of the use of Heavy Fuel Oil, such as currently is the case with the WEB power plant. In addition, SMEs think that recycling can reduce cost and lower consumption. On the other hand, 1 interviewee supports environmental management practices, but not in the sense of all the dome and gloom of global warming. There was also 1 interviewee that

thinks that at present, it doesn't have much influence, while another thinks that the big companies have their sustainability environment in place, and yet they leave a footprint, bigger than a SME can ever do.

Innovation

Interviewees were asked what their opinions were about the influence of innovations on sustainable practices. From14 interviewees 12 believed that innovations influences sustainable practices, whereas 2 remained neutral as they were of the opinion that it depends on the sector, type of business and feasibility. Their perceptions of innovations are: new machines, new clients, efficiency in production, sustainable energy systems, knowledge through seminars, new technology, new procedures and processes and to go digital.

Aruban SMEs owners/directors perceptions on sustainable SMEs and their influence on the Aruban economy

The opinion of owners/directors of Aruban SMEs regarding a sustainable SME and its influence on the Aruban economy can be summarized through the following quotes:

- A sustainable SME can become a role model for other SMEs to follow;
- Due to the nature of a sustainable business more money is gonna stay on the island;
- "A sustainable SME will positively influence the Aruban economy as it creates jobs on a smaller scale that will contribute by paying their share of tax etc.;
- Yes, if there is money available it will be better for the future. In the future we need to be more sustainable; it will provide more jobs;
- If our economy is managed by the 70% of small businesses, right now...but if we see it based on percentage that I personally manifested of 70%, it has a big influence on the economy;
- Surely sustainable SME's will influence the economy, but depends on what 'green' is. The support of the government is also very important;
- Well it has been said many times that we cannot go on with having only tourism as being the only economical pillar within the society, so if these are the projects that you have to handle, yes;
- All the impact will be on the government, in the sense, for example WEB, that all the money of the people of Aruba, and not of the Hotels or other big companies, will be invested in WEB and if you go outside the green, it will be strongly impacted, because their profits will diminish. But you have another way to invest in that sector, but it will be difficult, because it will lose many employees, we are talking about one of the biggest companies of Aruba and it will be risky. The government must come with a plan to catch those employees of WEB. The company must be self-sufficient (in the future). Self-sufficient takes away the responsibility from the government of all that has to do with the economy;
- If you are not sustainable, than the business you can go bankrupt with the consequence for the country.

From these 14 interviewees, 4 were of the opinion that a sustainable SME would have "an influence" on the Aruban economy, 8 were of the opinion for it to be a "positive influence", 1 thought it would have a "negative influence" regarding the utility companies and 1 had no opinion on the matter.

Conclusion and Recommendations

This is the first study conducted regarding Aruban SMEs and sustainable practices. Therefore, it was imperative to start by examining whether these SMEs had any influence on the Aruban economy. The results demonstrated that SMEs (excl. micro enterprises) contributes with 83.4% of Active Companies, 55.9% of FTE's and 47.9% of total Wages paid, as well as 48% to the GDP. These results are even higher if Micro enterprises are included, being 98% of Active companies, 56% of FTE's, 63% of all Employees and 48.5% of all Wages paid.

SMEs have a substantial contribution with respect to the number of Active companies, number of employees and the amount of FTE's. Previous to attempting to uncover their perception of sustainable practices, it is important to comprehend how they describe sustainability and if their description differs from the expert's and literature review like the Triple P's theory in business being: people, planet and profit. SMEs concurred with "profit" the most, followed by the "environment". With respect to "people" it was the least and was in some instances when referred to employees, associated to costs of doing business. Nonetheless, SMEs related "sustainability" with terms like lifestyle, natural resources, recycling and harmful chemicals as well as pollution and waste.

Therefore, this connotation of sustainability to profit (long term continued existence) can be also deduced from the majority of interviewees (8 from the 14) as they perceive sustainable practices as having a negative influence on their business financials. Regarding their measurement of social impact; even though it entailed various activities, the reoccurring ones engaged in were programs, donations and sponsoring of charitable organizations and environmental activities.

Moreover, the findings showed that Aruban SMEs think that environmental management practices are necessary but needs to be enforced by legislation and that there needs to be an organizations on the island that could certify and provide the SMEs with assistance and support it go through this process. With respect to innovations, 12 from the 14 believed that innovation influences sustainable practices. Finally, 8 from 14 owners/directors of Aruban SMEs believe that a sustainable SME has a positive influence on the Aruban economy.

However, the main limitation using this research method is that the findings are limited to the perception of the interviewees, which makes it not suitable for generalization or quantitative predictions. Additionally, this paper is based on preliminary findings derived for my final thesis. Correspondingly, based on these preliminary results it would be recommendable for relevant government departments and business support organizations to promote and facilitate programs that educate Aruban SMEs on the holistic approach to sustainability, as knowledge capability is essential if businesses want to develop and incorporate sustainability in their long-term strategies instead of short-term tactics. Moreover, subsidies are necessary to aid in the process of assisting Aruban SMEs in their contribution to the sustainable efforts and initiatives the government is building upon.

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Caribbean dreams and a thesis

There is more to research than writing on the beach

As I had already written a thesis before, the thesis part of the research collaboration was very much in the back of my head when I was on the plane on my way to this island. What was in the forefront of my brain was that I was going to another continent for the first time in my life. However, as soon as we arrived we were welcomed with open arms and my nerves about being on another continent disappeared as snow for the Aruban sun.

The coming weeks were filled with introductions, sunburns, explorations, finishing our methodologies, and meeting our local supervisors. Although we each officially had only one local supervisor, the research group and all teachers involved all helped just as much with finding the right contacts and giving suggestions on the research of each individual.

As soon as my methodology was complete, I started the research I came here to do: investigating energy saving practices of the hotels. After a few hotels already I became really happy with my topic. I was learning interesting things about the technology hotels use, and was able to provide tips on how to decrease energy consumption right away. The most important reason I loved the topic, was because of the tours I got at the hotels. In addition to all the machinery (freezing cold cooler rooms, and boiling hot heater rooms), I was allowed to see many other amazing things.

While visiting the pump system to a large pool in one hotel, we passed a couple of parrots that were just taken out of their cages to take pictures with the guests. My tour guide saw me look at the majestic animals, and a few quick words with the caretaker later three huge parrots were standing on my arms.

At each hotel I also asked to see a room, to check the air-conditioning unit. At this one hotel my tour guide started beaming and brought me to the top floor. Proudly he said that the suite we were about to enter, was the one that the king and queen of the Netherlands would stay in during their visit in May this year. Amazed I walked trough the beautiful space, and we walked onto the balcony careful not to touch the balustrade as a note on the window had warned us that there was wet paint. When we walked back inside the painters looked shocked. Turned out the wet sign was to warn people the floor of the balcony had just been painted. Willem-Alexander and Máxima, if you read this: I'm sorry I walked on your freshly painted floor.

Sometimes I was allowed to be higher than the top floor: more than once I ended up on the roof of a hotel looking at solar power units, the ever-stretching ocean, the pearly white beaches, the hills of Arikok, the always visible Hooiberg, and all the other things on this island I now call home.

Reduction of energy consumption at Aruban hotels

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INTRODUCTION

Mike Eman announced in 2012 that Aruba is going to be energy neutral by the year 2020: all energy consumed on the island should be generated through renewable sources by then (Eman, 2012). The government itself is taking steps towards achieving this goal through, for example, reducing import tax on energy efficient items and equipping all public buildings and road lighting with LED technology (Renfro, 2015). Nonetheless, with over 900.000 visitors per year and as a major driver of the economy of Aruba, the tourism industry is an important place to address energy efficiency as well (McMahon, Cullinen, Lee, & Kazemi, 2013). Although this is an important factor on the road to sustainability, little is known about the current sustainable policies of hotels.

Environmental policies at hotels

Due to the fact that such a large proportion of the local economy, as well as the income of all hotel staff, is dependent on tourism, many hotels are careful with greener alternatives. Some changes to a more sustainable alternative are more easily made than others. Technical changes have a low threshold of implementation; although a change can be very expensive - as is the case with for example solar boilers or increased insulation in the rooms - such measures will decrease energy consumption leading to a return of investment over a few years. Behavioural changes have a higher threshold to be introduced in the tourism sector. Managers can exert a certain amount of pressure on their staff to increase the temperature of the air-conditioning unit a little, or to close the sun blocking curtains in a room. Pushing guests to do the same would not reflect well on hospitality and is therefore not pursued. Nonetheless, there are little nudges that hotels give guests to make them more aware of energy saving practices. These are often in the form of reminders to reuse towels, or to close the balcony doors.

Some hotels in which these nudges are more frequent promote themselves as being green hotels. They often do this through accreditations from worldwide organisations such as 'green globe', 'earth check', or

'travellife'. These certifications tell to what extent a hotel complies with international guidelines on sustainable behaviour. Because of these accreditations, hotels are able to show their commitment to environmental practices and highlight examples of outstanding progress through achievement awards (Griffin & DeLacey, 2002). Through these accreditations there are some guidelines on how hotels can become more sustainable. Nonetheless, these guidelines are not specifically tailored to Aruba, as the accreditations are a global initiative.

In this exploratory research an inventory of techniques (technical and behavioural) to reduce energy consumption will be presented, with the aim to provide an overview of possibilities for hotels that aspire to be greener.

RESEARCH DESIGN

All 33 'Hotels & Resorts' as well as all 'Timeshares' as published on the official website of Aruba (aruba.com) were asked to cooperate in the research. In total, 17 contact persons at hotels responded and were interviewed individually. The contact persons ranged in job description from environmental manager to engineer to landscaping manager. During semi-structured interviews a few general questions about the hotel were asked first, enquiring about the amount of rooms, the average cost of a room, whether the hotel was timeshare or not, and if so, how many rooms, the average occupancy, and the year of build of the hotel. The rest of the interview concentrated on reduction of energy consumption and the involvement of both staff and guests in environmental policies. In order to get as much information as possible, the discussion of reduction of energy consumption was broken up in various parts:

- Energy efficiency (e.g. replacing old incandescent light bulbs with LED)
- Energy saving (e.g. increasing insulation through double glass, or placing air curtains)
- Fuel switching (e.g. from a gas boiler to an electric boiler)
- Source changing (e.g. from taking energy from the grid to producing it via PV cells)
- Supply-demand management (e.g. monitoring guest behaviour to see what times the boiler can be switched off)

Each category was introduced with various examples to give an idea of the sort of answers expected. The categories were not always mentioned in the same order: when the interviewee naturally landed on a different one, that category was further explored. Where possible, the interviewed personnel were asked to provide the year and month of the implementation of each change mentioned. The last part about behaviour included a question on the involvement of guests (e.g. towel policies or green pages in the guestbook in their room), and on the involvement of staff (e.g. through workshops or notices to remind staff to switch off the lights). In addition, interviewees were asked if they could give a short tour of the premises - this way, any changes that had not been mentioned before would still be introduced. At the end of the interview, hotels were asked to provide energy consumption data from the last few years for gas and electricity. All information was promised to be treated confidentially, in order to be able to see to what extent the chosen methods had influenced the total energy consumption. In some hotels the questions about

technology were discussed with someone else than the questions about behaviour, as in some cases two different people were in charge of these specific topics.

Data analysis

TECHNICAL CHANGES

The effectiveness of each technique implemented to reduce energy consumption is difficult to analyse, because there are a myriad of factors that need to be taken into account. Examples of these factors are temperature and occupancy (Kirk, 1996).

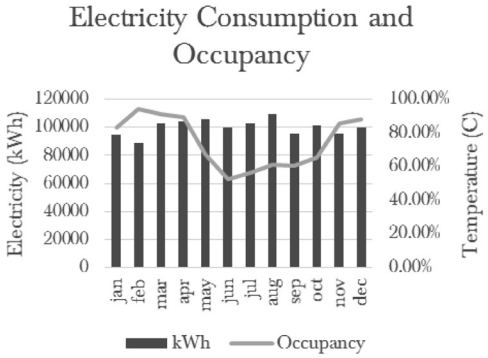

Figure 1: Electricity consumption as compared to Occupancy

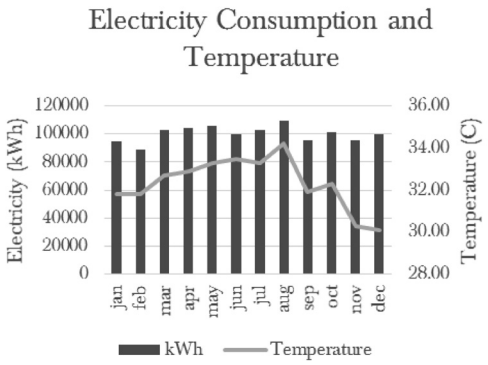

Figure 2: Electricity Consumption as compared to temperature.

Figures 1 and 2 show that spikes in energy consumption correlate with temperature change and occupancy of the hotel. This leads to a lot of variation within one year qua energy consumption. Other factors that should be considered are for instance the size of the hotel, whether the lobby has a natural air conditioning system or an artificial one, and number of office spaces that are in use.

Similar to the interview structure, the inventory was categorised according to different ways to reduce energy consumption: energy efficiency, energy saving, fuel switching, source changing, and supply-demand management.

A multiplicative decomposition analysis needs to be conducted in order to determine how much each change contributed to lowering energy consumption. This kind of analysis allows for all factors to be taken into consideration.

BEHAVIOURAL INVOLVEMENT OF GUESTS AND STAFF

As discussed previously, technical changes are implemented far more easily than changes in behaviour. Therefore, a model will be used in order to determine to what extent hotels promote three different the following stages of behavioural change for both staff and guests (Boekaerts, 1992):

1) Decision to change
2) Initial active changing
3) Generalisation of skill

The first stage was operationalised as whether an environmental policy was in place or not. In order to analyse the second stage, it was examined whether staff

keep to the policy and how managers react if personnel do not act according to the environmental policy. For guests it is dependent on whether or not they make use of the opportunities the hotel offers to be more sustainable. For the third stage it was analysed how often reminders are necessary for guests and staff to keep to the environmental policy. Examples of actions that were considered 'reminders' in this study are meetings, notices, or pamphlets.

RESULTS

Energy efficiency

Many of the changes considering energy efficiency concerned replacement of an old item for a newer, more efficient item. Figure 3 shows that every change into a more efficient item correlates with a slight decrease in energy consumption, even when temperature and occupancy did not decrease.

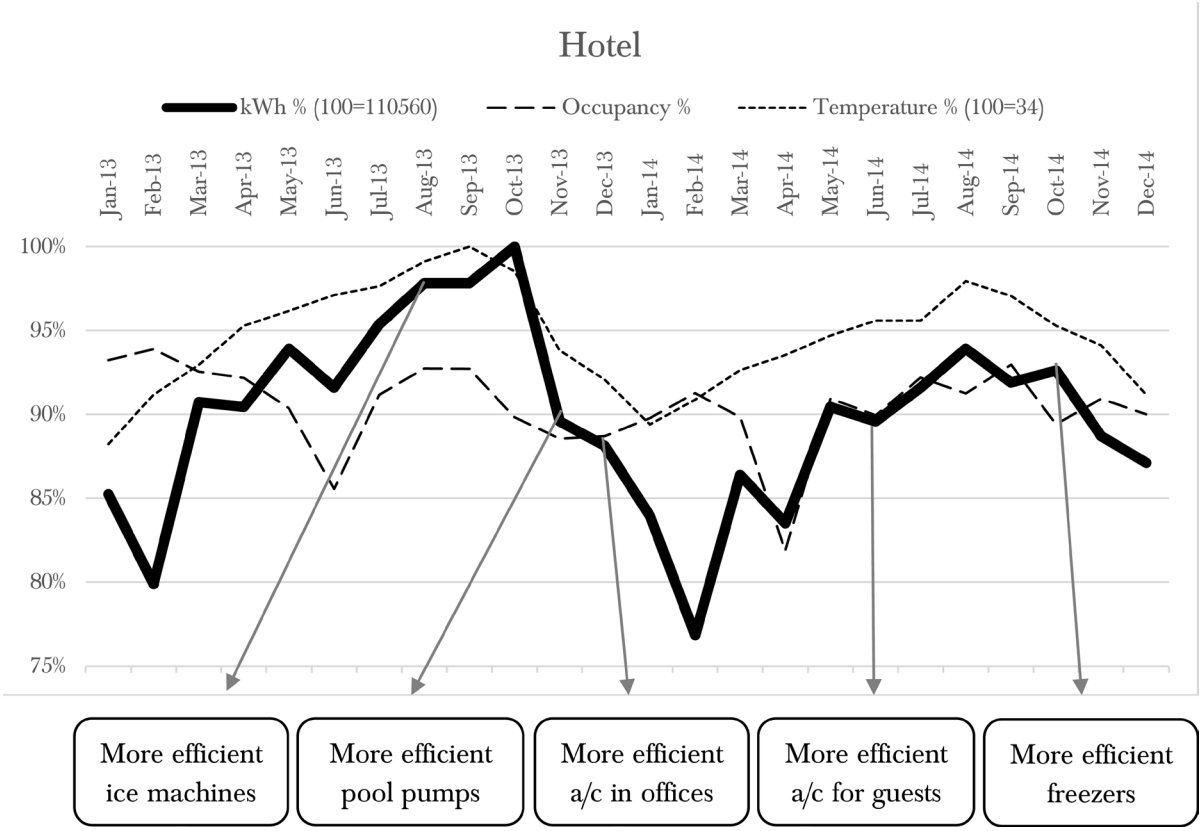

Figure 2: Electricity Consumption as compared to temperature.

