

CASE STUDY

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The Green School: a sustainable approach towards environmental education: Case study

A cooperation between the Suriname Conservation Foundation (SCF) State Oil Foundation for Community Development and the Suriname Waste Management Foundation (SUWAMA)

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Abstract

'The Green School' is an Environmental project which is being executed at a national level at every primary school in Suriname. This project was initiated in October 2013 and is being financed by the Suriname Conservation Foundation and the State Oil Foundation for Community Development. The SUWAMA foundation is the executor of this project. The main objective of the Green School is to create a community in which we approach our Biodiversity in a sustainable and safe way. This is achieved by positively influencing the behavior of children towards our environment, focusing on the subjects Biodiversity (school gardens and endangered species), Waste (reduce, reuse and recycle), Water and Energy. Via the project all schools are provided with the necessary training, information and materials. Of the 333 primary schools registered in Suriname, 286 have officially and successfully been nominated 'Green Schools'. The approach of the Green Schools differs from the normal natural science curriculum of the schools in terms of more practical activities such as games and or 'do it yourself' activities. The focus of this project is to teach children about the environment in a positive and practical way, hereby stimulating interaction. Every school elects at least five environmental brigades every year and they are responsible for making sure everyone abides by the rules of a Green School. The advantages of this approach are that children learn to work together in groups and thus socialize. Their creativity is also stimulated and they gain practical knowledge. For example in the class they learn about measurements and different types of plants, but when putting in place a garden together with their teachers, they actually measure areas up and see the plants. This not only makes learning more fun, but is a proven way to improve learning. Also great improvement has been observed at the schools after monitoring, such as cleaner classes, cleaner schoolyards and a more sustainable approach towards water and energy usage. By August 2016 all the primary schools will officially be 'Green Schools'. The next phase of the project is making the Green School an official part of the curriculum of the primary schools.

Keywords: Environment, Biodiversity, Recycling, Waste, Water, Energy, Sustainable, Education, Behavior

Background

Introduction

Environmental protection has become a necessity for sustainability in every sense. The Suriname Conservation Foundation (SCF), the State Oil Foundation for Community Development and the Suriname Waste Management Foundation (SUWAMA) are organizations that have dedicated themselves to protect the environment in Suriname and hereby ensure our future generations with all necessities to survive.

It is for this reason that the 'The Green School' was established in 2013, focusing on educating our children namely the 'future of Suriname' on how to approach our environment in a sustainable way, so that current generations can provide for their basic needs, without depriving future generations of theirs. The Suriname Conservation Foundation (SCF) and the State Oil Foundation for Community Development have made available a total of SRD1, 500,000.00 for the execution of this project.

This chapter describes the work areas of the above mentioned organizations and also defines the specific challenges in Suriname which have led to the establishment of this project.

About Suriname

Suriname is a small tropical country in northern South America, well known for her immense untouched natural beauty, diverse cultures and rich biodiversity. The capital of Suriname is Paramaribo, which is located in the coast and in which about 44 % of the population lives.

The population of Suriname in 2014 was 573.311, consisting of people of all races among which Indians, Indigenous people, Negroes, Javanese, Chinese, Brazilians and Europeans. The mother language of Suriname is Dutch as Suriname used to be a colony of the Netherlands until 1975.

The main economic activities are gold mining, the oil industry, agriculture and fishing.

The total surface area of Suriname is 163.270 square kilometers (km²) of which only about 15 % is populated, mostly in the coastal area. The country is divided into ten districts.

The larger part of the interior of Suriname (and namely the District Sipaliwini) is covered in green and is sparsely populated by mostly maroon and indigenous people villages (Slangen 2008; Stichting Algemeen Bureau voor de Statistiek in Suriname 2003–2015).

About the sponsors of the project 'The Green School'

The Suriname Conservation Foundation (SCF)

The Suriname Conservation Foundation was established on the 14th of March in 2000 and has an effective partnership with the Republic of Suriname and Conservation International with substantial contributions from the United Nations Development Program, the Global Environmental Facility and the United Nations Foundation. The Suriname Conservation Foundation focuses on the protection of the biodiversity and generally the protected areas of Suriname.

