

RESIDENT DOLPHINS: ALLIES AGAINST THE PLASTIC IN PISCO, PERU

FINAL REPORT

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ABSTRACT

Present report summarizes activities developed by ACOREMA as part of the initiative: *Resident dolphins: allies against the plastic in Pisco, Peru*, developed during the period November 1, 2018 to August 31, 2019. Activities implemented included monitoring of the resident dolphin groups at the Paracas National Reserve and working with the local schools some actions to help reducing the use of single use (disposable) plastics, as addressed by recent legislation in Peru. Eleven surveys were completed during the study period in the Paracas Bay. Dolphins were observed in 8 of the surveys (72.7%). Group size ranged from 2-12 (average 5.38, sd=3.46 and mode=2). Five new individuals were identified by their natural marks, raising the number to 135 individuals recognized. Two pairs mother –calf were registered during the sightings in early January 2019. One dolphin of the group was involved in an episode of entanglement with fishing net. The Supay dolphins were present at their known range, ranging from 12 to 22 animals, although no calves were observed.

A total of 76 lectures *The Marine Pollution by Plastics* were imparted at 15 local schools, reaching directly 3,792 people (including 3,664 students and 128 teachers). In collaboration with three local schools, a pilot experience for reducing the use of single use plastics was implemented; 2,000 water bottles were produced and distributed to these schools, with a compromise to use them instead of plastic bags and straws. Teachers, students, and principals of the schools made the follow up of the initiative, reporting the use of the water bottles and publishing the activity in their social networks. The booklet *The Marine Pollution by Plastics. Basic information for Primary school teachers* was produced (in a number of 1,000) and distributed free of charge to teachers, school principals, school assistants, personnel of the local dependence of the Education Ministry and from the local marine reserves, local guides and tour operators, among others. A digital version of the booklet was published at the ACOREMA website (available for reading and download) to increase the coverage of public to be reached.

1. INTRODUCTION

Pollution by plastics is one of the main conservation problems around the world; the increase of plastics and microplastics is posing a real threat to marine life and fisheries in almost all the oceans and shorelines. The coastal-marine environment in Peru is not the exception, and it is highly impacted by plastic. While politics about management of solid wastes are recently being implemented, it is necessary the concourse of local population in the mitigation of this problem, as it is known that this is a long-term effort.

In the Pisco province, southern Peru, ACOREMA is developing research and conservation on marine biodiversity. Emphasis to this end is dolphins, and at the same time, the reduction in the use of plastics is promoted in the area, with specific actions worked with the people. The main objective is to help reducing the pressure on the marine environment, which in turn will benefit the biodiversity and the people living along the coast. Previously, a campaign to help reducing/recycling the use of plastic bottles was organized and directed to the publics in the Pisco-Paracas area, exchanging bottles for plastic-recycled bags. This initiative was a good opportunity to raise awareness about the problem with plastics and its effects on the life, while pointing the need to participate in the conservation of marine species through single actions (such as avoiding that plastics reaches the sea and the beaches. Dolphins –even more if they are resident in a particular area-, are good subjects to link the people with the adjacent ocean; this because they live close the shore, and are particularly vulnerable to human activities, among them, pollution by plastics. In a previous initiative developed in 2017, information about the resident dolphins was transmitted to the local people in the Pisco province, highlighting their importance as members of the local marine biodiversity. Currently, there are two groups of resident dolphins in the project area: the Paracas Bay Dolphins (of about 100-130 individuals) and the Supay Dolphins (comprised of 24 individuals); the fact that the dolphins can be identified as individuals, and that they spend their life in the area, make easier developing a bond with the people living in coastal localities such as the Pisco-Paracas area. That was the first step, and here is a need to keep the people informed about the life and threats of these “neighbours” in the other side of the shoreline.