There are a few concrete categories in which energy efficiency measures can be divided. Firstly there is a very easy measure: lighting. Light Emitting Diodes (LEDs), very efficient lighting, can be installed in multiple phases in order to ensure that there is no hinder from the building activities. Moreover, the lights can be bought in small amounts, which is attractive as one big investment may scare managers off. Each space (inside and outside) at a hotel has lights that are on for a large amount of time. Hotels that have switched completely to LED mentioned that they use at least 30% less energy for lighting than before installing LEDs.

Installing chillers or cooling towers to provide cool water or air to the air-conditioning units and replacing all the air-conditioning units on the property to newer, more efficient ones, are larger investments. As the air-conditioning system needs to be on at all times in hotels to prevent the formation of mildew, it is important that this equipment uses as little energy as possible. The inverter system is a popular choice in this case. Regular air-conditioning units react when the set point temperature is bypassed by multiple degrees; this switching on and off leads to peaks in energy consumption and large differences in temperature. An inverter unit, on the other hand, continuously adjusts the temperature to the set point. This avoids electricity peaks and leads to a decrease in energy consumption. Hotels report that the difference in energy consumption between a conventional and an inverter air-conditioning unit can be as large as 40%.

One of the most frequently used places in a hotel is the swimming pool. The larger the pool, the more pumps are needed to keep the water fresh. Updating to a completely new pump system makes the system more efficient, and helps to keep the pool clean. A new pump system usually includes a frequency drive. Frequency drives ensure that the pressure on the pipes is constant, which reduced the chance of leaks occurring.

Energy saving

Measures in this area are often tested first before they are installed 'en masse' in hotels, to see where they have the most effect. Sun protecting foil, for example, is mostly necessary on those windows that face the sun most. However, when a window is usually in the shadow, this foil has little added value and may not be worth the investment. Not all hotels have made such an investment yet. Sun blocking curtains, however, seem to be the norm everywhere. These curtains keep the sun from damaging the furniture in a room, and from influencing the temperature.

Another way of protecting a building from the heat of the sun is through insulation. It is possible to increase the insulation in a room by installing weather strips on doors, and placing double glassed windows. Another option is to place a white material on the roof in order to reflect the sun from the building. The cold or the heat of water can be preserved as well, by sufficiently insulating the water pipes.

The right temperature can be more efficiently maintained through air curtains. These 'curtains' will keep the cold inside the room. In order not to have guests step through a blow of cold air every time they leave their room, another way to protect the temperatures in guest rooms is through air-conditioning in the hallways. This way the

temperature difference between outside and inside is smaller, such that less cold is lost when the door is opened. Another way to prevent the air-conditioning from working harder due to an opened door, is through a smart system. In such a system the air-conditioning unit is connected to the door: when the door is open for more than 20 seconds the unit will stop cooling. In hotel lobbies it is common to use the natural airflow (by placing openings on both sides) to keep the place at a nice temperature.

Other measures to increase energy saving are adjusting the laundry programmes to more efficient ones, only washing when there is a full load, and installing a sky roof: natural lighting through the roof means that there are no lights needed in hallways during the day.

Fuel switching & source changing

Besides the government, many hotels have already switched to other resources than gas or oil. Various hotels heat their water through so called solar boilers. These take the heat directly from the sun through solar panels in order to warm up the water. This is different from photovoltaic systems which convert sunlight into electricity rather than warmth. This technique is also used in hotels, but it is less common than solar boilers.

Another way to heat up water is through a heat exchanger system. The heat that is produced as a by-product of a chiller can be lead to the heat exchanger where colder water will take up the heat from the chiller, thus increasing in temperature. Most hotels have a gas boiler as back-up in case there is not enough sun, and sometimes also to heat up the water enough to prevent bacteria. Some hotels also use artificial UV light to kill these bacteria, instead of heating up the water further.

Supply-demand management

By monitoring demand it is possible to conclude that it is not necessary to always leave everything running. For example boilers can be switched off during the night, as most people do not use warm water during those hours. In addition, lights can be equipped with a motion or light sensor such that they automatically switch off when there is no demand for them. Similarly, air-conditioners in offices can be switched off during the weekends if the rooms are not in use.

It is also possible to manage the supply of cold air for the guests. For example during the night the temperature set point of the air-conditioning unit can be increased a little without the guest experiencing hindrance. Similarly, an air-conditioner can be set to return to a pre-installed temperature as soon as guests leave their room. The air can be cooled to the preferred temperature of the guest again, when they return to their room. Sometimes the air-conditioner is programmed in such a way that the guest can only change it four degrees above or under the set point temperature that the hotel installed.

Behavioural involvement guests and staff

As explained in the previous paragraph, there is a wide variety of factors that can be controlled in the room of a guest without them experiencing any inconveniences. Generally, the pressure on guests to perform sustainable behaviour tends to be very subtle. Mostly, pressure consists of notices reminding guests to close doors or leaflets with

reminders to switch off lights when leaving the room. Some hotels put 'green pages' in their information booklets with more information about the hotel's sustainable policy, and how the guest can contribute to this. Instead of using paper, it is also possible to have one of the channels on the TV dedicated to this issue.

In some cases guests are asked to participate more actively. For example with a towel policy guests have to decide whether they want their towels washed: leaving them on the floor or in the bathtub is a sign to have them washed, but hanging them on the towel rack means the towel will be used again. Guests can also be invited to join events such as 'earth hour', a global initiative where lights are switched off for an hour during the evening. For timeshare locations, owners attend so-called owners meetings during which they are reminded that when energy consumption is kept low, the maintenance fee will be lower as well. During these meetings it is sometimes also discussed how to keep energy consumption low.

Guests are usually stimulated to reach only the first level of behavioural change (decision to change), with just a few outliers to the second level (initial active changing). The first level is achieved through the notices that are left for the guests. After this it is their own choice whether they want to do what the notices suggest or not. The second level is achieved when guests indeed make the conscious decision to use their towels a second time, or to participate in an event such as earth hour. Nonetheless, as long as it stays the guest's own choice whether or not to engage in any sort of sustainable behaviour, there will be no harm in presenting more opportunities to act sustainably.

Staff, on the other hand, are encouraged more than guests to behave in a sustainable manner. In fact, the first level is often mandatory to them through policies (e.g. closing curtains, switching off lights, turning up air-conditioning). The second level of behavioural change is already achieved when they keep to the policy. Some hotels have special classes and workshops for their employees to understand the importance of sustainable behaviour. Reminders are given during pre-shift meetings. Here the staff is reminded to close the curtains as far as possible when working in a room, and to always set the air-conditioning higher and switch off the lights when they leave. For office staff reminders are given via notices about switching off the computer and lights when leaving the office. With these reminders in place, this level of initial active changing is certainly maintained. When a member of staff does not need these reminders, it can be assumed that level three has been reached: generalisation of skill. The workshops and classes are a way to show the importance and the relevance of decreasing energy consumption, and may eventually also lead to staff performing similar behaviour outside the workplace. This is already promoted in some hotels through showing in workshops how to save energy in the hotel and at home, or by stimulating employees to carpool to the workplace together.

CONCLUSION

The above summary of energy saving practices in hotels on Aruba should be considered an extensive guide to what are useful techniques to reduce energy consumption in this sector. Currently it seems that many technical changes are already in place, whereas there are still advances to be

made in behavioural changes. Since there is a reasonable hesitation to involve guests, this is an area that is currently still underrepresented in sustainable policies. In the future it would be interesting to see to what extent guests can be involved (and want to be involved) while not feeling unreasonably pressured to do so. If a hotel wishes to avoid guest involvement, the other methods discussed may be of help. There is evidence that all measures discussed are effective in hotels on Aruba. The results may therefore be interesting to all hotels on Aruba and on other Caribbean islands.

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I want to thank all people that helped during the process of doing my research. First of all I want to thank all students in the research collaboration group (specifically Florianne Sollie with her timeless perseverance for peer reviewing), as well as all teachers involved (especially Eric Mijts and Jocelyn Ballantyne) for their support and suggestions in shaping my research, as well as their support in everything outside my research. In addition I want to thank all hotels and their employees that responded to my call, and made time to meet with me and proudly showed me their property. A big hearty thank you to Dagmara Avanindra from Bureau Innovatie, who was able to help me deal with some local particulars. And last but by far not least I would like to thank Andrea Ramirez Ramirez and Rob van der Vaart for their endless patience and written guidance during this journey.

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Multidisciplinary project

Working with student from different disciplines these last months was very interesting. Not only were they from different disciplines but also from a different country, which makes their perspective on certain subject different that yours. So when we sat together to give feedback to each other you could see that each and every one of the research topics where approached from different perspectives. This surely led me into thinking twice about matters I already thought of in the first place regarding different aspects of my research. In this manner my view on and approach towards my research topic felt much more complete, which made me more confident and eager to start and continue doing research.

In these feedback sessions helpful data, ideas and data sources were also shared between us which definitely helped your research run smoother. All of this made feedback sessions so much valuable. Feedback was so elaborated that every session time ran out on us. Running out of time should definitely be prevented in future projects.

These sessions also taught me different ways of obtaining information and how to carry it out. For example, it made me reconsider interviewing people just by hearing how the rest were interviewing people.

Moreover, the preparation for each feedback kept me on track with my research instead of giving me the change to procrastinating most of the time.

What I learned about the project is thus how valuable working as a group can be and how valuable feedback is in general, even more if it's from someone who's studying something different than you.

During the whole project I also had the feeling we were advancing as a group. I was always interested in knowing what advancement everybody had made since the last feedback session. What I also enjoyed about the project was that I was involved in their research as well. I also got to provide my view on their topic and participate on field trips relevant to their research, which in a way also turned out really helpful for my research given most of the research topics overlapped. This overlapping was also something that made the project feel as a whole instead of individuals conducting their own researches. Overlapping of research topics in these kind of projects is highly recommended.

Something I didn't expect and that is specific to this project, given its nature, is the fact that it has left an impression on me. I've become even more aware of our environment thanks to the new information I've obtained from all the places we've visited and all the people we've talked to. I'm glad I could have formed part of this project and would surely recommend it to other students

Legal perspectives on solid waste management in Aruba

Research

Francis Alexis Malca Caceres, April 2015

Introduction

How are pest control businesses supposed to properly dispose of all the products they won't be using anymore? Insecticides and other chemicals for example. Is a business license required when providing waste disposal services? Who are the ones appointed to monitor and investigate if such businesses and the public in general are complying with the legislation involved? These are merely some of the questions that show the importance of having legislation regarding waste management and everything surrounding it. It is a crucial, if not the most crucial, step towards insuring a proper waste management, which in its turn will help minimize and prevent health, safety and economic problems. However, this does not mean that raising environmental awareness among citizens is unnecessary.

Thus given the importance of waste management in any country, it raises the question: what legislative framework does Aruba possess surrounding waste management? This main question will be dealt with and answered in this paper. However I will be directing my focus specifically on solid waste - waste sources ranging from households to industries and medical facilities. I will start by introducing the methodology I used during my research and how it worked out in practice. Thereafter I will supply the data gathered along with an analysis of it. Lastly I will provide you with my conclusion regarding the research.

Methodology

Given my research question it is obvious that the first place I turned my attention to was legislation regarding waste management. As any local law student knows, this is easier said than done when it comes to Aruban legislation, especially regarding explanatory memoranda and delegated legislations, where primary legislations are further elaborated.[1]

I first searched relevant literature but as expected there wasn't that much written about the topic regarding Aruba. Then I searched online, i.a the Aruban Government, Parliament and Advisory Council website.[2] I barely found legislation regarding waste management and mostly of them where primary legislation. Contacting Directie Wetgeving en Juridische Zaken (DJWZ) which supports the field of legislation could also have provided me with relevant (delegated) legislation. However one must know beforehand what specific law is being sought, which wasn't the case in the beginning of my research. And with regards to the delegated legislation that I was aware of, namely the ones mentioned in the primary legislation I found, where not available due to the fact that they were never enacted or even drafted. Other sources of legal information are the involved parties in the activity of waste management; the stakeholders. The most important stakeholder from a legal perspective would be the department of the government with the task of formulating policy and bills concerning the environment. In this case it's Directie Natuur en Milieu

1 Memorie van Toelichting (MvT), Landsbesluit(-houdende algemene maatregelen) or Ministeriële Beschikking, and Landsverordening respectively.

2 www.overheid.aw, www.parlamento.aw and www.rva.aw respectively.

(DNM). It turned out that they indeed had a bill related to waste management, among other topics. However it is not accessible to the public yet. DNM also organized a stakeholder workshop which provided relevant insight in the world of local waste management and its key stakeholders. For that reason it was not that difficult to approach them later on. By interviewing them I did not only receive legal information but practical supportive information, e.g. what is it that qualifies them as key stakeholders. Finally I brought the labyrinth to an end by requesting some specific legislation from DJWZ I became aware of during my research.

I would like to note that given the influence international regulations can have on national legislations, I also searched for international regulations regarding waste management that may affect Aruban legislation. However, due to the non-trans boundary nature of the topic in question, even at an international level there is limited legal data to be found.

Data and analysis

Even though there's a lacuna in legislation regarding solid waste management in Aruba, I still managed to collect some legal data. In this section I will present and analyze legal, and some practical, data that in my opinion are relevant within the context of this paper. This does not mean however that there aren't a few other legal provisions to be found sporadically in our legal system.

Algemene Politieverordening (APV)[3]

The main and most substantial source of solid waste management regulations is the APV, which contains general police regulations. The dozen or so legal provisions pertaining to solid waste management found here, can be divided in to two different types according to the location they're aiming at: some concern public roads, in the broadest sense, and some private properties.[4] A distinction can also be made between the types of wastes concerned, as made clear by art. 54 which will be discussed later on. Lastly, another distinction can be made between articles containing prohibitions and obligations.

Public sphere

Under the heading *'the use of public roads'* we find the general prohibition of contaminating public roads in any way.[5] We also find more specific regulations. Art. 15 talks about construction and commercial waste if you will. Paragraph 1 section c states that it is prohibited without a ministerial permit to have or put certain material, namely material used for construction or construction waste, on public roads, unless necessary for continuous loading or unloading.[6] Paragraph 2 states that when performing any work activities on or by public roads there's the obligation of cleaning up the remains thereof immediately afterwards. Regarding commercial waste management: paragraph 3 obliges the ones with a ministerial permit to have merchandise on public roads, to make sure that his/her assigned area is duly cleansed before leaving.

The transportation of waste is also regulated in the APV. Art. 17 paragraph b states that any kind of object or substance, i.a. construction or yard waste, may only be transported if properly covered, and by vehicles equipped and used in such a way that deposition and flying away of the content is prevented.[7] Four more articles can be found concerning transportation of other specific goods.[8] In essence they prohibit transportation of those goods on public roads on 'outside districts', unless it's duly covered by required

3 AB 1995 no. GT 8.

4 What is meant with by 'public roads' is determined by art. 1 APV, which entails much more than only roads. Some examples are: public yards, bridges and in principle every place accessible to the public. It should also be noted that with public in this paper is meant pertaining to government ownership.