The main objective of the foundation is to support the management, preservation and sustainable utilization of the biodiversity, by financing the following:

1. Management of protected areas and buffer zones;
2. Activities for nature conservation in non-protected areas;
3. Education and awareness programs, training and scientific research for nature conservation and the environment, activities focusing on the generation of income whereby the biodiversity is used in a sustainable way and is protected.

Through her national and international recognition, good cooperation with stakeholders and her visible commitment towards sustainable utilization and protection of the environment, the Suriname Conservation Foundation has successfully been able to financially contribute to the economic development of Suriname and the protection of the biodiversity of the world.

The SUWAMA Foundation

SUWAMA, SURiname WASTE MAnagement, was founded on April 15th 2008 and is a nationwide operating foundation.

“The immense pollution in Suriname, which is only growing instead of decreasing, has been the primary motivation for the foundation.”

SUWAMA has the following aims:

1. Promote waste separation in Suriname.
2. Develop and stimulate corporate social responsibility.
3. Mobilize, educate and unite people to increase and protect the quality of the natural environment.
4. Perform activities that are related to above-mentioned aims.

The mission of SUWAMA is to systematically increase the consciousness of the whole Surinamese society and all Surinamese organizations, so that they handle the environment, energy, water and waste in a sustainable way.

The strategy of SUWAMA is focused on collaboration with partners, so that the responsibility for a cleaner living environment is shared by the whole Surinamese society.

“Everybody in Suriname must be involved: foundations, government, associations, companies, households, schools, children’s homes and others!”

SUWAMA has since her founding successfully executed different environmental projects with different partners and continues to dedicate herself to the protection of the environment.

The State Oil Foundation for community development

The ‘green’ initiatives of State Oil Suriname are based on her ‘Health, Safety and Environmental policy’. The source of this policy is to execute company activities in a way that prevents damage to the safety and health of employees, contractors, neighbors and the environment.

In 2009 State Oil Company established the 'State Oil foundation for Community Development', with the objective to contribute to the development of the community in a structured way. The foundation supports sustainable projects that promote the development of the Surinamese community. These projects are financed by State Oil Company. The sustainable projects are projects that improve education, health, safety, environment, sports, art and culture, energy and entrepreneurship.

The environmental projects focus on:

1. Protection/preservation and increase of the quality of the environment. These projects focus on the preservation of the biodiversity and creating or promoting a clean, safe and healthy living environment and
2. Promotion of the environmental awareness level through environmental education.

Environmental issues in Suriname

Suriname faces diverse environmental issues. The issues of main concern are listed below per environmental topic:

Biodiversity

Biodiversity or biological diversity is defined as the degree of diversity of life forms (types and genes) within a given ecosystem, biopsp or the entire planet. Biodiversity is an indication of the health of an ecosystem. The larger the diversity within the system, the more resilient it is against external influences such as climate change.

Suriname has a very rich biodiversity. The registered types until now are: 102 amphibians, 172 reptiles, 93 frogs, 47 lizards, 106 snakes, 3 caimans, 15 turtles, 715 birds, 192 mammals, 370 freshwater fishes, more than 600.000 terrestrial invertebrates and 5100 plants (Suriname Conservation Foundation 2012–2015). Unfortunately, there is currently too little respect for our biodiversity and this manifests itself as follows:

1. Uncontrolled deforestation, mining activities, agricultural activities and infrastructural works. These result in the destruction of entire ecosystems;
2. Land division for housing projects especially in the northern part of Suriname, which lead to the destruction of Mangrove forests alongside the coast. This is resulting in land erosion, flooding and emissions of greenhouse gases due to the decomposition of the forests. These forests function as storage for gasses such as carbon dioxide, which is one of the main contributors of global warming;
3. Illegal animal trade and hunting;
4. Pollution of water and soil, causing disruptions in aquatic systems.

It is obvious from the above that awareness about the value and importance of our biodiversity must be increased effectively.

Waste

Pollution in Suriname manifests itself as follows:

1. There is a large amount of litter (street). The reasons for this are diverse:

2. Our community is not (yet) environmentally conscious;
3. There aren't enough waste treatment facilities;
4. There aren't any environmental laws or waste acts.
5. The main waste management activities are waste collection and landfilling in the different landfills or uncontrolled open combustion of waste. The reason for this is:
6. Insufficient waste treatment and or recycling facilities;

The waste situation in the districts outside of Paramaribo are also of great concern. Plastic goods and containers are transported to the interior in large amounts for example and are left there. This waste eventually ends up in the environment and mostly the rivers. Large amounts of plastic waste are visible in the rivers during low tide.