Recently, a law was issued in Peru to reduce the use of disposable plastics (also called single use plastics). The Peruvian Ministry of the Environment is currently engaged in campaigns for reducing the use of plastic bags and plastic straws. A common practice in Peru is to get drinks in plastic bags, also using plastic straws; this has been observed in local schools, where children take these bags from home or buy drinks at the small shops located in or around the school. The present proposal is a contribution to the national effort for reducing the use of plastic bags in day to day activities, through a practical manner, and to help to reducing the amount of plastics that end in the shores and the sea

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2. OBJECTIVES

a. General objective

To promote a reduction in the use of plastics in the Pisco province and the importance of conserve the marine environment, using the resident dolphins as symbols for this aim.

b. Specific objectives

- To increase the baseline information and monitoring of the two resident common bottlenose dolphin groups identified in the Pisco province.
- To developed an initiative to involve the educational sector and other target community groups for reducing the use of disposable plastics.

3. ACTIVITIES DEVELOPED

3.1 Monitoring of the resident dolphins

At the beginning, and before the development of fieldwork activities, the corresponding research permit was requested from the Head office of the Paracas National Reserve, whose territory embraces the range of the two resident dolphin groups under study. An additional permit was requested from the Production Ministry, as dolphins are under the coverage of this governmental entity. Once the permits were issued, fieldwork was organized following the scheme of previous studies. Boat surveys were implemented in the Paracas Bay to approach dolphin groups to document re-sightings and identification of new individuals. Pictures of dorsal fins of suspected new individuals were contrasted with the current catalogue and verified with the DARWIN program. Each new dolphin identified was assigned a correlative number and incorporated to the catalogue. Basic information collected included group size, sighting location (recorded with a GPS Garmin), behavioural patterns, presence of calves, and interactions with human activities occurring in the area. Each individual observed was listed and its re-sightings recorded. Observations were also carried out within the range of the Supay Dolphins, south of the Paracas peninsula, where it is found the second resident group present in the Paracas Reserve. In this case, data was collected from the cliffs, along a stretch of coast covering Supay beach, Yumaque beach, Lagunilla and north to Punta Prieta (figure 1), using binoculars 10 X 50 and a telescope 10 X 20-60. The basic information collected was the same as indicated above for the Paracas Bay Dolphins. Data was entered in an excel datasheet for posterior analysis

3.2. Lecture program about marine pollution by plastics

Bibliography sources about plastics and its effects on the marine environment were reviewed, to define the themes and to elaborate the contents of the lecture: *Marine*

Pollution by Plastics. Work was done to design and production of a series of flipchart plates as a visual aid for the lecture. In addition, a roulette was produced to help reinforcing the items presented during the lecture. With the same purpose a kit with a series of products made with recycled plastic bottles was obtained and used during the lectures.

The lecture program was introduced to the principals of local schools, and the schedule for the lectures was discussed. Thus, the lectures were given to students and teachers. Information about participant schools, number of students and teachers participating, questions formulated, and other data were systematized for posterior assessment.

3.3. Pilot experience for the use of water bottles at local schools to reduce the use of disposable plastic bags, cups and straws

Water bottles were produced to be used by the local students; these bottles should include a message about reducing the use of plastic. One local school was selected to lead the pilot experience in the use of water bottles. The principal and the teachers were very enthusiastic about the idea, and also to reproduce the experience in two other schools. Once accepted, the water bottles were distributed, and provisions were taken to orient and advice the initiative already assumed by the school. In addition the participant schools were included in the lecture program about plastics. Water bottles were also distributed to key actors in the community.

3.4. Production, publication and distribution of the booklet: The Marine Pollution by Plastics. Basic information for Primary school teachers.

Information was compiled for outlining the structure and themes to be included in the booklet, as well as the information and images to describe and illustrate the problem of plastics and its effects on the marine environment at the local, national and global realm. In the design of the booklet it was considered a design to be printed and other to be published in the ACOREMA website. For distribution of the printed booklet, the directory of schools of Pisco produced by the Education Ministry was reviewed; with this, schools from (mostly) the three coastal districts were visited, as well as the local Education Management Unit (a dependence of the Education Ministry), for distribution of the booklet. The later also received a flyer to inform the teachers about the initiative. Copies of the booklet were also distributed to several governmental entities and members of the tourism sector. The voucher documents for distribution of the booklet were organised and systematized.