5 Art. 16 APV.

6 For the sake of brevity, with construction waste or material used for construction in this paper is meant namely: debris, rubble, clay, lime, sand, soil and manure. For the exact content reference is made to the article concerned.

7 For the sake of brevity, with yard waste in this paper is meant namely: sawdust, shavings, chips, straw, hay, ashes, mud and paper. For the exact content reference is made to the article concerned.

8 Articles 60 to 63 APV.

paperwork or takes place from Oranjestad or San Nicolas. They also include some procedural matters pertaining to it.

Private sphere

Stepping into the private sphere we find that it's prohibited to bring in or have heaps of ashes or waste on open or closed yards.[9] The same is prohibited with regards to construction waste or materials used for construction, other than during or immediately before or after having performed work activities.[10] In art. 29 we can read that it's also prohibited to use waste or manure to heighten or fill yards and fields, as is heaping any kind of waste on them. However, an exception is made if it takes place on a designated public landfill.

So far we've seen mostly prohibitions and only a pair of obligations regarding waste management.[11] Under the heading *'the disposal of waste'* we find three articles, one being explicitly an obligation. These articles are essential regarding waste management given their specificity and clarity on the subject compared to the previous articles. Art 53 obliges the owners of private lands and roads to ensure the disposal of all filth on and the duly cleansing of them. The next article provides the proper way of ensuring this.[12] Unfortunately it does so only regarding household waste, which is distinguished in art. 54 paragraph 2 from non-household waste, namely commercial, bulky and construction waste. It is appropriate to note that this is the only article in the whole APV where these types of wastes are mentioned as such, thus further specification of the terms with exception of household waste are lacking. The proper way of disposing of household waste is by offering it in a garbage bin provided by a waste collection company, and in such a way that it cannot be spread on or across the open roads.[13] At the moment two such companies exist in Aruba: Serlimar (Servicio di Limpiesa di Aruba) and Ecotech, a public and private institution respectively. It seems that both of them can fall under this article, given that it speaks of 'a' instead of 'the' waste collection company. Rules regarding the monitoring household waste disposal should be further regulated by delegated legislation according to paragraph 3, namely by a decree containing general measures.[14] I was unable to find such a decree.

Up until now only art. 29, although somewhat simplistic, has provided us with information as to where we may dispose of our waste, that is in a designated public landfill. This brings us to the third article. Art. 55 paragraph 1 clarifies the subject by also providing two other ways of lawfully disposing our waste. It states that it's prohibited to let waste or any substance run or fall, nor to be placed, dumped, thrown or poured, except:

1) on a landfill site designated by the minister of Public Works and Health;

2) on or by the open road during a period of maximum 12 hours before the regular pick up by the waste collection services;

3) on waste bins or such objects brought or placed for that purpose. It is prohibited to use these for another purpose than for the dumping of small waste or small utensils.[15]

Any other way of waste disposal is thus illegal.

Enforcement

The APV also provides us with clarification as to the parties in charge with the enforcement of this law. In general the ones in charge are the police officers.[16] Regarding enforcement of articles 16, 17, 28, 29, 53, 54 and 55 however,

9 Art. 28 paragraph b APV.
10 Art. 28 paragraph c APV.
11 The former regards both the use of public roads and private properties, while the latter, art. 15 paragraphs 2 and 3, only public roads.
12 Art. 54 paragraph 1 APV.
13 Art. 54 paragraph 1 APV.
14 For the sake of clarity, with a decree (containing general measures) in this paper is meant a Landsbesluit(-houdende algemene maatregelen).
15 Art. 55 paragraph 2 APV.
16 Art. 174a APV.

officials designated by a decree for that purpose are also in charge.[17] I was unable to find such delegated legislation. The remaining three paragraphs regulate the competences attributed to them. These are further regulated in delegated legislation.[18] The punishment for infringement of the articles I've just referred to can be a detention of maximum six months or a fine of maximum Afl. 10.000.-.[19] The punishment is substantially lower for the infringement of other articles. Aside from the officials mentioned in art. 184 Code of Criminal Procedure (Sv), officials designated by a decree for that purpose are also in charge with the detection of infringements regarding APV articles,.[20] Rules regarding requirements that need to be met by them can be set up through a decree.[21] I couldn't find either of such decrees.

Conclusion

As may have been noticed, the APV provides us with some articles regarding waste management but lacks further elaboration on many subjects pertaining to it, as seen by the lack of delegated regulations. Most importantly, it fails to cover many other relevant subjects. For example, it doesn't elaborate explicitly on the disposal of non-household waste as is the case with household waste, other than the way it should be transported.

Public Stakeholders

As I already mentioned, other sources of legal data lie with those who are involved in the activity of waste management. There are both public and private stakeholders involved in this matter. In this section however, I will name only a few public ones and elaborate on their role regarding waste management. I will start with the government and then I'll mention some specific public institutions.

Government

The government in general has started to look for solutions to our current needs regarding waste management. Apparently they are of the opinion that land filling is old fashioned. Due to this, and the current governmental plans of 'going green', they have started different projects. One I would like to mention is the project 'Waste to Energy' (W2E). For this project the government has done research regarding the best possible way of waste disposal suitable for our island. Of course it also took financial matters into account. The outcome of the research made by the government was that gasification of waste would be best suited for our island. In this context various negotiations have taken place. The government is currently negotiating with Ecotech regarding the matter. However, negotiations with other (foreign) institutions have not been excluded.

Specific Institutions

Government departments pertaining to the field of environment are DNM and Bureau City Inspector (BCI).[22] Furthermore the APV makes reference to waste collection companies. As mentioned before Serlimar is the public one.[23] These three institutions will be discussed in this subsection.

Serlimar

From all the different legal categories that constitute our national legislation, we find the ordinance regarding the establishment of Serlimar under the category

17 These are all the articles mentioned so far except art.15 APV, regarding materials on public roads and the immediate clean up after work activities and merchandise sale, and the briefly mentioned articles regarding transportation of specific goods.
18 Landsbesluit algemene bepalingen toezichtuitoefening (AB 1998, no. 70).
19 Art. 175 paragraph 3 APV.
20 Art. 174b paragraph 1 APV. Officials mentioned in art. 184 paragraph 1 Sv are: police officers, special police agents, and criminal investigation department officials.
21 Art. 174b paragraph 2 APV.
22 MvT van Landsverordening tot vaststelling van de begrotingen van de ministeries van het Land voor het dienstjaar, 2014.
23 Landsverordening instelling Serlimar (AB 2005 no. 5).

'environmental enforcement'. With the purpose to maintain a clean living environment, the legislator decided to put waste management in hands of an institution, which turned out to be Serlimar. Serlimar is responsible for the collection and processing of waste from households and businesses, both in solid and liquid form, in an efficient manner and according to related environmental standards.[24] Seeing that commercial waste also falls within its responsibility, it would be appropriate to address this in the APV as is already the case with household waste. Serlimar is also responsible for maintaining public domain land, green space surrounding governmental buildings and public roads and beaches. Within the context of those goals, Serlimar may broaden its tasks via a decree containing general regulations.[25] Such a decree is yet to be made.

As seen before, the APV mentions a designated public landfill. There's supposed to be a (ministerial) order where the current landfill Parkietenbos is designated as such. However I was unable to get my hands on such a regulation. Nevertheless, Parkietenbos has been Aruba's official public refuse dumping-site since the 1960s and Serlimar its administrator. Parkietenbos consists of two main deposit sections: the container park and the landfill itself. The landfill is where land filling takes place. The purpose of the container park is to receive the waste materials separated in order to be able to recycle or reuse them. That is why there are different containers there, e.g. for metal, cardboard or construction waste. These are then either exported or sold to private companies on the island, basically to private stakeholders such as Ecotech and Johnson's enterprises. As to the way waste is being processed there and the current available space, there are different stories. One thing that is agreed upon is that there are fires occurring there. Whether (illegally) man-made or as result of self combustion. Whatever the truth may be regarding Parkietenbos, one thing is for sure, land filling is old fashioned.

24 Art. 2 paragraph 1 Lv Serlimar.
25 Art. 2 paragraph 2 Lv Serlimar.

City Inspector

Another private institution in this context that is worth mentioning is BCI. To ensure better results regarding waste management, some specializations within governmental departments have taken place. This resulted in the creation of BCI. BCI can be regarded as 'the eye' of the government when it comes to tracking down wrongfully disposed waste, such as is the case with illegal dumping. BCI contributes in making and maintaining Aruba clean: through citizens request or request from (public or private) institutions, or by personal islands inspections, BCI makes sure that waste spread throughout our island is cleaned, be it an illegal dump or not. It does so with the help of other institutions such as Serlimar. Moreover, thanks to BCI, other public institutions that deal with waste management even though it's not their first task, can now be more efficient by focusing on their main tasks. Just to name a couple of examples: police officers ,who are i.a. in charge with enforcing the articles provided in the APV, and Serlimar, that does daily island inspections.

DNM

Another crucial aspect regarding waste management is the policy and legislation surrounding it. As has been noted many times, we are behind regarding waste management regulations, even when compared to neighboring islands. There are a lot of questions that cannot be answered legally but only by what is done in practice. To prevent future problems, both judicial and environmental, it is of paramount importance to have good policy and legislation. The organization appointed by the government to prevent these kinds of problems through drafting of policy and legislation is primarily DNM. Currently there is an environmental management bill waiting to be sent to Parliament, known as *Landsverordening Milieubeheer*. It appears that the bill contains much needed regulation to fill the gaps mentioned in this paper among others. It is agreed upon by many public stakeholders and officials that this bill would in a substantial way meet the legal needs of

our current environmental legislation.

Conclusion

Hopefully this paper has provided the necessary information regarding legal perspectives on solid waste management on Aruba. Or to put it in other words: the legal perspectives on solid waste management we are lacking. It should be noted though, that just because certain rules have not been codified yet, there aren't any rules that are being applied in practice. Some regulations found in the much anticipated bill *Landsverordening Milieubeheer* for example are already being put into practice by many public organizations. Or on the contrary one could reason that practice is being codified through the bill. Either way the bill contains much needed waste management legislation, for which the Aruban population can be thankful for. It is surely a crucial step towards a 'green' Aruba, but we still remain in anticipation of its approval. Approval, however, isn't the last step. Whatever space may be available in the landfill, one thing is for sure, if it's not already full it eventually will be. Introducing regulations alone will not change this. New waste management methods are desperately needed. Hopefully the much anticipated legislation and waste management projects will go hand in hand, ensuring a clean living environment for us all.

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"Two completely different worlds"

I pull out another bag. "Oh look", I say unsurprisingly but with a heavy heart. Under the dirt is yet another bag, just below the plastic bag I had pulled from the ground just a second before. Thinking I would have completed the transect plot quickly, I look up, dumbfounded by the realization that I had still only just begun – there were scraps of plastic sticking out everywhere, camouflaged by leaves, and the dust and ash that drops from the sky.

I've been working in the forest - downwind of the landfill - for 7 hours now, unable to take a clean breath all that time. I wear my facemask and pray the filters don't run out – the air around me is thick with the stench of smoldering toxins, and I can hardly see 10 meters in front of me. Why am I reciting my day to myself as though it is a book? Honestly I wonder how useful this facemask is in these conditions, I still feel as though I am oxygen depleted.

My experience around my research had many faces, but the actual field research was oft heart breaking. It baffles me how we can speak so positively of ourselves yet be so careless. On LinkedIn, Serlimar Sui Generes states that their operation provides the Aruban community with a *"clean and healthy environment by ensuring a responsible, service oriented and efficient implementation of activities relating to waste prevention, collection and processing and green space."* The Parkietenbos Landfill and Container Park, operated by Serlimar Sui Generes – the government entity in charge of waste disposal on Aruba – supposedly has official boundaries, yet my research and experience can show that these boundaries are but another situation where we decide to turn a blind eye. We claim many things, but the brutal truth is not nearly enough has been – or is being – done to make a difference, nor are we willing to take responsibility for our faults.

Although my research was often very heavy, my overall experience in Aruba and of this project has been uplifting. The collaboration effort between the University of Aruba and University College Utrecht has been extremely successful; friends were made and amazing experiences were shared. Something I found truly inspiring was how quickly those involved were willing to help each other with difficulties they faced; whether it was to get their own hands dirty or to provide contacts of those who could be more helpful. It is because of the people involved in the project that I also know that the first steps are being made to try to live up to the Aruban vision. It may be a difficult road, but clearly there are some that care, and are trying to find different ways of dealing with the environmental issues present on the island.

What an experience it has been, and never will I look back with regret. My research has left me stunned; however, the beauty and kindness of Aruba and her inhabitants has left me stunned all the same. I truly experienced Aruba as two completely different worlds, and it has been beautiful.

Where does the Parkietenbos landfill end? A waste and pH-gradient assessment

Rikkert D. Loosveld, April 2015

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1. Introduction

A healthy environment is quintessential for any type of floral growth; of course this includes certain consistent (and specific) conditions, such as healthy pH levels. pH is affected by a variety of different things, typically chemically related such as industrial effluents or runoff from power plants, but can also be affected by temperature and disruption of soils (oxidation of otherwise oxygen depleted soils; EPA). Another key factor for healthy environments is maintaining an *undisturbed* system. Trash and debris of all sizes disturb the ecosystems in various ways, and in mangrove ecosystems trash is just as destructive. Large debris can hinder the growth of trees and damage the roots. But smaller, lighter and seemingly harmless trash can be just as – if not more – destructive. Plastic bags for example can get tangled in the prop roots and suffocate the trees or create anoxic conditions (DG Environment News Alert Service, 2011). These are well-established facts, however, in Aruba there is little information or data on the mangrove ecosystems. Very clear though is that the mangrove ecosystems in Aruba are highly disturbed, particularly surrounding the Parkietenbos Landfill and Container Park and are subject to immense amounts of trash annually.

1.1 Mangroves' importance

Mangroves provide a list of services both ecological and anthropogenic, ranging from breeding grounds for fish and supporting the fishing industries to coastal and coral

protection, sediment retention and coastal substrate stabilization (Anthony and Gratiot, 2012). Whilst the list continues, some of the most important functions of mangrove ecosystems for Aruba are the protection they provide against storm surges, coastal erosion and sediment retention, their filtration services (photosynthetic, gaseous, and within the surface soils and waters), their provision of breeding, resting and hiding grounds for fish and crustaceans; the protection they provide the coral reefs and of course their aesthetic qualities for the tourism industry.

Parkietenbos in particular should be an area of concern, not only because of its increasingly deteriorated state, but also because it is one of the largest remaining mangrove areas on Aruba, and one of the first and last things one sees when arriving and departing from Aruba. For the tourism industry – which Aruba is heavily dependent on – it should be a priority to maintain a clean, green environment, as this is also one of Aruba's main advertisements. Parkietenbos acts as a shield for the Parkietenbos Landfill and Container Park as it not only hides the view of the landfill from certain angles from boaters, but also contains a lot of the waste which is carried away from the landfill due to the coastal winds and currents along the area – predominantly (but not limited to) plastics, which would otherwise likely end up in the bay of Oranjestad or on the beaches along the tourist stip.

Unfortunately, the Landfill and Container Park has expanded to approximately 18ha and currently reaches a height of 42m, and is now seen towering over the mangroves of Parkietenbos. The boundaries of the landfill are becoming increasingly difficult to understand, as the landfill is slowly expanding towards sea, and further into the mangroves, largely because of improper waste disposal. Furthermore, due to the constant open-air, uncontrolled burning of materials on the landfill, smoke clouds cover the forests regularly (see cover photo). Usually however, the landfill is smoldering, thus not noticed as much unless in the area, yet white smoke travels across the forest and water towards the southern barrier reef.