This pollution has different negative effects to mention some:

1. Effects on the biodiversity: very often animals mistake waste for food and consume it. Once consumed, animals no longer feel hungry due to the large amount of food in their stomach and stop eating. This results in the death of these animals. Animals can also become entangled in waste, which makes it impossible for them to move forward. This pollution also has its effects on the quality of water and soil;
2. Effects on human health. Waste piles very easily become a breeding ground or medium for various disease spreading organisms. For example stagnant water in waste makes good breeding grounds for the Dengue mosquitoes. Illegal waste piles also accommodate vermin;
3. Effects on tourism and our living pleasure: waste disfigures the beautiful nature of Suriname. Every tourist or guest in Suriname is confronted with large amounts of waste not only in the populated coastal areas, but also the interior of Suriname. This can cause a decrease in tourism as tourists visit Suriname for her immense beautiful environment;
4. Effects on the drainage systems: the large amounts of waste, especially the plastic bottles, cause blockages in our drainage systems (for run-off water). During periods of heavy rains excessive water cannot be drained away, which results in the flooding of large areas. This also creates very unhygienic situations.

Water and energy

Water and energy are indispensable.

We use water to drink, cook, bath, wash, clean and much more.

Different researches have proven that our water sources worldwide are running low and this is also the case in Suriname, with decreasing amounts of rain to fill up our underground reservoirs. This is why we consider it of great importance that water is utilized in a sustainable way and that spillage of water is prevented.

Nevertheless, it seems that in Suriname water is taken for granted, due to the availability and low water bills. This presents itself through leaking faucets, broken water pipes and also the way we use water for personal purposes, for example leaving faucets on during the brushing of our teeth. This way significant amounts of water are lost.

In the interior of Suriname, households depend on water from the rivers for all their needs. Contamination of this water by either waste or mercury for example from the

mining industries has in some areas made it impossible for villages to use this water for any purpose.

The awareness level about water contamination is not yet what it should be and requires extra attention.

Energy has many uses, such as for lighting, cooling and almost all our household apparatus. The energy usage of Suriname is about 200 mega watts per day. Of this amount, about 120/140 mega watts are generated via hydropower at the dam in the district Brokopondo. The rest of the energy is generated with the use of diesel generators.

These diesel generators also produce large amounts of carbon dioxide (green house gas).

In Suriname efforts have been made to reduce the amounts of energy used via the promotion of low-energy light bulbs and solar panels.

Despite many energy saving efforts, it still seems that energy is not always used in a responsible way, for example light which are unnecessarily left on by day, apparatus that is left on without being used, charges left in contact points and much more.

Issues concerning the current curriculum of primary schools

The current curriculum of the primary schools was also consulted and it is notable that it is outdated and lacks practical exercises. The majority (90 %) of the lessons are theoretical, which causes limitations for children to participate.

During consultations with the schools it also emerged that the schools operate very dependently of the Ministry of Education. As a result of this, projects very often fail shortly after implementation, especially when the involvement of the ministry or the project initiator ends.

The problem definition

These issues, especially those regarding the environmental are of main concern and do not only pose a threat to our environment, but also to our economic development and the livelihoods of many communities. Also if effective early stage education about the environment is not implemented in our current system, the negative behavior towards the environment will keep on manifesting itself.

Based on the above mentioned environmental and curriculum issues, the following problem was defined:

How can we together increase environmental awareness and hereby effectively protect and preserve our environment in a sustainable manner?

The definition of the problem, led to the formulation of the following research questions, namely:

1. Who needs to be educated? Where do we begin?
2. What do we want to achieve? What are our goals?
3. Which topics do we need to focus on?
4. What is the environmental situation in the different districts? What facilities are available?
5. Which type of awareness and or education is effective?

6. Which materials do the schools need?
7. How do we adapt the different topics so that their effectiveness is increased per district?
8. How do we make environmental progress measurable?
9. How do we make this project sustainable?