4. RESULTS AND DISCUSSION

4.1. Monitoring of the resident dolphins

Eleven surveys were conducted in the Paracas Bay during the study period. Sighting locations recorded are shown in figure 1.

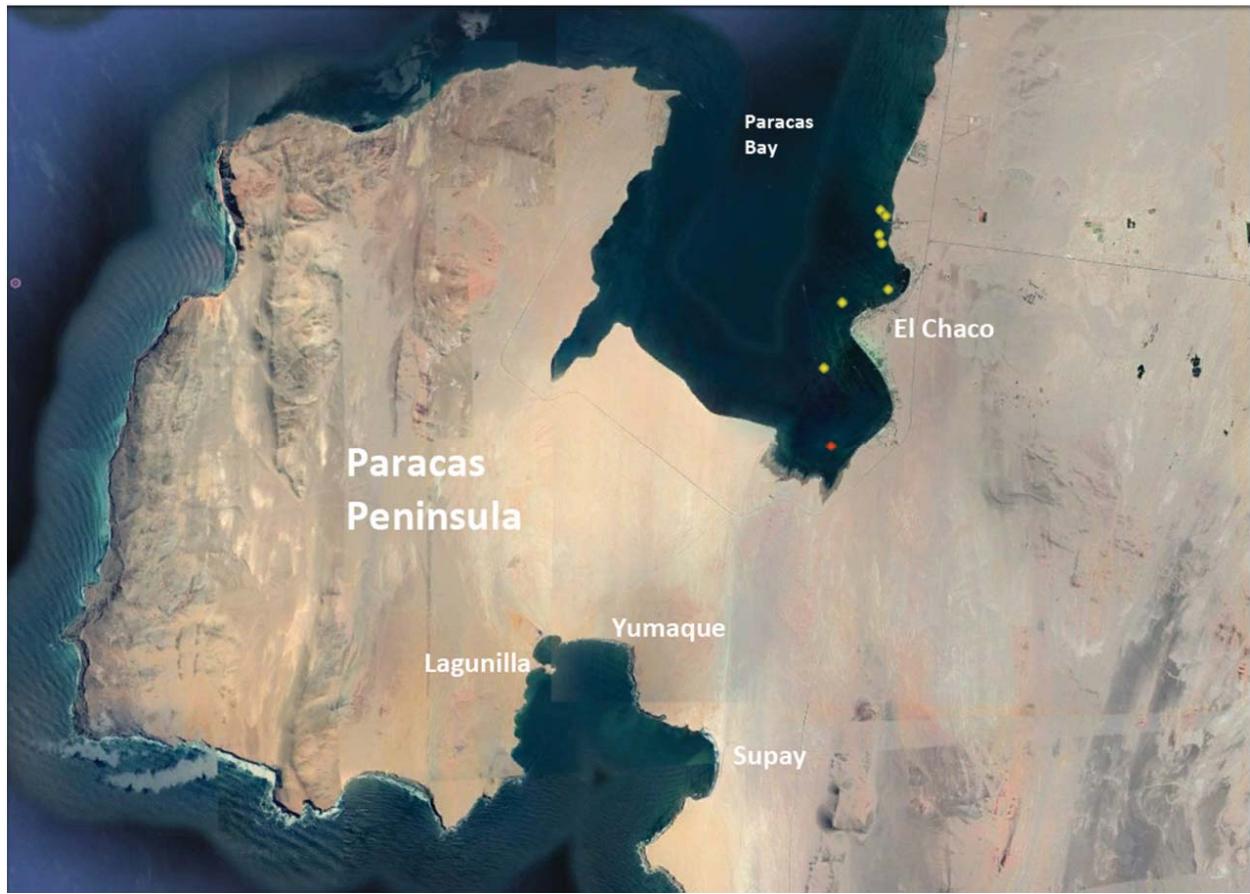


Figure 1. Map of the study area with location of the sightings of resident dolphins in the Paracas Bay. The red point corresponds to the location of the entangled dolphin as described in the Results section.