1.2 Research

This research examines whether there are still clear boundaries of the landfill and if the waste is actually contained. In doing so, this research investigates the pH-gradient of the forestry on both sides of the landfill to assess the possibility of acidic leaching and other underground processes from the landfill, and will also investigate the trash concentrations found within the forests. The trash analysis will provide an indication of the current physical conditions and provides an inventory of the types of solid wastes that can be found, from which we can argue whether they are predominantly originating from the landfill directly, or if they originate from illegal disposal and littering. Furthermore, this research will investigate if the growth of the mangrove forests of Parekietenbos is stunted due to, potentially, pH-levels and trash concentrations. This particular paper however, will only review the preliminary findings on the pH-gradient and the trash concentrations. The research questions thus are as follows:

1. Does the Parkietenbos Landfill and Container Park have and maintain its boundaries?

2. How does the Parkietenbos Landfill and Container Park negatively affect its surrounding forestry with regards to improper waste disposal and the pH gradient?

1.3 Hypotheses

We expect that the pH of the Left and Right Parkietenbos will be significantly lower than that of the Spanish Lagoon, suggesting that not only are the areas under the healthy norm for Aruba, but are also significantly more acidic due to the proximity of the Landfill and Container Park.

We expect to see that the Left parkietenbos is significantly more affected by wastes – especially soft plastics (predominantly bags, fragments and foam) as they are often carried downwind, and are then caught in the trees or in the roots.

2. Methodology

2.1 Equipment

This research utilized a thermometer, Garmin eTrex 10 GPS, Google Earth Pro, compass, two Luster Leaf Rapitests (Digital Soil pH Meter), Universalindikator Merck, distilled water, (max. 40kg, min .01kg), 3m Stanley measuring tape, string, a Samsonite weight scale, and the NOAA Data Sheet for Field Surveys. For safety puposes a filter facemask was worn throughout the duration of each survey of the Left Parkietenbos as the area is downwind of the landfill.

2.2 Study Area

This research focused solely on the mangrove forestry on either side of the Parkietenbos Landfill and Container Park; however, did use the Spanish Lagoon for baseline information on the pH-gradient, trash densities and composition, and tree sizes. For the purpose of this research, the study areas are known as *Left Parkietenbos*, *Right Parkietenbos*, and the *Spanish Lagoon*.

Image 1 illustrating the focal study area of this research.

2.3 Procedure

Ultimately, two methods for conducting the research were used; the first method was initially proposed for both the Left and Right Parkietenbos; however, was ultimately only used for the Left Parkietenbos and for one (the only) transect in the Right Parkietenbos; and the second method was used for the Spanish Lagoon (as the measurements here are baseline and not based on distace from the landfill) but was ultimately also used for the majority of the Right Parkietenbos due to the circumstances of that particular area.

2.3.1 Left Parkietenbos

The researcher(s) walked along a 'horizontal' *transect* (perpendicular to the landfill boundary), *ideally* every 50m along the width of the Left Parkietenbos, starting at meter 0(transect 1) (top right of the Left Parkietenbos), followed by a transect (2) starting at meter 50, 100(transect 3), …, 250(transect 6). A few things were considered however; firstly, in keeping with the ultimate goals of this research it was essential to sustain the least possible amount of damage to the area and its inhabitants, which resulted in slight detours at times and the losing of some bearings; secondly, some of the transects (3 and 5) were conducted in alternating directions to avoid systematic variance of the pH-gradient of the system because of the influence of temperature, which meant that for these transects the starting point was loosely based on what was expected to have been the end of the horizontal line (transect) starting from their respective starting positions (meters 100 and 200). With this in mind, the researcher used a compass and tried to hold a bearing of 302° when heading towards the waterfront (away from the landfill), and when conducting transects with an alternative direction a bearing of 122° was maintained. We used a GPS to mark our initial and final locations to better visualize the transects. Each transect continued until a significant change in the local system occurred; for example, where the ground substrate became predominantly water (transects 1,2,4,6), the landfill (transects 3,5) or a beach (transect 1; Right Parkietenbos).

Along each transect two pH measurements were made every 2m, one with each Luster Leaf Rapitest. A second handheld digital reader was used throughout the surveys to act as a control mechanism, provide more data and to save time. The digital readers were always positioned approximately 50cm apart.

Furthermore, a series of *plots* were created every 20m. A plot is an area of 4x4m where all trees were counted according to their productivity (if a tree had leaves it was considered productive), the tree circumferences measured and all trash was collected, sorted, weighed and recorded. The trash is collected only

after the pH levels have been recorded at all 3 points (meter 0, 2, 4) of the plot since the removal of the wastes could cause oxidation processes to occur, thus changing the pH of the local environment. As the plots are 4x4m, the plots occur at meters 0, 24, 48, 72, etc. until the end of the transect.

2.3.2 Right Parkietenbos and the Spanish Lagoon

The first method was applied to the only transect in the Right Parkietenbos, starting at the bottom left corner of the area. However, due to the surface and ground consistency of the area the pH measurements are limited to only certain areas to avoid damaging the Luster Leaf Rapitests. For the remainder of the study area and that of the Spanish Lagoon this research applied the second method.

The second method consisted of completing all requirements at each plot, whenever possible, or rather, whenever space and access permitted it. The Right Parkietenbos is largely an overwash forest (Hutchings & Saenger, 1987), making the area largely inaccessible, limiting the plots to or near the borders of the study area.

The Spanish Lagoon is used for baseline information, and due to its more positive characteristics; is associated as the healthy norm for Aruba. For the Spanish Lagoon the plots were also limited to the outskirts of the lagoon, mainly on the left side and end of the lagoon. The plots were limited to areas where spaces in the mangle growth allowed the researcher to venture away from the walking trails, to get more representative data. The area of Spanish Lagoon on the water directly connected to the Caribbean Sea, is seemingly a pristine and undisturbed area, showing signs of epibiont sponge growth (a positive indicator of mangrove health; Diaz, Smith and Klaus, 2004) and has a thick concentration of *rhizophora mangle (red mangrove)*. This, however, meant that there were only a handful of pockets where data could be gathered whilst keeping the area mostly undisturbed. The end of the lagoon, being much more open, allowed many plots to be made; however, it is important to make the distinction as this area is no longer directly accessible by water from the lagoon.

3. Results

3.1 Area description

The smoke is thick and the scent of burning chemicals is strong. The Left Parkietenbos, being downwind of the landfill, clearly suffers more from the effects of improper waste disposal. The wind carries plastic wastes through the air and disposes it like sediments in the trees. The trees within 30-50m of the landfill suffer substantially more. The productivity tree count suggests that there is significantly less new growth within this area, especially within the first quadrants. The trees that have survived thus far are decorated with plastic bags, and the leaves still present on the trees are filled holes and covered in dust and ash. The ground is more covered with trash than it is uncovered, only sometimes seems lesser than is actually the case because the trash is camouflaged by the leaves, ash and dust that have also fallen from the sky. The only colors seen are those from new solid waste that has recently drifted into the system. Everything else is eerily gray and quiet, as this area of the forest is largely uninhabited, other than the flies and the odd passerby bird or dog. The abundance of trash could elucidate the increased number of unproductive trees, the lack of new growth. The transformation of the forest with increasing distance from the landfill truly is astonishing.

Surprisingly, the red mangroves, when present, are clearly better adapted to dealing with the conditions. The red mangrove seems to have less difficulties growing, the majority of the Left Parkietenbos seedlings and saplings are red mangroves and their leaves are far less damaged than those of the white and black mangroves. Whilst white mangroves also occur in the area, the trees are showing much greater signs of stress in the area, as the vast majority of the white mangroves in the Left Parkietenbos have heavily affected leaves, and there are almost no seedlings and/or saplings to be found.

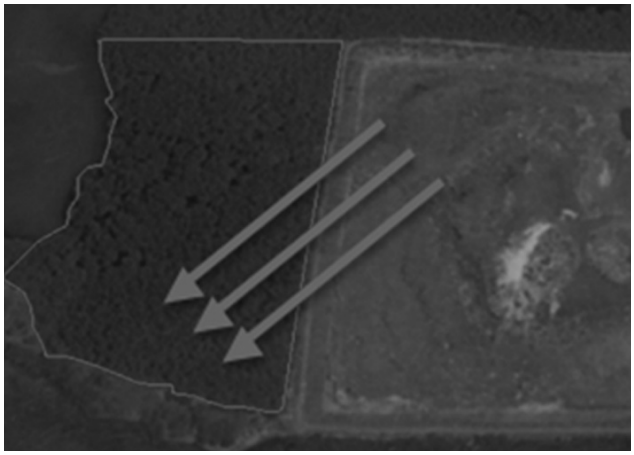


Image 2. Image illustrating the general direction of the coastal winds in Aruba along the Landfill & Container Park.

As illustrated by Image 2, the bottom right corner of the Left Parkietenbos is the most affected area. Unfortunately, the area was much worse than expected, with the ground being trapped under more than 50cm of plastic build up.

3.1.1 Transect 6; Left Parkietenbos

During cleanup of the first plot of the final transect (6; at meter 250) with every bag that was collected, another one would turn up beneath it. The bags had piled up and tree roots had tried extensively to grow through the plastics. An often seen image, sadly, is that of a plastic bag raised like a tent, because a root was trapped under it, slowly suffocating. This *one 4x4 m quadrant*, contained 137.57kg of waste, and took more than 4 hours to clean up. In total – for this quadrant alone – we collected 2731 individual items, of which 93.37% (2659 items) was plastic. Of this total, 2402 items was plastic bagging (1830 plastic bags, 266 plastic bagging (thicker plastic) and 306 soft plastic fragments (fragments of single-use plastic bags)). Even after 4 hours on this plot, not all the waste was collected, as there were still fragments sticking out from the mud, and some bags could still be found in the treetops.

Although there was less trash to be found on the rest of transect 6, the concentrations of trash remained significantly higher when compared to earlier transects. It is likely that, due to the proximity of the transect to the border of the forest, there is more space surrounding the transect, allowing debris to enter the system more easily. However, more likely is that the wind factor plays a greater role in abundance of trash on the transect, as a greater portion of the transect is directly in the landfill plume.

3.2 pH-Gradients

3.2.1 Spanish Lagoon

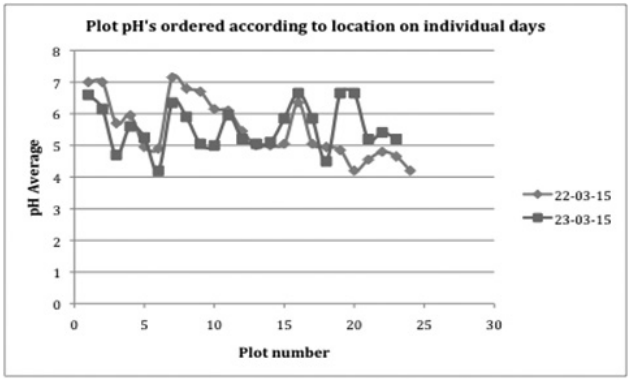


Figure 1. Graph showing the pH levels of each plot according to location on their respective survey days.

As figure one shows, the pH-levels of the system vary quite significantly. Please note, however, that plots 1-8, 10 and 13 from day 22-03-15 are the exact same plots 23-16, 12 and 10 respectively. There were two surveys completed at the Spanish Lagoon to account for systematic variance of the effects of temperature on the pH-gradient, and also to increase the amount of information available on the system. Thus, day 23-03-15 actually started with plot 23. Also, important to note is that the large variety in pH could be largely dependent on the distance from water in the lagoon. As an example, the pH-levels of plots 23, 22, 21, and 18 of 23-03-15 were found in much more barren locations, relatively far from water and more representative of a basin forest; whereas plots 20 and 19 were in close proximity to water, and contained *rhizophora mangle*.

3.2.2 Left Parkietenbos

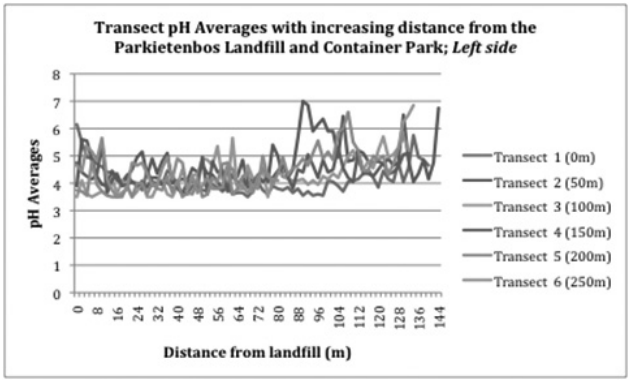


Figure 2. Graph showing the pH-gradients for transects 1-6 in the Left Parkietenbos.

Figure 2 shows the changing pH-gradients (based on the average of both measurements per site) changing with increasing distance from the landfill. Although it may not seem significant, there is a slightly positive correlation between pH-levels and distance from the landfill; and since pH is a negative logarithm (base 10) the difference in hydrogen ions between – for example – pH 5 and 6 is ten-fold. Thus, if we examine the graph above, the difference is actually a lot bigger.

Also, the Luster Leaf Rapitests have an acidic limit of pH 3.5 which was obtained on several occasions. Unfortunately, we did not have a method for successfully measuring the pH without influencing and disrupting the system so were limited to this restriction. Nevertheless, we can still observe a pH increase of approximately one complete level (pH 4 à pH 5). As alluded too in the *Area Description*, its incredibly how adaptive mangroves are and how well they can withstand the pressures exercised on them and the conditions of the area.

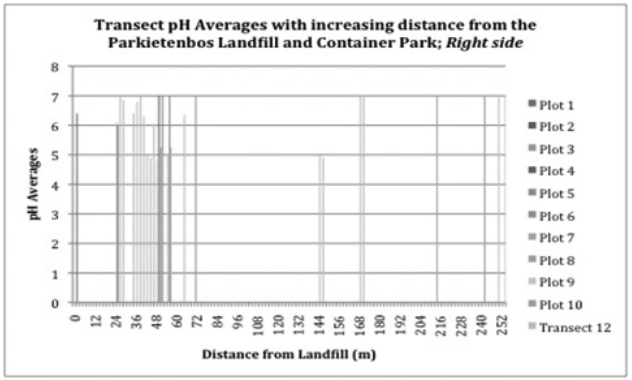


Figure 3. Graph showing the pH-gradient for the plots and transect of the Right Parkietenbos.

Figure 3 illustrates the variability of the pH-gradients for the Right Parkietenbos. Clearly seen is that the lowest reading found in the Right Parkietenbos was pH 4.8 – significantly higher than those found in the Left Parkietenbos. However, due to the substrate composition the results here are questionable, considering that there is a greater possibility that sands in the ground altered the pH measurements as they are more coarse particles that may carry a different pH than the soils. Furthermore, a lot of information is missing from this figure, as the measurements are limited predominantly to the borders of the forest, and only 3 measurements against the landfill border were made.

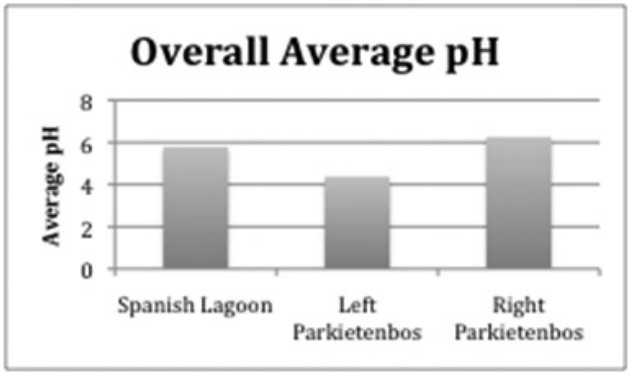


Figure 4. Graph illustrating the average pH-levels for the entire individual systems.

Inferable from the information provided by the transect, is that if more data is gathered from more variable locations within the study area – including more plots along the landfill and more centralized plots – potentially lower pH (more acidic) readings could be observed.

Interestingly though, is that the averages of the pH-gradients of each individual system shows that there are very clear differences between the individual study areas. Most surprisingly still, is the average pH for the Right Parkietenbos. However, as previously mentioned, there may be other factors influencing this outcome. Most important to notice from this outcome, is the very acidic average pH level for the Left Parkietenbos, supporting our initial hypotheses.