'The Green School' was developed based on these questions as guiding criteria for continue effectiveness and improvement of the project.

The development of the project and approach used in the different districts are presented in the following chapter 'Method'. The results of the approach is presented and discussed in chapter

'Results and discussion' and final conclusions are presented in chapter 'Conclusion'.

Please note that the method described is the method used to develop 'The Green School'. The results presented are mostly qualitative and are used as a tool for continues improvement of the activities.

Method

'The Green School' has the following objective:

To create a cleaner and environmentally conscious Suriname in which the biodiversity is utilized and protected in a sustainable manner. The main focus is 'Sustainability'.

Changing behavior towards the environment is a proven challenge, but however it is a necessary first step towards an environmentally conscious community.

Therefore it was chosen to influence the behavior of children, so that they will approach our environment in a sustainable and responsible manner. The environmental topics covered by the project are biodiversity, waste, energy and water. These topics were chosen as such because they are areas of concern in Suriname and because they are all connected to each other in one way or another. For example if we pollute our water, this has negative impacts on the aquatic organisms that live there, which in turn has effects on animals who feed on them and humans as well.

This chapter presents the method used to develop 'The Green School'. The project has different phases, all which contribute to the success of the project. The phases include:

1. Development of the project addressing the research questions;
2. Development of the materials;
3. Implementation of the project;
4. Monitoring, evaluation and adjustments;
5. Development of practical curriculum based on the activities of the project together with the Ministry of Education, Science and Culture in Suriname.

Each phase is described below in details.

Development of the project

'The Green School' is very comprehensive and dynamic and therefore strategies and activities keep changing depending on the situation per district.

The project covers the primary school in all the ten districts of Suriname. The number of schools per district is presented in Table 1.

The main concern areas (topics) regarding the environment were identified and determined through consulting the schools, the current curriculum of the schools and organizations involved with the environment.

After the environmental topics were chosen it was decided that the project will focus on children from the 4th and 5th grade of the primary schools between the ages of 9 and 11 years old.

Why children? *Because their behavior can easily be influenced and formed.*

Why the 4th and 5th grade? *Because a certain level of awareness/consciousness is required and because the children from the 6th grade have a busy schedule with exams.*

Based on the topics it was also determined which behavior the project wanted to achieve. This behavior is described below per topic:

1. Biodiversity:
 - (a) Appreciation for all life on earth;
 - (b) Understanding of the negative effects of pollution on the environment.
2. Water and energy:
 - (a) Responsible behavior towards water and energy utilization focusing on ways to save water and energy at school and at home.
3. Waste:
 - (a) Keeping the classes, schoolyard and home free of waste and litter;
 - (b) Waste segregation at school (plastic bottles) for recycling purposes and waste minimization.

In order to effectively achieve the above mentioned behavior and keeping the main goal in mind, the following criteria was used as a guideline to develop materials:

Table 1 The number of schools per district in Suriname

| District | Number of primary schools |
|------------|---------------------------|
| Paramaribo | 105 |
| Wanica | 42 |
| Para | 30 |
| Commewijne | 23 |
| Saramacca | 16 |
| Nickerie | 27 |
| Coronie | 4 |
| Marowijne | 20 |
| Brokopondo | 18 |
| Sipaliwini | 48 |
| Total: | 333 |

1. All materials developed must initiate interaction with the children, hereby increasing participation. By doing so children learn better and chances for change in behavior are greater. Interaction and participation will be increased by integrating the following:
 - (a) More practical activities such as games, presentations and plays in which the children act and have different roles, storytelling and experiencing nature itself;
 - (b) More 'do it yourself' activities such as putting up a school garden together with children and letting them experience this for themselves;
 - (c) Giving the children the opportunity to think and be creative.
2. Schools must be able to initiate their own environmental projects independently and at low costs (taking their budget into consideration).
3. Using a positive approach, by eliminating the words 'do not' from all material to be developed. Telling children how 'not to' do something, lacks relevant information and usually makes them inquisitive. By telling the children how to do something, we give them the correct information and answers at once.
4. Provide a basis for sufficient recent and up to date information.