Observation effort during this low impact monitoring completed 22.7 hours. Dolphins were observed in 8 of the surveys (72.7%). Group size range and other information about these sightings are shown in the following table (and figure 2):

Table 1. Summary of data on dolphin sightings during the study period

Range	2-12
Average	5.38
Standard deviation	3.46
Mode	2

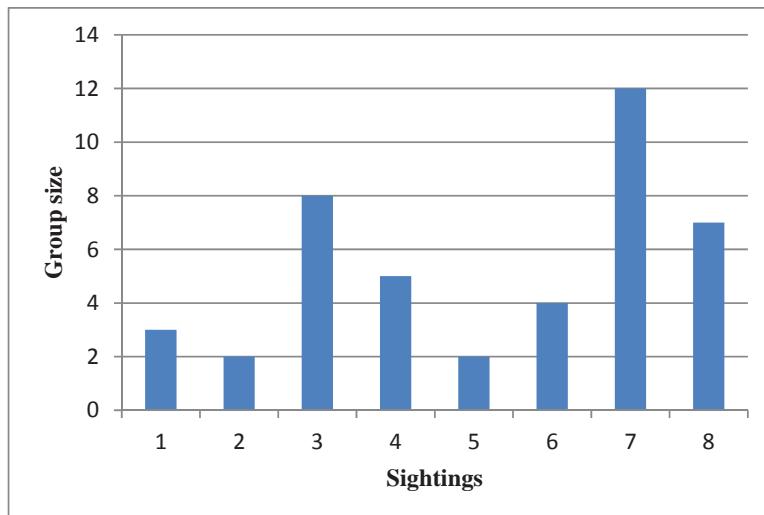


Figure 2. Group size of the Paracas Bay Dolphins registered during the study period

Table 2. Re-sightings of dolphins with natural marks were observed during the surveys. Individual, recognizable dolphins recorded, are included in table 2:

Individual code	Name assigned	Individual code	Name assigned
PBD008	Old hat	PBD105	
PBD014	Trinity	PBD113	
PBD020	Longscar	PBD121	
PBD024	Breeze	PBD127	
PBD037	Paraca	PBD131	
PBD039	Sharpy	PBD132	
PBD042	Smooth	PBD133	
PBD074	Juna	PBD134	
PBD078	Shalom	PBD135	
PBD091	Santi		
PBD095	Denise		

Five new individuals were identified during the study. These are PBD131, PBD132, PBD133 and PBD134 PBD135 (Figure 3); these have been included in the catalogue for the Paracas Bay Dolphin group. In the case of PBD132 and PBD133, identification as a new individual were supported –besides the marks in the dorsal fin- in features of the coloration in the anterior half of the body, due to the dark grey color of the head and the high contrast between the cape and the colour of the side, respectively.



Figure 3. New individuals identified for the Paracas Bay Dolphins



Figure 3. (Continue) New individuals identified for the Paracas Bay Dolphins

Regarding new calves, during the study period it was possible to record 2 pairs mother-calf, one corresponding to PBD113. Another mother-calf pair was observed, in this case the female involved was PBD127; both pairs were recorded in early February 2019 (Figure 4)



Figure 4. Mother-calf pairs observed during the study period. Top: PBD127; bottom: PBD113

Behavioural observations were recorded. The Paracas Bay Dolphins used the bay area for feeding and caring the calves. Feeding techniques included circle grouping and disperse chasing of fish, with active jumping. When interacting with fishing boats, the dolphins did not show interest for tourism boats (15% of times they approached these types of boats), while showed the highest interest for the fishing boats or “bolichitos” entering the bay (78% of cases). Interactions of dolphins with human activities included entanglement in fishing net; in this case the dolphin involved was identified as PBD037 “Paraca”, as discerned from the top nick located in the tip of the dorsal fin. This dolphin

had been rarely seen during previous years; however the part of the fin showed when raising the surface did not leave doubt of its identity (Figure 5)



Figure 5. PBD037 “Paraca” raising the surface in the inner part of the Paracas Bay, and carrying a piece of net around its tail. The small picture shows the features of the dorsal fin that allowed identification of this individual.