3.2 Trash concentrations and composition

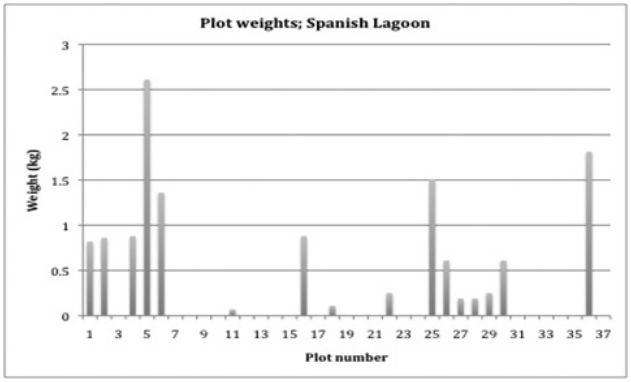


Figure 5. Graph showing the total weight of trash collected at each plot for the Spanish Lagoon. Recall that plots 1-8, 10 and 13 of 22-03-15 are the same plots as plots 23-16, 12 and 10 of 23-03-15 respectively, thus there are 37 plots listed, instead of the original 47. The plots listed from 25-37 are the plots from 23-03-15 that are unmatched in chronological order of how they were conducted.

Figure 5 illustrates the weight of the trash collected at different plots in the Spanish Lagoon for both survey days. Given that there is a no relationship with the landfill here, as the study areas are not neighboring one another, it is understandable that we do not see a specific pattern emerge.

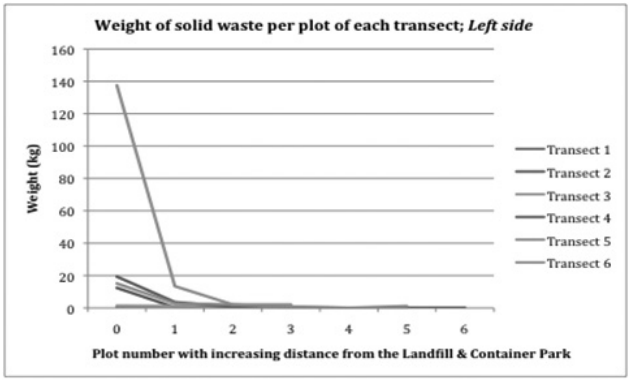
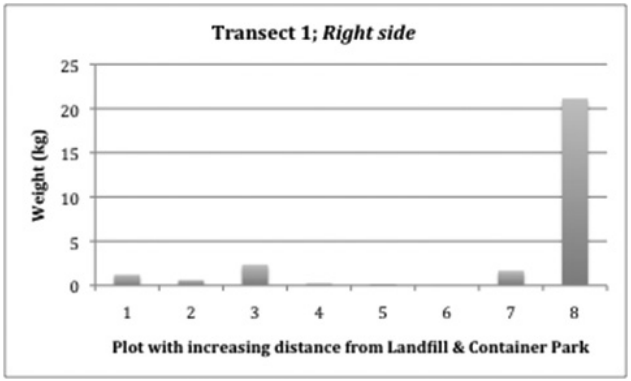


Figure 6. Graph showing the plot weights collected along the transects in the Left Parkietenbos.

As Figure 6 clearly shows, and not surprisingly, is that in the first plots – the plots closest to the landfill – the greatest volumes of waste were found. This graph also supports what was mentioned earlier regarding the wind patterns in the area, as transects 4, 5 and 6 all have the greatest amount of trash present in at least the first 2 plots. Furthermore, it shows how important mangroves are and how well they can prevent continued transportation of waste. This is important, because as mentioned before, all the waste blocked and contained by the trees would end up in the ocean if the Parkietenbos forestry was inexistent, and would further damage marine ecosystems, and more heavily impact the tourist industry on Aruba.

Given that transect 6 alone contained more than 2731 items; the amount of trash in the area and the effects thereof is unimaginable. It is crucial that such findings are used to further stimulate the political agenda by supporting environmental causes and policies such as the currently developing 'Plastic Bag Ban'. Hopefully, by compiling a plethora of evidence to show the negative impacts on our local environments, we can convince authorities to take further and more drastic measures to aid the regeneration of the local environments.



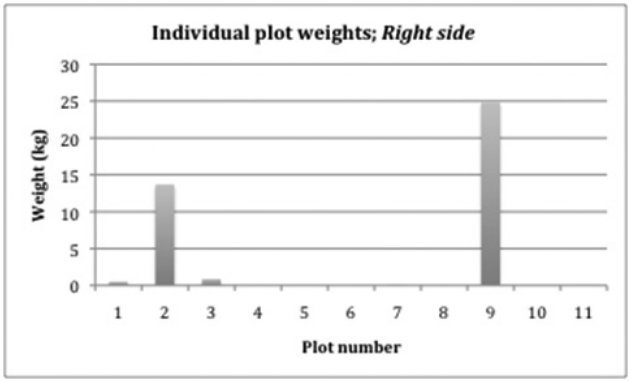


Figure 7. Graphs A and B showing the transect and plot weights of the Right Parkietenbos respectively.

Similar to the Spanish Lagoon, no direct correlation between trash concentrations and weight and the distance from the landfill at which the plot occurred were observed. Plots 2, 9 and Transect 1 Plot 8 were all areas that were easily accessible and just out of the public eye. These areas were also more representative of dump overflow; however, this is unlikely for Plot 9 and Transect 1 Plot 8 as they were not in the direct proximity of the landfill, but rather quite far away. These areas also contained wastes much more representative of being left behind by its previous owner – shoes, wheels, cabling, the lid of a laundry machine, an engine part, and food and drink related items. Plot 2, although it doesn't have the greatest weight of the area, definitely contained the most items. The area where the plot was located also seemed like an extension of the landfill – there was rusty material scattered around the area, ranging from rusty wiring to motorbike frames. In the area also a wide variety of trash was found, mostly heavier materials as opposed to soft plastics, further supporting the hypothesis that in the Left Parkietenbos the majority of the trash is soft plastics due to the wind directions.

5. Concluding remarks

The preliminary findings of this research provide clear insight into the current conditions of the study areas, especially highlighting the increasingly degraded state of the Left Parkietenbos. The pH-gradients observed indicate that the Left Parkietenbos truly has an extremely acidic substrate, unquestionably less preferable for the vegetation. Such acidic concentrations suggest that certain processes are affecting the area, and it is likely the landfill is, unfortunately, leaking certain chemical wastes. Interestingly though is that the Right Parkietenbos does not have the same acidic subtrate. This could be explained however as the Right Parkietenbos is predominantly an overwash basin and also is next to a less heavily used area of the landfill (currently the right side of the landfill is used for the burning of plant debris).

The solid waste findings suggest that improper waste disposal continues to play a large role in the health of the mangrove system of the Left Parkietenbos, as the vast majority of the waste found in the area is comprised of soft plastics, and most likely entered the area through wind transportation from the landfill, and being held by the mangroves. For the Spanish Lagoon and Right Parkietenbos it is less easy to claim a definitive origin of most waste collected. Whilst it is very clear that large amounts of trash collected were simply the result of illegal littering, a large amount of trash could also originate from the waterways, or have been transported by winds also.

Necessary though is increased awareness of the current situation, and the mentality of waste disposal methods

and attitudes in Aruba should be altered, as it is clear that not enough of the local citizens and tourists are concerned enough with the damage such waste is causing.

Additionally, the Parkietenbos Landfill and Container Park should be closed, the area cleaned and decontaminated, and should a landfill still be necessary if Aruba is not 100% dedicated to the BioGas industry, then at least modern waste disposal methods should be applied. This involves the immediate removal of all open-air burning, and essentially means all materials that can be recycled, are separated and recycled, and only excess wastes are burned in a closed and contained fire, with special filtration systems that remove the vast majority of the chemicals released by the fire.

In answering the first question we can conclusively say that our preliminary findings provide evidence that shows that the Landfill and Container Park boundaries are not clear, nor are they maintained, due to the large volumes of waste escaping the system, the underground processes occurring creating a more acidic neighboring environment, and of course, the constant open-air burning heavily polluting the surrounding environment.

5.1 Research continuation

Further statistical analysis of our results will occur, and we will assess at least the following information; we will examine if there is a link between the pH-gradient and trash concentrations and its specific compositions recorded; and whether there is a relationship between the circumference data and the pH-gradient or the trash concentrations. In doing so, we are examining if there is evidence that suggests that either the pH-gradient of the trash concentrations are stunting tree growth and productivity. The productivity is measured through tree count.

5.2 Further Research

For further research we strongly advise conducting longitudinal studies including net primary productivity, collecting more extensive data on all sites, and to include more study areas of Aruba such as Isla di Oro, Mangle Halto and the barrier Reef as all of these areas have significant mangle growth, and could provide interesting information about the ecology of the island and how the local conditions affect the areas. Additionally, more specific research should be conducted to assess the leaching qualities of the Landfill and Container Park, to provide a better inventory of the leachate materials which could, in turn, help determine which substrate areas specifically are more damaged and altered, and which materials should receive extra attention during clean-up of the areas.

Acknowledgements

I would like to thank the following people; everyone involved in the UAUCU collaborative research for his or her involvement and/or feedback on my project; my supervisors M. Eppinga and T. Becker for their continued support and insight into the methodological aspects of my research; and Colegio Arubano for providing me with some of the necessary equipment for my research. I would like to give a special mention to T. de Scisciolo, S. Scholte, and A. Dijkhoff, without whom I would have had to spend significantly more time and resources on travelling to and from my research sites. I especially want to thank G. Nicolaas for her help and support during the final two assessments, of which the last was by far the most challenging of all; and E. Mijts, for all his equipment, continued support and aid throughout the entire process of the project. Finally, I want to thank J. Ballantyne and E. Mijts for their collaborative effort in creating this research program, as without them this project would not have become reality and I would not have been able to have this wonderful experience.

For more information about this research, please contact Rikkert Loosveld at r.d.loosveld@students.uu.nl

Tobia de Scisciolo - University College Utrecht

"An important lesson"

It is 6:40 in the morning and the sky is leisurely getting brighter as the sun is emerging from the sea. I am currently at Warirui, completely isolated from everyone, if it wouldn't be for the few goats lazily grazing on the hills behind me. I am about to start my beach assessment, but I first indulge myself in admiring the astonishing beauty of the nature surrounding me. The fresh morning air fills my lungs and awakens my mind. The wind is howling loudly, filling my ears with its incessant blowing, so intensively that it covers every other sound, even my own thoughts. All is filled with the loud voice of the wind, except one other sound can be perceived: the fierce roaring of the great breaking waves. After I gave myself the time to absorb my surroundings and the sun is slowly departing the distant horizon water line, I prepare myself to begin my assessment. Gradually, though fairly rapidly, the realization of the pollution on this seemingly pristine and wild paradise strikes me strongly and abruptly awakens me from my idyllic dreaming. Unfortunately, or should I actually say fortunately, my research has strongly confronted me with the dark side and reality of the consequences of the modern 'gifts' of our consumeristic society.

Although the mournful modern situation of marine pollution has permanently marked me, something else has been extremely important to me during my stay in Aruba. Thanks to the program my path has been crossed by several incredible people, who have inspired me and have helped me to realize an extremely important truth, which will be my companion for the rest of my life. It would be impossible to mention them all, but nonetheless I should at least mention a few. There is Eric, with his great generosity and inspirational motivation in encouraging a change through education. There is Kimberly, who loves her sea and would do anything to protect it, even though this might mean getting stung by a Lion Fish. There is Tatiana, who adores and promotes the preservation of the silent protector of Aruba: the mangroves forests. There is Giovanni, who, although he has a busy life, has always found the time to help in trying to maintain a clean environment, as he cares about our beloved nature. There is Anthony, whom with his dog and boat never loses a chance to show the true face of Parkietenbos. There is Ghislaine, who is always there for you and approaches the situation from a different angle.

What all these people have in common, and the many more I could not mention, is their inspiring inner strength and motivation that allows them to keep fighting for what they believe is right. Schools, books and documentaries are excellent to spread knowledge and awareness relative to the current environmental situation; however, it is often forgotten to mention how many people are trying to make a change, to improve the situation with the means that are available to them and who are trying to spread the necessary knowledge and awareness.

So I would like to conclude by thanking you all for inspiring me, making me grow and preparing me for the next chapter of my life. A chapter that I will be facing with a serious mind, as the current environmental situation is not a joke. However, I will be facing it with a smile in my heart, since I carry you all within me and because you taught me that, although sometimes the problems might seem insurmountable, one should never forget to play his or her own part in being the change one hopes to see in society.

The Assessment of Aruba's Shoreline Pollution:

A Comparison between the South Coast and the North Coast.

Tobia de Scisciolo, April 2015

t.descisciolo@students.uu.nl

1. Introduction

Because of the low production costs of plastic products, the vast majority of them are disposable, based on a one time use. The problem with this consumeristic behaviour is linked to the almost indestructible morphology of plastic fabrics. They contain toxins that can be dispersed in the surrounding environment and can enter marine organisms affecting the food chains and therefore, humans (Stevenson 2011). In addition, plastic products do not undergo biodegradation, but on the contrary they fragmentize into smaller particles through photo-oxidative degradation (Shah, et al. 2008). These characteristics of plastic imply that once plastic waste enters the environment it can remain in it for centuries; indeed, some scientists believe that almost all the plastic created since its invention in 1940, apart from the burned plastic, is still on the planet, either on the sea floor, floating in the oceans and seas, stranded or buried on shorelines, or thrown in landfills (Derraik 2002; Stevenson 2011).

Moreover, it is known that plastic litter has buoyant characteristics, which allow it to float and be easily transported by oceanic currents, permitting it to reach even the remotest areas in the world (Howell et al. 2012). This has been shown by the presence of plastic litter in the five major gyres in the world, which are places of convergence of different oceanic currents (Howell et al. 2012). Since the acknowledgment of the issues related to plastic pollution

in the environment, this debris has been monitored and classified into three groups: macro-debris (>2.5cm), meso-debris (25-2mm), and micro-debris (<2mm) (Shah et al. 2009). The two main sources of origin for plastic pollution can be classified as land-based and ocean-based (Stevenson 2011).

It is known that more than 260 species are affected by plastic debris and these effects often result in the death of the animal through ingestion or entanglement (Hammer et al. 2012; Stevenson 2011). It seems that the most severely affected species are sea birds and sea turtles, which are local to Aruba (Hammer et al. 2012). Plastic litter is accumulating on the shorelines all over the world and it arrives from both land and sea. In coastal states and islands, as for instance Aruba, whose economies are based on tourism, the accumulation of plastic on the shorelines can negatively affect their economy (Stevenson 2011). In addition to the aesthetic problems caused by macro-debris accumulation, there is also a health hazard both for humans and wildlife.

This research examines the current situation of pollution on the shores of Aruba, with a particular emphasis on plastic litter. It focuses on the systematic comparison of litter concentration between the north coast and the south coast. Beach litter assessments were performed in order to address the following questions: What is the pollution level of Aruba's shoreline? What percentage of the trash collected was plastic? Is there a difference in pollution concentration between the north coast and the south coast? The main focus on this research is placed on macro-debris and meso-debris. A very nice side effect of this research has been that in the process of collecting data, all beaches studied were cleaned. This paper will predominantly focus on the overall results obtained from the field research conducted so far, as an in depth analysis has yet not been performed.

2. Study Area

The research was conducted on Aruba, a small island in the Caribbean that is part of the Kingdom of the Netherlands. The water masses that enter the Caribbean Sea come from

the South Atlantic and North Atlantic Ocean (Gyori et al. 2001). As it is in Figure 1,

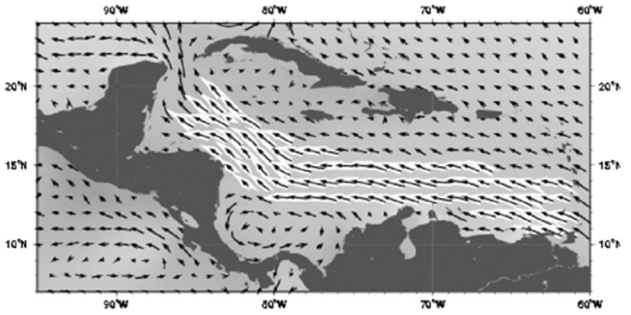


Figure 1. *Map of the Caribbean Current* (Gyori et al. 2001).

the Caribbean Current (in white), has a north-westward motion that moves through the Caribbean Sea into the Gulf of Mexico (Gyori et al. 2001). The water of the Caribbean Current arrives from the Equatorial Atlantic Ocean, which passes via North Brazil, Venezuela and Guiana Currents (Gyori et al., 2001). For the accuracy of this research it is important to take oceanographic currents into account, due to the buoyant nature of plastic debris. Moreover, it is the north coastline of Aruba that is directly exposed to the Caribbean Current and is windward; whereas the southern one is sheltered from direct exposure to the currents and is leeward.