As a result of the above, different activities were developed for the different topics. The activities for the topics are listed below:

1. Biodiversity: information about the endangered species of Suriname and school gardens (their importance and how to set them up);
2. Waste: recycling and its importance, lessons about the impact of pollution on the environment;
3. Energy and water: lessons about the importance of water and energy, what we use them for, why we must utilize them well and sparingly and the effects of water pollution;
4. The formulation of rules for a 'The Green School';
5. Environmental brigades: environmental brigades are trained and installed to make sure the entire school abides by the rules;
6. Environmental games.

All this information was used as a guideline to develop the materials for the schools.

Development of materials

Different materials were developed for 'The Green School'.

To develop these materials, information was also obtained from different environmental organizations and also governmental authorities, to mention some:

1. The Ministry of Agriculture for information about school gardens;
2. The Ministry of Regional Development, namely the department of education for information about endangered species off Suriname;
3. 'Kinder Museum Villa Zapakara' for the development of creative plastic bottle collection bins and

4. 'Bioslogos' for the development of the school garden posters.

The materials developed differ for some districts as a result of the differences in situations and available facilities in these districts. The materials developed are:

1. A guide book, consisting of information about 'The Green School', the different activities and materials needed to execute them, lessons about endangered species, games and how to successfully execute small projects independently by for example reusing waste materials;
2. A logbook, in which all activities and improvements concerning the environment are recorded. This logbook is also used as tool for measuring the impact of the activities during monitoring.
3. A green board with all the rules of a 'Green School'.
4. Creative plastic bottle collection bins. This offers the children a fun and interactive way to segregate the plastic bottles from other waste types. The bins were developed by different local artists.
5. The bins were supplied to schools in the districts where collection of the segregated plastic bottles for recycling was possible. The schools in district Marowijne received general waste bins due to inadequate infrastructure. In Brokopondo and Sipaliwini the schools will be provided with reusable water containers, in which they can bring their beverages to school. This way the production of plastic bottle waste will be minimized;
6. School garden posters: these posters provide the children with information about how to set up a school garden together.
7. Schools also receive pots, soil and seeds to start up their gardens. In the district Sipaliwini schools will be stimulated to put up gardens for the cultivation of available nuts, seeds and medicinal plants as these types of plants are readily available in their villages and form part of their tradition;
8. Environmental posters: posters with information about water and energy saving and how to protect the environment were also developed. These posters are posted on school walls as a reminder to take care of the environment;
9. Vests, badges and waste pickers for the environmental brigades. The environmental brigades are supplied with vests and badges, so that they can be distinguished.

Implementation of the project

The implementation planning is made per district and all local authorities are approached for approval before starting. Once all permissions are obtained, the school teachers are invited to attend a training and workshop, during which they are provided with all necessary information. After the training the materials are delivered and the schools are given 6 weeks to 2 months to implement the activities. This way the schools have enough time to familiarize themselves with the provided materials and lessons and can plan in activities at ease. This also gives them the opportunity to use their creativity.

After the 2 months, the SUWAMA team visits the schools to see if the activities are executed and if the schools need any additional assistance. The situation at the schools is also registered, which serves as a baseline study. Through observations and a checklist/

questionnaire the following qualitative information is collected during the baseline study:

1. Previously executed environmental and recycling projects;
2. Conditions of classes and school yards;
3. Existing school gardens;
4. Water sources and usage;
5. Available materials about for example endangered species;
6. Energy availability and usage and
7. Existing recycling programs.

This information is processed in a general database.

Monitoring, evaluation and adjustments

Six months after implementation the schools are randomly and partially monitored. A representative amount of schools (a minimum of 40 % of the schools) is visited by the SUWAMA team physically to observe and register where possible how effective the activities are. The remaining schools receive a checklist, which they fill out and submit to SUWAMA. The situation at the schools during monitoring (baseline) is then compared to the situation in the beginning during implementation, to determine the effectiveness of the activities. The logbook is hereby consulted for information. Depending on the results, the activities are evaluated and adjusted accordingly.

Development of practical curriculum

All project results are presented to the Ministry of Education, Science and Culture. Adoption of the activities of the project by the Ministry is crucial for the sustainability of the project and the adoption has already been approved by the Ministry and the adoption process started in December 2015.

Results and discussion

This chapter presents the results and discussions of the project.

The participation of the schools in the project training/workshops and the execution of the activities have been very successful. Until now, 85 % of the total amount of schools have successfully participated in the project.