For these reasons it can be assumed that the southern coastline's pollution is predominantly land originated. The northern shoreline's pollution, on the other hand, is assumed to originate in marine pollution, since this shoreline is more directly exposed to wind and sea currents. In addition, the southern beaches are the ones most subject to tourism,

local beachgoers and water activities. The northern pocket beaches, however, are more difficult to reach due to rougher conditions of the sea. They are only used by few beachgoers (e.g. surfers and bodysurfers or sightseeing tourists) and will therefore be defined as rural beaches.

The research was performed exclusively on sandy beaches. A total of 10 sites were chosen, 5 on the south coast and 5 on the north coast (see Figure 2). On the south coast, where sandy beaches are abundant, the five sites were chosen in order to cover the entirety of the coastline. Starting from the north, the five sites on the southern coastline were: Arashi Beach (12°36'37.93"N 70°03'12.18"W), Eagle Beach (12°33'2.53"N 70°3'24.98"W), Surfside Beach (12°30'43.76"N 70°01'52.70"W), Mangel Halto (12°27'50.64"N 69°58'09.71"W) and Rodger's Beach (12°25'03.28"N 69°53'03.85"W). On the north coast, due to the limited natural availability of sandy beaches and more difficult accessibility the 5 sites were chosen mainly based on feasibility. Starting from the north, the five sites on the north coast are: Lighthouse Dunes (12°37'01.13"N 70°02'43.85"W), Warirurí (12°33'32.32"N 6959'17.81), Dos Playa (12°30'19.85"N 69°55'0747"W), Grapefield Beach (12°27'32.02"N 69°52'46.35W), and Boca Grandi (12°26'22.23"N 69°52'25.99"W).

Figure 2. *Map of the 10 sites covered during this research distributed around Aruba.*

At each site on the south coast a length of 152m was analysed, with the exception of Mangel Halto (110m). The sites had varying widths and for each site the area from the water front until the end of the beach was analysed (Arashi: 35m; Eagle Beach: 40m; Surfside Beach: 20m; Mangel Halto: 40m; Rodger's Beach: 20m). The end of the beach is commonly defined as the beginning of vegetation or the presence of man-made constructions (e.g. a parking lot or wall). On the north coast, due to the limited availability of sandy beaches, the sample areas covered are more various (Lighthouse Dunes: 152x15m; Warirurí: 87x37m; Dos Playa: 102x37m; Grapefield Beach 101x40m; Boca Grandi 152x44m).

3. Methods and Analysis

Shoreline pollution is an increasingly acknowledged modern issue, for this reason the UNEP (United Nation Environmental Program) in cooperation with the IOC (International Oceanic Commission) have developed a standardized procedure for shoreline litter assessment, in order to facilitate monitoring and data collection (Cheshire et al. 2009). The methodology for this research is based on the assessment guidelines formulated by the UNEP and IOC in combination with the NOAA (National Oceanic and Atmospheric Administration) ones.

Once on site, for the assessment of macro-debris, the researcher and collaborators followed a specific skirmish walking pattern perpendicular to the water front, with a distance of about 2m between each surveyor (see Figure 3). If the researcher

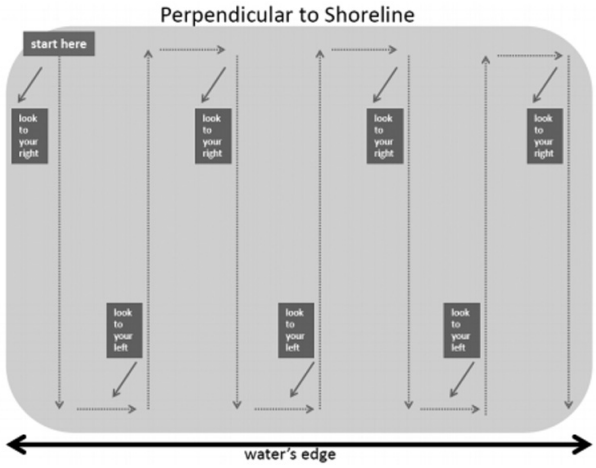


Figure 3. *Walking pattern perpendicular to water front used during assessments.*

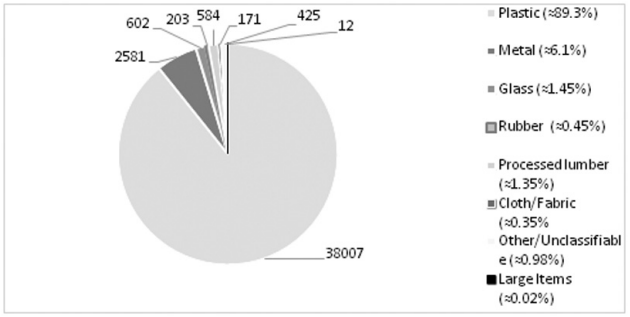
was alone he covered the entirety of the area following the same procedure. While walking, every single item of litter larger than 2.5cm was collected in trash bags. After collection, the litter was sorted and analysed, which involved counting all the items collected. Items were defined and classified according to material. They were also weighed using a Samsonite scale (max. weight supported: 40kg). If an item was too large or heavy to remove it from the beach, it was marked to prevent double counting, and noted down. For site characterization and shoreline debris analysis, modified NOAA's data sheet were used. For the recording of each location the GPS (Global Positioning System) tracker GARMIN eTrex 10 was used. Each site was covered once between February 7th and March 4th, 2015.

A meso-debris analysis was performed on each site as well. The meso-debris (25-2mm debris) analysis consisted of collecting sand samples from a 50x50cm square at a randomly chosen point along the high tide wrack line in the surveyed transect. The sand was 10cm of sand were scooped in order to fill a 20-liter bucket. Subsequently, the sediments were sieved through a 2mm mesh stainless sieve and washed with fresh water to remove the remaining sediments. The remaining samples are placed in a container with salt water, mixed and left to rest for two hours. This same procedure will be repeated twice in order to separate floating matter, presumably plastic debris, from the not-floating ones. Subsequently, manually and visually separate them and identify every non organic material, also from the non-floating material, which will be subsequently identified and weighted. This procedure enabled a later extrapolation of the density concentration of meso-debris on the surveyed transects. Such procedures have been recommended by Hidaldgo-Ruz et al. (2012), who have reviewed the currently existing methodologies on meso-plastic debris and micro-plastic debris. However, it was partially adapted to the means and material available to us.

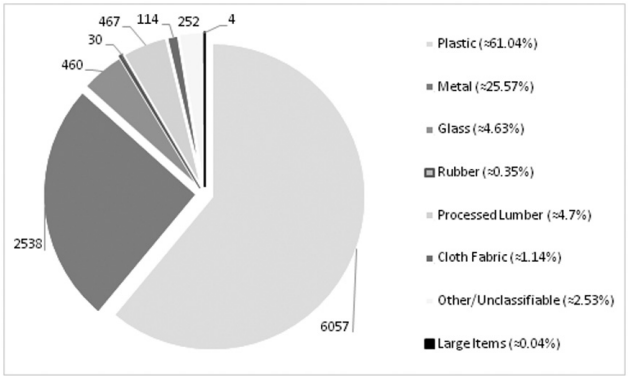
Once all the sites had been surveyed, a second round of assessments was conducted on the exact same locations between March 7th and April 1st, 2015. Each site was reassessed 28 days after the previous assessment, both for macro- and meso-debris, in order to compare the results to the previous measurements. The only difference in methodology for the second round of assessments is that each transect was subdivided in two different sub-transects: 0-15m from the waterfront and 15m until the end of the beach (15m+). The goal of this method was to determine whether there is a correlation between trash concentration and distance from the water front.

4. Preliminary Results

This section will focus on the preliminary results of the macro-debris analysis only, as the meso-debris sorting and analysis is yet to be completed.



Graph 1. *Overall concentration of material found and their abundance during the total of the 20 beach assessments performed*



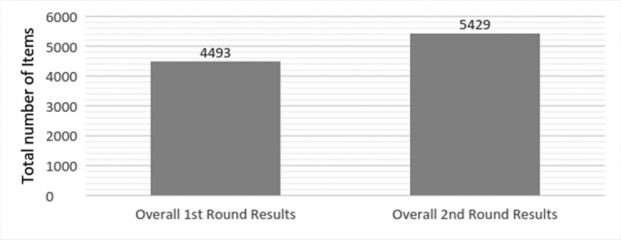
Graph 2. *Overall concentration of materials and their abundance found on the southern coastline after two rounds of assessments.*

In total, 243.53kg of trash were removed from the studied areas on both the northern and the southern coastline of Aruba. The 243.53kg of trash consisted of 42,585 items that have been collected, weighted, sorted and counted. As it is possible to observe in Graph 1, by far the most abundant material found was plastic, which corresponds to 38,007 items out of the total of 42,585 items collected. This means that approximately 89.3% of all the trash collected was plastic. The overall most abundant plastic items found were plastic fragments (15,320). The second most abundant material found was metal, mostly beer caps found on the southern coastline (2,380 beer caps out of the total of 2,581 metal items found). There is a considerable difference between the amount of plastic and the amount of metal found. All the other items combined account for only around 4.6% of the total trash collected.

4.1. South Coast

From the south coast a total of 47.61kg of trash were collected, consisting of 9,992 items. Graph 2 shows that the most abundant type of trash found is plastic with an overall 61.04% (6,057 items), followed by metal, which is the second most abundant type of trash found representing 25.57% (2,538 items) of the total. Graph 2 also shows that the other materials found, together account for only 13.39% of the total trash collected (1,327 items). When looking at the most abundant items found during the studying of the south coast it becomes evident that the majority of the trash found can be related to the careless behaviour of some beachgoers. This can be seen by the fact that 5 out of 6 of the most abundant items are linked to smoking, drinking and eating activities. The most abundant items found are: cigarettes (2,560), beer caps (2,380), plastic fragments (659), plastic straws (605), plastic bottle or container caps (543), and plastic food wrappers (445). A more detailed list of the items found can be found in Appendix I.

When comparing the overall results of the first round of assessments performed on the south coast with the ones obtained from the second sets of measurements on the same locations, it is possible to observe that there was a slight increase in the trash concentration and abundance found (see Graph 3). Indeed, a comparison of the two sets of results shows that during the second round of assessments there had been an increase of approximately 9.4%. As a matter of fact, the results from the first

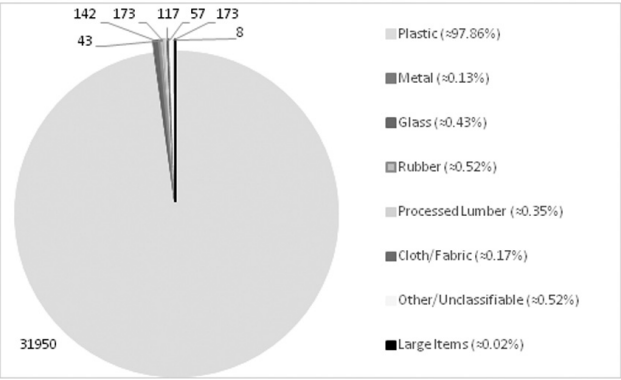


Graph 3. *Comparison of the total number of items found during the 1st and 2nd round of assessments performed on the south coast.*

sets of measurements showed a total of 4,493 items collected, whereas from the second collection the total number of items found was 5,429, marking an increase of 936 items.

4.2. North Coast

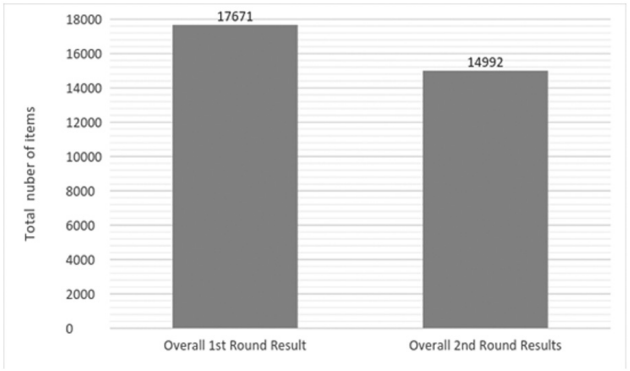
From the overall results of the north coast it is possible to immediately notice that the numbers are high, especially compared to the ones of the south coast. From the north coast, a total of 195.92kg of trash was collected (32,663 items).



Graph 4. *Overall concentration of materials and their abundance found on the north coastline after two rounds of assessments.*

Graph 4 unmistakeably shows the great disproportion of trash materials found on the north coast. Plastic accounts for approximately 97.86% of all trash found on the north coast, which in items is 31,950 out of 32,663. All the other materials combined are the equivalent of around 2.14% out of the total (713 items). The second most abundant materials after plastic, with an even score, are rubber and other/unclassifiable material with each have 176 items and respectively account for around 0.52% of the total. They are then followed by: glass ≈0.43% (142 items), lumber/building material ≈0.35% (117 items), cloth/fabric ≈0.17% (57 items), metal ≈0.13% (43 items), and large items ≈0.02% (8 items). On the north coast, when taking into consideration the 6 most abundant items, it is possible to observe a great divergence from the first most abundant item found and the remaining 5, but they are all made out of the same material: plastic. The mostly found items were plastic fragments (14,661). These are followed in decreasing order by: beverage and container caps (6,285), straws (2,880), plastic rope/net pieces (1,698), bags (1,922), and plastic utensils (1,034). For more detailed information on items found and their abundancy on the north coast please consult appendix II.

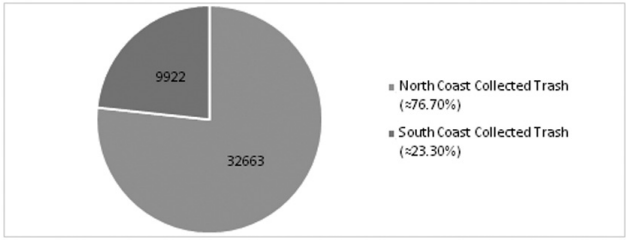
On a more positive note, when comparing the overall results of the first and second set of assessments performed on the north coast, it is possible to notice a moderate decrease in the inclusive weight and number of items collected during the second set of surveys, as it is visible in Graph 5. Graph 5 shows that there was a decrease of around 8.2% in the trash found during the second series of assessments, which is equivalent to a reduction of 2,679 items.



Graph 5. *Comparison of the total number of items found during the 1st and 2nd round of assessments performed on the north coast.*

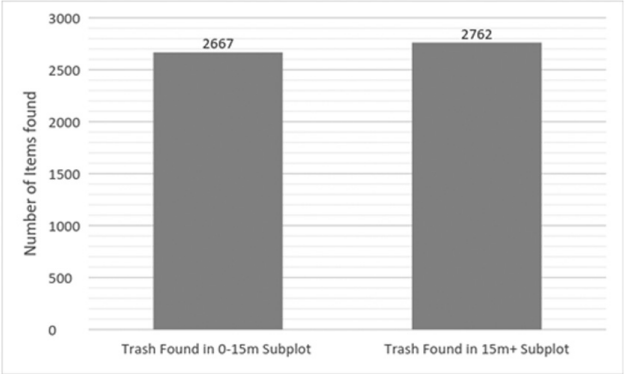
4.3. Comparison of the Northern and Southern Coastlines.

It is evident that there is a great difference between the results found from the northern and southern coastline. The overall trash collected from all the sites on the north coast accounts for 195.92kg, equivalent to 32,663 items, around 76.70% of the total trash collected. The total litter removed from the southern coastline, on the other hand, weighed 'only' 47.61kg (9,922 items) and accounted for around 23.30% of the overall trash collected (see Graph 6).