Below is an overview of the total amount of schools, teachers and children reached via the project from October 2013 until September 2015:

- (a) Total number of schools reached: 282
- (b) Amount of children reached: 5905
- (c) Amount of teachers trained: 279

The baseline study

As mentioned earlier, a baseline study was conducted at the schools, which provided important qualitative and in lesser amount quantitative information about the available other projects that were previously executed at the schools. To mention these projects:

1. In 2009 recycling programs were initiated at schools especially in the coastal areas. During the baseline study about 40 % of the schools still participated in the recycling programs and collected their plastic bottles for recycling purposes. Some of the schools had issues with the recycling programs for the main reason that the plastic bottles were not collected frequently. These projects only focused on the recycling of plastic bottles and minimizing waste litter and were limited to a 1 day information session at the schools, after which arrangement were made for the segregations and collection of the bottles. Currently the plastic bottles are collected by the government partially and two recycling companies.
2. State Oil Company of Suriname also installed environmental brigades (2 per school) in the district Saramacca as part of their policy. The exact tasks of these brigades were not clear and most of them were no longer active at the schools.
3. The Ministry of Agriculture started school garden programs in 2007. A total of 32 school gardens were set up in the districts Paramaribo and Wanica. The intention of the ministry was to guide the schools for a period of two years after which the schools would independently continue with the gardens. However without the guidance of the ministry, most of the schools did not continue this project. The schools also face different challenges when putting up a garden for example limited space, theft, flooding and soil infertility form obstacles. Of these schools, less than 10 % still have a school garden.
4. The Ministry of Regional Development, Department for Education had also executed awareness sessions at schools in the coastal areas. These schools were provided with information and posters about endangered species. As this project was limited to the coastal areas, it was decided to extend its range by adding it to the Green School. This way all schools would be provided with information about our endangered species.

Other important information collected during the baseline study was:

1. In some districts none of the above mentioned environmental projects were implemented.
2. Not all schools make use of water from a single source, but they use rain water as well or entirely. This makes measuring the amount of water used before and after the execution of the Green School difficult as there is no fixed indicator or meter.
3. All schools are provided with janitors by the ministry, who clean the classes after school hours. Also some schools have gardeners, who clean the yards daily after school. These gardeners are hired by the schools themselves. Schools were visited during school hours and the results of the observations were limited to the one time visit.
4. Information regarding the amount of energy consumed was also not readily available per school, as this is arranged for by the ministry of Education, Science and Culture. The SUWAMA team did not have access to this information.

The information collected during the baseline study was used to describe the situation prior to the implementation of the Green School. The baseline results actually present

the number of schools that still participate in the projects or make use of their materials, however it could not be determined what the effectiveness of these projects have been and if results of the baseline were due the impact of the projects or measures taken by the ministry or schools.

Monitoring

Six months after the implementation a representative amount of schools (a minimum of 40 % of the schools) was visited by the SUWAMA team physically to observe and register where possible how effective the activities were. The monitoring results were registered mostly from observations at the schools, discussions with the teachers and by consulting the logbooks and can therefore be subjective. Therefore two observers were sent at each school for more representative data. Also data obtained was mostly qualitative and less quantitative. The results of monitoring are presented in more detail during the comparison of the situation at the schools before and after the implementation of the Green School.

Comparison of the situation at schools before and after the implementation of the Green School

After monitoring, the results were compared to the baseline situation to determine the effect of the Green School.

In the Table 2 the results after monitoring of 76 schools are compared to the results of the baseline study. Improvements are presented in percentages.

Below the improvements are discussed in more detail:

1. Clean school yards: an improvement of 17 % was observed and this was achieved without school gardeners. The teachers explained that they have observed improvements in the behavior of the children. They no longer throw away their waste in the yard, but throw them in the bins. This is especially noticeable after the lunch hours, when the schoolyard will usually have plastic and paper everywhere. The environmental brigades are also very strict at executing their tasks and make sure nobody litters.