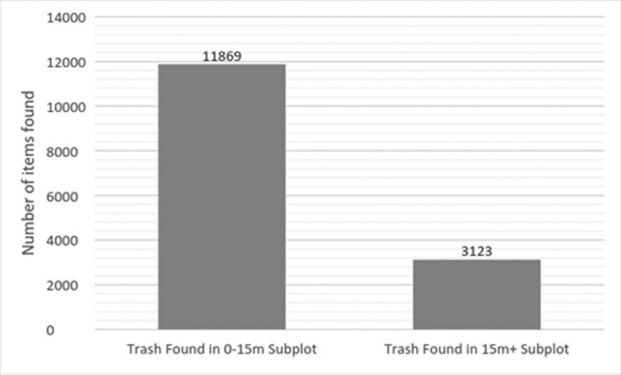
Graph 6. *Overall comparison between the trash collected from the north and south coast of Aruba after all the performed assessments.*

Another clear distinction among the different coastlines' results is where the majority of the trash was found with respect to the water front, which was possible because during the second round of assessments each plot was subdivided in two subplots: 0-15m from the shoreline and 15m+ from the shoreline. When observing the total results from the urban coastline it is possible notice only a minor difference, of 95 items, between the two



Graph 7. *Overall difference in number of items found between the 0-15m and 15m+ from shoreline subplots from all the south coast covered sites.*

subplots (see Graph 7). On the other hand, when comparing the overall results obtained from the combination of both subplots covered on the north coast, a considerable difference emerged (see Graph 8). To be more precise, there was a difference of 8,746 items. The vast majority of the trash was found in the subplots closer to the shoreline (0-15m), which account for 11,869 items, 79.16% of the overall trash collected from all the second round of assessments on the north coast. In contrast, in the subplots located further from the water front (15m+), the total items recovered were 3,123, which is 20.84% of everything that was found in the second sets of measurements.



Graph 8. *Overall difference in number of items found between the various subplots (0-15m and 15m+ from shoreline) from all the north coast covered sites.*

5. Discussion and Preliminary Conclusion

Throughout this research it has become evident that there is a great discrepancy between the amount of trash found on the north coast and south coast of Aruba. Compared to the rural coastline, much less trash was found on the urban coastline. It is clear from the south coast results that all trash collected is the outcome of improper waste disposal by the beachgoers, who have been observed to be both locals and tourists. This means that the majority of, if not all, trash found there is land based. This may be assumed because 5 out of 6 of the most-found items on these sites are related to smoking, drinking and eating activities. This demonstrates that is fundamental to raise awareness among beachgoers and that the use and production of unsustainable food and drinking products should be decreased. The only kind of trash that cannot be directly related to such activities are plastic fragments of which the abundancy can be explained by the fragmentation degradation properties of plastic. Moreover, the researcher observed that a high concentration of trash accumulated around the palapas, where people rest in the shade.

On the north coast, the scenario is very different. Although the most abundant material found is plastic, as on the south coast, there was much more trash collected. It is evident that the vast majority of litter is brought in by the sea, having marine based origin. This was shown by the second round of assessments performed, which provided evidence that the vast majority of trash ends up at the wrack line, where also all the seaweed and algae brought in by the sea accumulate on the beach. Although the trash found on the north coast does not originate in Aruba, it is accumulating consistently and affecting Aruba's coastal ecosystem. Nonetheless, it has to be said that 4 out of the 6 most abundant items found are related to one time use objects (bottle/container caps, straws, bags and plastic utensils), which emphasizes the importance of using more sustainable objects, such as glass bottles and reusable bags. The most abundant objects found were plastic fragments, which can have a severely detrimental impact on the marine ecosystem as they can be easily ingested by animals. It is also important to note that once plastic enters the marine food chain, it will affect humans as well, as we are connected to the marine food chain by eating fish.

From the preliminary results it is concluded that plastic is by far the most abundant material found among the southern and northern shorelines of Aruba. The assessments have shown that Aruba's beaches are facing an environmental issue related to trash abundancy. Moreover, the results raise concerns regarding public health and safety, as many hazardous items are to be found on both the south coast and the north coast, such as glass fragments, condoms, hygiene pads, syringes, medical waste, etc. For more detailed information, consult Appendix I and II.

Further analysis of the data collected will shed light on the trash concentration ratio of both the macro-debris and meso-debris for each site covered. So far, this research has underlined the importance of raising awareness and educating the local population and tourists about the debris that results from unsustainable consuming activities and

the importance of beach clean-ups for both coastlines. Even though the trash found on the north coast is probably the result of poor waste management of other countries, or from marine pollution caused by cruise ships and fishing vessels, Aruba has to manage the waste that is accumulating on its northern shores, as this waste is affecting Aruba's coastal ecosystem. This research has resulted in the removal of 243.53kg of trash (42,585 items). Sadly, this is only a small portion compared to the greater picture of the entirety of Aruba's coastal current situation; which can change only if awareness is raised and regular clean-ups are performed.

6. Acknowledgments

I would like to sincerely thank Eric Mijts and Jocelyn Ballantyne for their incredible work in setting up the Aruba Research Program. They gave a rare opportunity to bachelor graduating students like me, to grow and develop at an academic and personal level by allowing us to set up and perform our own field work research thesis. You opened a window into the future, as you have allowed us to experiment first-hand the beauty and challenges of doing field research in, for some of us, an unknown environment. You made it possible to personally experience if what we thought we would like to do in our coming future is really the direction we want to follow.

I also want to thank my supervisors Tatiana Bekker and Maarten Eppinga for their inspirational support and guidance. I would like to thank all the people in the Aruba research program and, who have made my research and stay in Aruba a wonderful and possible experience. I would like to specially thank Giovanni Jacobs for his help and dedication in assisting me with the majority of the beach assessment I have performed. I would also like to show gratitude towards all the other students who have helped me during my assessments: Rikkert Loosveld, Kimberly van Loom, Sil Scholte and Florianne Sollie. I am also extremely grateful to the collaboration of Arikok National park, through Sherman Lee, who have allowed me and supported me in performing my research in their area of jurisdiction. I am also thankful for Zaida Everon, of Colegio Arubano, who has allowed me to use their facilities and have made the analysis of my data possible.

I would like to conclude by thanking my family for always supporting and motivating me in following my dreams and passions

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APPENDIX I. Overall Debris Data Sheets of the South Coast

DEBRIS DATA: (continued on back)

ITEM	MTERIAL			TOTAL
PLASTIC				
Plastic fragments	Hard	Foamed	Film	
Food wrappers	176	3	266	445
Beverage bottles	36			36
Other jugs or containers	17			17
Bottle or container caps	543			543
Cigar tips	60			60
Cigarettes	2560			2560
Disposable cigarette lighters	8			8
6-pack rings	1			1
Bags			168	168
Plastic rope/small net pieces	60			60
Buoys & floats				0
Fishing lures & line	33			33
Cups (including polystyrene/foamed plastic)	179	12		191
Plastic utensils	208	7		215
Straws	605			605
Balloons			109	109
Personal care products	16			16
Toys				
Fragments	618	14	27	659
Other:	279	12	40	331
Overall	5399	48	610	6057
METAL				
Aluminum/tin cans	43			43
Beer caps	2380			2380
Metal fragments	23			23
Other:	92			92
Overall				2538
GLASS				
Beverage bottles	53			53
Jars	1			1
Glass fragments	406			406
Other:	0			0
Overall				460

ITEM	MATERIAL	TOTAL
RUBBER		
Flip-flops	4	4
Gloves		
Tires		
Rubber fragments	18	18
Other:	8	8
Overall		30
PROCESSED LUMBER		
Cardboard cartons	8	8
Paper and cardboard	196	196
Paper bags	6	6
Tissue/napkins	214	214
Lumber/building material	22	22
Other:	21	21
Overall		467
CLOTH/FABRIC		
Clothing & shoes	17	17
Gloves (non-rubber)	0	0
Towels/rags	5	5
Rope/net pieces (non-nylon)	62	62
Fabric pieces	30	30
Other:	0	0
Overall		114
OTHER/UNCLASSIFIABLE		
Firework	176	176
Plaster	14	14
Wine cork	16	16
Condom	6	6
Hygiene pad	15	15
Battery	4	4
Stuffed animal	1	1
Razor blade	1	1
Duct tape	3	3
Baby diaper	2	2
Hand grenade Col Smoke Red L70A1	1	1
Bullet case	9	9
Phone charger	1	1
Swimming goggles	1	1
Tampon	2	2
Overall		252

LARGE DEBRIS ITEMS (> 1 foot or ~ 0.3 m)				
Item type	Status (sunken, stranded, buried)	Approximate width (m)	Approximate length (m)	Description / photo ID #
Lumber plank	Buried	0.15	3.61	
Lumber plank	Buried	0.12	1.16	
Lumber plank	Buried	0.12	1.32	
Wooden pallet	Buried	1.5	1.5	

APPENDIX II. Overall Debris Data Sheets of the North Coast.

DEBRIS DATA: (continued on back)

ITEM	MATERIAL			TOTAL
PLASTIC				
Plastic fragments	Hard	Foamed	Film	
Food wrappers	194	1	670	865
Beverage bottles	121			121
Other jugs or containers	534			534
Bottle or container caps	6285			6285
Cigar tips				0
Cigarettes	20			20
Disposable cigarette lighters	127			127
6-pack rings	19			19
Bags			1622	1622
Plastic rope/small net pieces	1698			1698
Buoys & floats	46			46
Fishing lures & line	74			74
Cups (including	934	6		940
Plastic utensils	1016	18		1034
Straws	2880			2880
Balloons			7	7
Personal care products	363			363
Toys	220			220
Fragments	12709	1951	1	14661
Other:	400	33	1	434
Overall	27640	2009	2301	31950
METAL				
Aluminum/tin cans	7			7
Beer caps	8			8
Metal fragments	10			10
Other:	18			18
Overall				43
GLASS				
Beverage bottles	39			39
Jars	6			6
Glass fragments	94			94
Other:	3			3
Overall				142

ITEM	MATERIAL	TOTAL
RUBBER		
Flip-flops	131	131
Gloves	5	5
Tires	1	1
Rubber fragments	25	25
Other:	11	11
Overall		173
PROCESSED LUMBER		
Cardboard cartons		0
Paper and cardboard	2	2
Paper bags	1	1
Tissue/napkins	7	7
Lumber/building material	105	105
Other:	2	2
Overall		117
CLOTH/FABRIC		
Clothing & shoes	46	46
Gloves (non-rubber)		0
Towels/rags	3	3
Rope/net pieces (non-nylon)	4	4
Fabric pieces	4	4
Other:		0
Overall		57
OTHER/UNCLASSIFIABLE		
Medical waste	64	64
Syringe	80	80
Brush	2	2
Bullet case	2	2
Light bulb	9	9
Led ceiling lamp	1	1
Filter mask	1	1
Sawing needle	8	8
Baby diaper	3	3
Condom	1	1
Hygiene pad	1	1
Plane's seat arm rest	1	1
Overall		173

***LARGE DEBRIS ITEMS* (> 1 foot or ~ 0.3 m)**

Item type (vessel, net, etc.)	Status (sunken, stranded, buried)	Approximate width	Approximate length (m)	Description / photo ID #
Wooden Pallet	Stranded/buried	1.2	Unknown	
Tire	Stranded	0.20	0.70	Intact
Plastic bucket	Stranded	0.35	0.50	Intact
Plastic tube	Stranded/buried	0.12	0.60	Emerging from the sand
Tire	Stranded	0.27	1	At the wreck line
Plastic tube	Stranded/buried	0.027	1.37	
Plastic box	Stranded	0.3	0.5	Broken
Wooden pallet	Stranded	1.02	1.22	

Giovanni Jacobs - University College Utrecht

Reflection on the UA-UCU project 2015

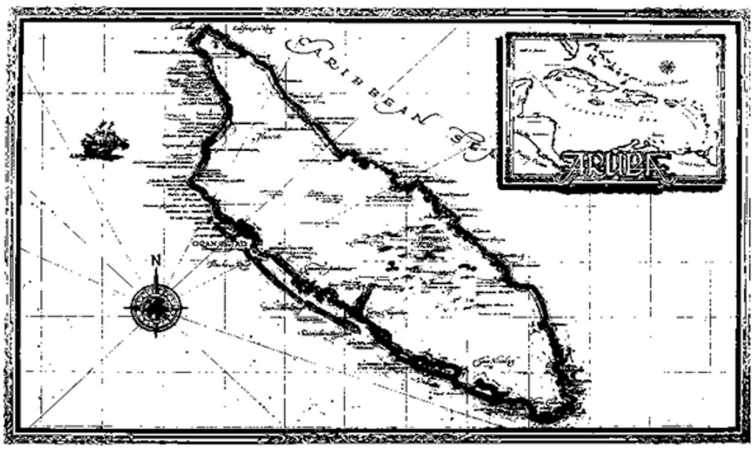
I have experienced the UA-UCU project as being an interesting multi-dimensional project with its focus on different aspects of the Aruban environment, culture and community.
Usually for gathering data or information for a legal essay, we primarily analyze the law, jurisprudence and books or articles on laws, and if necessary we approach lawyers or judges. For gathering data and information for the UA-UCU project, I had to do more fieldwork. I visited different agencies and interviewed different people. To really understand the problem of beach pollution, I assisted Tobia di Scisciolo with his research on beach pollution. To collect data on the pollution of the beaches, we manually cleaned several beaches several times. This has been an interesting though wearisome experience.

I have also attended a testing of the bathing water quality by the D.N.M. at different beaches of Aruba.

Working together with a group consisting of different disciplines, I have learned to analyze and address issues from a different perspective than the one I've learned in the last four years of law school.

Mapping Aruba's Policy on Beach Care

Giovanni Jacobs, April 2015



1. Introduction

Aruba's economy is highly dependent on its white beaches, clear sea and beautiful natural landscape. People all over the world visit Aruba to enjoy this scenery. But there is a downside to this tourism-based economy. While tourism has been a successful sector of the Aruban economy, it also has a negative impact on the environment.[1] If not controlled properly, the result is overuse, abuse and quality degradation of the environmental resources.[2] Ocean and beach trash is a serious pollution problem that affects the health of people, wildlife and local economies. Trash in the water and on the beaches can be harmful for beachgoers and marine animals. It is also an ugly sight to have trash on the beaches and this can have a negative influence on the tourism of Aruba.

Adequately resolving this problem is important to the tourist industry as well as for maintaining the original quality of the environment.

1.1 Not just beaches, but the Aruban beaches

Beaches can be defined as long, thin belts of sediments that cover the continents and islands at their shorelines. In tropical areas with good reef development, the beach sand may be composed primarily of calcite from pulverized coral and seashells.[3] Coral reefs cover only 1% of the ocean floor, which means that these kinds of beaches are relatively very rare.[4] Luckily, Aruba's coast is lined with wide sandy beaches, consisting of carbonate sand that is made up of seashells and calcite; giving it it's beautiful white color. Aruba has nice beaches and it's not uncommon that they are highly praised. If you use the Internet to search for information about the beaches of Aruba, you will probably get the following description:

1 J. W. T. Koopmans, E. L. Sjak-Shie, G. A. E. Thodé, *Milieu en ruimtelijke ordening in Aruba,* Oranjestad: VAD 1994.
2 L. Dwyer & R. Spurr, Tourism Economics Summary, Australia: STRC Centre for Economics and Policy, Gold Coast Campus University 2011.
3 A. E. Gates & R. P. Blauvelt, Encyclopedia of Pollution, New York: Facts on file Inc. An infobased learning Company 2011.
4 F. Borrero et al., Earth Science, Geology, the Environment, and the Universe, Ohio: National Geographic, McGraw-Hill 2008.

"The beaches of Aruba are widely considered to be among the cleanest, widest and most spectacular in the Caribbean region".[5] It's primarily for the use of these spectacular beaches that tourists come to Aruba to enjoy their vacation.

In 2013 almost 97% of all the tourists that came to Aruba, visited its beaches.[6] Approximately 72% of these tourists strongly agreed with the statement that Aruba has nice beaches, while 28% agreed with that statement.[7] Although these statistics don't elaborate on how clean the beaches are, they convincingly show that the tourists like Aruba's beaches.

Such optimistic numbers have not been found when asking the tourists if they agreed or disagreed with the statement that Aruba is clean. Merely about 16% of the tourists strongly agreed with the statement that Aruba is clean, while 80% agreed and 4% fit in the categories of neither agreed or disagreed, disagreed, strongly disagreed, or don't know.[8] Unfortunately these numbers show the opinion of tourists on the cleanliness of Aruba in general, and it's not specified if the beaches fall within the range of this statement.