Table 2 Comparison of the situation at schools before and after the implementation of the Green School

| Topics | Situation prior to the implementation of the Green School (76 schools) (%) | Results after monitoring (76 schools) (%) | Improvements (%) |
|--|--|---|------------------|
| 1. Clean school yards | 79 | 96 | 17 |
| 2. Clean and neat classrooms | 88 | 98 | 10 |
| 3. Biodiversity (education about endangered species) | 60 | 99 | 39 |
| 4. School gardens | 3 | 7 | 4 |
| 5. Recycling | 40 | 88 | 48 |
| 6. Energy and water saving | 15 | 84 | 69 |
| 7. Installation of environmental brigades | 11 | 100 | 89 |

2. Clean and neat classrooms: an improvement of 10 % was observed. Paper is no longer thrown away in the classrooms, but this is also thrown in the bins. Some schools have also made extra posters, reminding the children that their classrooms always needs to be tidy.
3. Biodiversity (education about endangered species): education about the endangered species of Suriname was increased with 39 %. Not all topics were discussed during the previously executed project by the Ministry of Regional Development, Department for Education. Via the Green School, more species were discussed and the method used also improved participation of the children.
4. School gardens. An increase of 4 % was noted. Some schools managed to put up simple school gardens using material readily available.
5. About 80 % of the other schools also expressed that they would like to have school gardens. Taking into consideration the obstacles, different methods need to be presented and made available for the schools. For example some schools plant in plastic bottles against the walls of the schools, where there is limited space. These schools have successfully planted flowers and herbs. Schools that have enough space, have set up larger gardens that also generate income that is spent for different activities for the children.
6. Recycling: an increase of 48 % was noted. Arrangements for adequate collection of the segregated plastic bottles were made the SUWAMA team, to ensure and stimulate participation. The teachers also observed an increase in segregation of the bottles. All bottles are collected through the provided collection bin, which is also a fun activity for the children.
7. Energy and water saving: a behavioral improvement of 69 % was observed by teachers especially. The pipes are no longer left open in the toilets by the children and lights are only switched on when necessary. It was also said that the children keep reminding each other not leave the lights on. As mentioned before, quantitative information about water and energy usage were not readily available, however that would be a better indicator to measure improvement. Also a number of schools for example in the districts Marowijne, Brokopondo and Sipalwini use either rain or river water. This also makes it difficult to get any numbers.
8. Installation of environmental brigades: all the schools have installed new environmental brigades. The brigades are installed either yearly, per semester or even monthly. The teachers have found the brigades to be very effective in correcting negative behavior especially littering.

It is also notable that the level of motivation among the schools varies. Some school executed the activities in a very enthusiastic way, while other schools were less motivated. Adoption of the activities of 'The Green School' by the Ministry of Education is therefore essential together with continues training programs for the schools to keep them motivated, so that all schools can reap the benefits of the project. Participation of parents and local organization can also contribute to the further development of the schools.

Conclusion

The following conclusions can be drawn from this project until so far:

1. The baseline study provided relevant information about previously executed projects, however it could not be determined if the results of the baseline were due to the impact of these projects or the measures taken by schools (gardeners) and the government (janitors). Also the projects executed were one time educational sessions held at the schools and plastic bottle collection thereafter.
2. Limitations in the collection of quantitative information about water and energy usage have made it difficult to actually measure improvements, which would have been a better indicator of improvement. As a result of this, mostly observations of the SUWAMA team and teachers and the logbooks were used to determine results.
3. The activities of 'The Green School' have been effective, when compared to the baseline results. Significant positive changes in the behavior of the children towards the environment have been observed by teachers and the SUWAMA team during monitoring. Great improvements have especially been observed and noted when it comes to education about endangered species, recycling activities, energy and water saving and the installation of environmental brigades.
4. To make these changes in behavior sustainable, the Ministry of Education will have to play her role in the adoption of the activities as a practical addition to the current nature science curriculum. 'The Green School' has already laid the foundation for sustainable change of behavior towards our environment, which provides a basis for continues improvement. From this point on, the ministry can improve to achieve more effectiveness.

Authors' information

L.S. obtained her Bachelor's degree in Environmental Technology in 2011 at the Anton de Kom University in Suriname and has since then dedicated herself to improve the overall quality of the environment in Suriname. She has since then executed different environmental projects together with local partners focusing on environmental awareness and recycling programs.

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Competing interests

I declare that I have no competing financial, professional or personal interests that might have influenced the presentation of the work described in this manuscript.

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