Actual data on the allocation of trash in different areas on Aruba, or data classifying the beaches in different cleanliness levels, I have not found. However, while assisting a research on beach pollution and several cleanup events, I have noticed that the beaches on the south coast of Aruba, especially those beaches nearby the hotels, are much cleaner than the more inland areas.

As a major source of income is derived from tourism and is based on the Aruban scenery, beaches and hospitality, the beaches are one of the most significant assets in the Aruban economy.[9] It is therefore that in this article Aruba's policy on beach care will be mapped, analyzed and interpreted, while focusing on different aspects of maintaining and/or improving the quality and safety of Aruba's beaches.

2. Definition of the problem

It is in the interest of Aruba that the beaches are being taken care of. From a legal perspective, the word "care" can be defined as "serious attention; under the law of negligence or obligations, the conduct demanded of a person in a given situation".[10] According to Article 21 of the Constitution of the Kingdom of the Netherlands, the State shall care for the habitability of the country and the protection amelioration of the environment.[11] Furthermore, the State is presumed to be the owner of the beaches.[12] So it's the government's obligation to take care of the beaches (and the territorial seas).

But to what extent and how this care is being carried out by the government is not clear. There islittle information on an overall overview on how and which governmental agencies and/or non-governmental agencies are caring for the protection and the improvement of the beach quality. There are different laws that play an important role in the beach care. To obtain an overall overview combined with the laws applicable on the beach, mapping of the policy on beach care is necessary.

3. Method

Several topics can fall within the scope of beach care, but for the purposes of this article, the emphasis will be mainly on beach cleaning and on the quality of the bathing water.

5 www.visitaruba.com/things-to-do/aruba-beaches.
6 L. Christiaans-Yarzagaray et al., Tourism Profile - Year Report 2013, Oranjestad: Central Bureau of Statistics 2014.
7 L. Christiaans-Yarzagaray et al., Tourism Profile - Year Report 2013, Oranjestad: Central Bureau of Statistics 2014.
8 L. Christiaans-Yarzagaray et al., Tourism Profile - Year Report 2013, Oranjestad: Central Bureau of Statistics 2014.
9 R. Derix, Opportunities and Challenges for Environmental Statistics in Aruba, Oranjestad: Central Bureau of Statistics 2014.
10 B. A. Garner, Black's Law Dictionary, Ninth Edition, Minnesota: Thompson Reuters 2009.
11 G. Betlem, Civil Liability for Transfrontier Pollution. Dutch Environmental Tort in International Cases in the light of Community Law, Londen: Graham & Trotman/Martinus Nijhoff 1993.
12 Article 5:26 Civil Code of Aruba.

To have insight into Aruba's policy and the role of law on beach care, and to capture it with detailed information, primarily a (analytic) legal research type is used combining the investigation, collection and examination of different policies, legal provisions, concepts and principles. At a minor scale, social science techniques of data collection (such as interviews) are used as well.

The legislation discussed in this article is translated from the original legislation in Dutch, so it cannot provide at all times the accuracy of the original text.

The main research questions in mapping Aruba's policy on beach care are:

- Which regulations are relevant on the subject of beach care?
- What are the policies of governmental agencies on beach care?
- What are the policies of non-governmental agencies on beach care?

4. Mapping laws and policies on beach care

Legislation plays an important role in addressing the increasing problem of beach pollution and in promoting beach safety. Environmental laws can be enshrined in specific laws like the Nuisance Act and in more general laws like the Aruban General Police Ordinance and the main tort Article of the Aruban Civil Code, Article 6:162.[13]

This section will begin with an outline of the Aruban regulations and policies on beach care.

4.1 Public law foundation.

Regarding the public law foundation, the legal basis of the environmental law can be found in Article 21 of the Constitution of the Kingdom of the Netherlands: "The State shall care for the habitability of the country and the protection and amelioration of the environment".[14]

4.2 Legal regulations on preventing pollution of the beaches

In order to ensure the safety and the adequate use of the public waterways under supervision of the State and that from the connecting beaches, shores, earth- and waterworks, by means of asserting penalties, provisions will be laid down by National Decree containing general measures, regarding: (...) c. the use of the beaches, shores, banks, and bays under supervision of the State; (...) d. the throwing or placing of solids in the waters referred to in section a, and on or by the works and areas referred to in section b and c.[15] In this Article, the National Ordinance Public Waterways an Beaches (AB 1987 no. 123) stipulates the requirement of (another) legal regulation that lays down the provisions to ensure the safety and the adequate use of the public waterways and the beaches. This is done by the National Decree Public Waterways and Beaches (AB 1987 no. 124). For the purpose of preventing the dumping of trash, it is forbidden to throw or leave behind bottles, packaging materials and other solids, in the public waterways or on the public beaches and shores, apart from the locations meant for this purpose.[16]

About the same is stated in Article 55 of the General Police Ordinance (AB 1995 no. GT 8): "It is forbidden to place, to dump, to throw, to pour, to flow, to drop or to keep waste, any object or any substance, elsewhere than: (...) d. the trash cans or similar objects placed and meant for this purpose". And although not specified for the beaches,

13 J. W. T. Koopmans, E. L. Sjak-Shie, G. A. E. Thodé, *Milieu en ruimtelijke ordening in Aruba,* Oranjestad: VAD 1994.

14 G. Betlem, *Civil Liability for Transfrontier Pollution. Dutch Environmental Tort in International Cases in the light of Community Law,* Londen: Graham & Trotman/Martinus Nijhoff 1993.

15 Article 2 of the National Ordinance of 1987 concerning regulations regarding public waterways and beaches (AB 1987 no. 123).

16 Article 30 of the National Decree Public Waterways and Beaches (AB 1987 no. 124).

form Article 16 in conjunction with Article 1 of this same Ordinance follows that it is forbidden to pollute the public road, and herewith the waterways, in any way.

From Article 6:162 (2) Civil Code of Aruba follows: "Except where there is a ground of justification, the following acts are deemed to be unlawful: the violation of a right, an act or omission violating a statutory duty or a rule of unwritten law pertaining to proper social conduct".[17] Acting contrary to the environmental regulations will result in breaching of the statutory duties under Article 6:162 Civil Code of Aruba.[18]

Violation on one of the prohibitions and failure to uphold one of the obligations is punishable.[19]

One of the activities at the beach that the Aruban people often enjoy doing is camping. Camping on the beaches of Aruba is not possible without a permit.[20] In a camping permit there are several provisions to ensure that the permit holder is not polluting the beach. From the Camping Permit follows that: "it is forbidden to build a bonfire on the beaches; it is forbidden to have a barbecue on the beaches within 5 meter of the white sands; it is forbidden to bury the remaining charcoal in the sand after using a barbecue pit; it is forbidden to pollute the beach or sea in any way".[21]

These are the main national legal regulations for preventing people and other actors on polluting the beaches.

17 G. Betlem, *Civil Liability for Transfrontier Pollution. Dutch Environmental Tort in International Cases in the light of Community Law*, Londen: Graham & Trotman/Martinus Nijhoff 1993.
18 G. Betlem, *Civil Liability for Transfrontier Pollution. Dutch Environmental Tort in International Cases in the light of Community Law*, Londen: Graham & Trotman/Martinus Nijhoff 1993.
19 Article 43 of the National Decree Public Waterways and Beaches (AB 1987 no. 124); Article 175 of the General Police Ordinance (AB 1995 no. GT 8); Article 6:162 in conjunction with Article 3:296 Civil Code of Aruba.
20 Article 24 of the National Decree Public Waterways and Beaches (AB 1987 no. 124) in conjunction with Article 15 of the General Police Ordinance (AB 1995 no. GT 8).
21 Provisions 13, 14 and 15 of the Camping Permit stipulated by the Minister of Integration, Infrastructure and Environment.

4.3 Legal regulations and policies on the cleaning of the beaches

In spite of these legal regulations, the beaches still are being polluted.

According to Article 2 of the National Ordinance for the establishment of the Servicio di Limpiesa di Aruba (AB 2005 no. 5), one of the responsibilities of the institution SERLIMAR is the maintenance of the domains owned by the State, the parks, the public roads and the beaches. Upon asking a policy officer at SERLIMAR if it is correct to assume that one of the duties of SERLIMAR is to cleanup the beaches, the answer was that for a period of time this was the case, but currently it does not fall under the responsibility of SERLIMAR. As of 2011 the department of Landscape Management has been transferred from SERLIMAR to D.O.W. (Public Works Department), by the Ministerial Regulation MinIIM/4018-2010. Nevertheless, if it comes to the attention of a controller that a beach is badly polluted, SERLIMAR will send a team for the purpose of cleaning up that beach. This is also the case in situations where there is a lot of seaweed on the beaches or if there was a special event on the beach and the beach needs to be cleaned.[22] SERLIMAR has no fixed policy for these exceptional cases. SERLIMAR is also responsible for the weekly collection of the waste in the trashcans nearby the beaches.

The duty to clean up[23] the beaches, lies with D.O.W. (Public Works Department). For achieving this D.O.W. uses six teams of private contractors consisting each of three employees with the sole purpose of cleaning up and maintaining the beaches five days a week.[24] Herein, D.O.W. appoints controllers to inspect the beaches on cleanliness and to supervise the work being done by the private contractors. The beaches that are being cleaned are: Arashi, Malmok, Hadicurari, Palm Beach, Eagle Beach,

22 Document Servicio General Mantencion Bo Bario (SERLIMAR).
23 E.g. the removal of trash or litter and seaweed.
24 P. Denters, R. Falconi, J. Lue, *Involvimento di D.O.W. pa cu mantencion di nos beachnan*, Oranjestad: D.O.W. 2015.

Mangel Halto, Santo Largo, Rodgers Beach and Baby Beach.[25] The cleaning up is being done mostly by hand and not with heavy machinery.

As regarding the cleanup of beaches on the North Coast of Aruba, D.O.W. sends its teams regularly to the following beaches: the area from Boca di Briek (ex-Natural Bridge) up to the Chapel at Alto Vista, the area of Rincon and from Zwart Mangel up to and including Boca Grandi.[26]

Besides the cleaning of the beaches, D.O.W is also responsible for the maintenance of the (quality of) beach sand, the nearby vegetation and the beach huts.

In cleaning up the beaches, the hotels also have a significant role. Usually the beaches nearby the hotels are not being cleaned by SERLIMAR or by D.O.W. because the hotels cleanup these. Their employees (beach attendants) clean up the beaches on a daily basis, often twice a day or continuously.[27] Moreover, some of the hotels use private contractors (divers) to clean up the bathing water. Besides cleaning up the beaches nearby, most of the hotels are also involved in cleanup projects at other beaches or other locations on the Island, like the Bubali Pond, the California White Sand Dunes, the Grapefield Beach, the Mangrove forests, and so on.

4.4 Beach safety policy

For the purposes of this article, beach safety shall only be elaborated on the aspect of bathing water quality.

4.4.1 Policies on monitoring and maintaining the bathing water quality.

Any physical, biological or chemical change in water quality that harmfully effects living organisms or makes water unsuitable for desired uses might be considered pollution.[28] Bacteria in the bathing water can be harmful to marine life and humans, causing sickness (i.e. diarrhea) and decease (i.e. gastroenteritis). As the quality of the bathing water degrades, the swimming-associated illness rate increases.[29]

Escherichia Coli and Enterococci are part of the normal intestinal flora in humans and animals, and are therefore, direct indicators of fecal contamination of the water and the possible presence of pathogens.[30]

Bathing water quality can be classified as 'poor', 'sufficient', 'good' and 'excellent'.

Parameter	Excellent Quality	Good Quality	Sufficient	Reference methods of analysis
Intestinal Enterococci (cfu/100ml)	100	200	185	ISO 7899-1 or ISO 7899-2
Escherichia Coli (cfu/100ml)	250	500	500	ISO 9308-3 or ISO 9308-1

Chart 1: Classification of water quality for coastal waters and transitional waters.[31](Source: Annex I, Directive 2006/7/EC).

As of 2006, the Department of Nature and Environment (D.N.M), in association with the Health Authority and the State Laboratory, periodically monitors the bathing water quality also on the presence of coliform bacteria. In the following bar chart the data from tests on the

25 P. Denters, R. Falconi, J. Lue, *Involvimento di D.O.W. pa cu mantencion di nos beachnan*, Oranjestad: D.O.W. 2015.
26 P. Denters, R. Falconi, J. Lue, *Involvimento di D.O.W. pa cu mantencion di nos beachnan*, Oranjestad: D.O.W. 2015.
27 Information obtained through interview with Hotel Riu Palace Aruba, La Cabana Beach Ressort and Casino, Amsterdam Manor Beach Resort and Manchebo Beach Resort & Spa.
28 W. P. Cunningham & M. Cunningham, *Environmental Science. A Global Concern.* New York: Mac Graw-Hill 2012.
29 Office of Research and Development & Office of Water, *EPA Action Plan for Beaches and Recreational Waters. Reducing Exposures to Waterborne Pathogens.* Washington: U. S. Environmental Protection Agency: 1999.
30 Office of Research and Development & Office of Water, *EPA Action Plan for Beaches and Recreational Waters. Reducing Exposures to Waterborne Pathogens.* Washington: U. S. Environmental Protection Agency: 1999.
31 Annex I of the Directive 2006/7/EC of the European Parliament and of the Council, of 15 February 2006, concerning the management of the bathing water quality and repealing Directive 76/160/EEC.

presence of coliform bacteria is set out. It can be noticed that the colony-forming unit per 100ml for the Intestinal Enterococci as well as for the Escherichia Coli, on average, was below 100 cfu/ml. According to the Bathing Water Directive (2006/7/EC) from the European Union, the quality of the Aruban beaches on this matter could be classified as being 'excellent'. Although at the present time there is no legislation in place to ensure the quality of the bathing water, the Department of Nature and Environment (D.N.M) will alert and advice the concerning authorities to take the necessary measures if the quality of the bathing water degrades.[32]

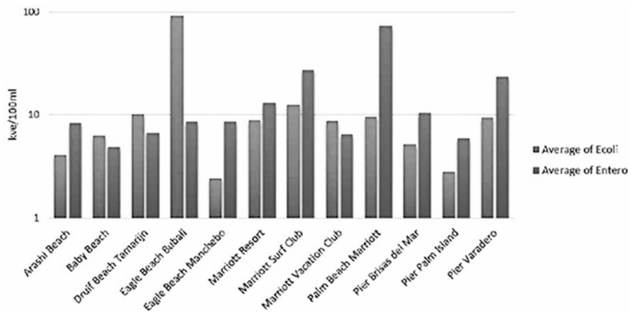


Chart 2: Average per location, during the period of 2009-2013.[33](Source: D.N.M.) (From left to right: 1st bar on the left is for Escherichia Coli, 2nd bar on the left is for Intestinal Enterococci, and so on).

5. Final Remarks, Conclusions and Recommendations

The starting point of this article has been the need to map Aruba's laws and policies regarding the care of the beaches. The regulations analyzed in this article are mostly national regulations, and it can be said that there are many regulations and policies for the purpose of achieving a proper beach care. A crucial element that was not subject to this article is the element of law enforcement. Information from the Aruban Police Force (K.P.A) on enforcing the regulations has also been gathered, but adding this would broaden this (limited) article beyond its scope.

There are many regulations that forbid the pollution of the beaches, but it is also the responsibility of the general public not to pollute the beaches.

Whilst analyzing the policies and involving the information obtained trough interviews with SERLIMAR, D.O.W. and D.N.M., I have come to understand the following. These agencies have basically the right tools and right knowhow to address the problem of beach pollution properly, but they lack the financial resources and manpower. Beach and water pollution must be addressed urgently. It is advisable for the Government to change its attitude more vigorously towards these problems.

To safeguard the bathing water quality, it is necessary to monitor the bathing sites according to criteria or provisions incorporated by law. Adopting provisions like those stipulated in the Bathing Water Directive (2006/7/EC) from the European Union would result in a more structured policy, with a legal basis for ensuring the bathing water quality of the beaches of Aruba.

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32 Information obtained through interview with Directie Natuur en Milieu, Ministerie van Economische Zaken, Communicatie Energie en Milieu.

33 Directie Natuur en Milieu, Ministerie van Economische Zaken, Communicatie Energie en Milieu, *Grafiek 1: Het gemiddelde E. coli en Intestinale Enterococcen per zeewaterlocatie, gemiddelde per locatie 2009-2013.*

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