Initially “Paraca” was dragging a large piece of net, which was partially removed by a local diver; this was reportedly occurring in April 2019. Several attempts were made to release the remaining net from this dolphin, but these were unsuccessful. A group of institutions including IMARPE, SERNANP and ACOREMA joined efforts in trying to freed “Paraca” from the net, but until writing this report no success was achieved. Despite the net around its tail, and the time passed since first recorded, “Paraca” does not show signs of emaciation, and apparently can feed with no problem; its condition is one of the reasons why it cannot be approached or captured to complete the task. New attempt will be made in order to get this dolphin rid of the net.

The Supay dolphins were found in their known range, from playa Supay north to La Mina, although these dolphins have been previously recorded up north to Punta Prieta. Group size ranged from 12 to 22 animals, although no calves were recorded during observations made. However, during a beach survey at Lagunilla beach (within the range of the Supay Dolphins) remains of a nearly 1mt long calf was found on early January 2019, which probably correspond to a calf from this group (Figures 6 and 7).



Figure 6. Observations (top and middle) of the Supay Dolphins from the cliffs at the Paracas National Reserve.



Figure 7. Remains of a bottlenose dolphin calf found at Lagunilla beach, Paracas National Reserve.

4.2. Lecture program The Marine Pollution by Plastics

As part of the lecture program the following materials were produced/acquired:

- 1 script for the lecture The Marine Pollution by Plastics
- 1 set of 10 flipchart plates for the lecture *The Marine Pollution by Plastics* (Figure 8).
- 1 educational roulette *The marine Pollution by Plastics*.
- 1 kit of goods elaborated with recycled bottles, included: 1 backpack, 1 tablet case and 1 handbag.

Both the flipchart plates and the roulette included the logos of ACOREMA, the Deutsche Umwelthilfe and Rapunzel Naturkost HAND IN HAND Fund, Schweinswale e.V. and Gesellschaft zur Rettung der Delfine e.V. (GRD).



Figure 8. Flipchart plates produced in aid to the lecture program The Marine Pollution by Plastics.

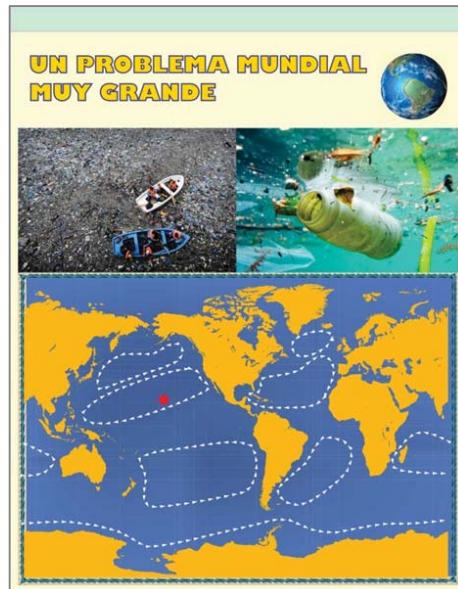


Figure 8. Flipchart plates produced in aid to the lecture program The Marine Pollution by Plastics.

A total of 76 lectures were organized and imparted, with participation of 15 schools (state and private) of the Pisco province. The number of the public reached directly with the lecture program was 3,792, including 3,664 students and 128 teachers (Figures 9 and 10). During the lectures and with the aid of the flipchart plates, participants learned the general characteristics of the plastics, types and sizes, its presence in the daily life of humans, the production and excessive consumption of plastics and the bad management and disposal of these products. Also, a description was made of the disposable plastics and why they are particularly a problem, who cause the problem?, the marine and land sources, consequences for humans, for ecosystems, for habitats and marine life, why this is a global concern, the degradation time, the law that regulates in Peru the use of plastics and what plastics should not be taken to the beaches and natural protected areas. The end of the lecture include recommendations for the students and their families to help mitigate the marine pollution by plastics, the practice of the 3 Rs (reduce, reuse and recycle) with examples for reducing the use of plastic bags by turning to cotton bags, baskets or backpacks. Also, the use of reusable dishes and tableware instead disposable ones, and the water bottles instead disposable cups, plastic bags and straws was recommended.



Figure 9. Views of the lecture program *The Marine Pollution by Plastics* developed at local schools of Pisco.



Figure 10. Views of the lecture program *The Marine Pollution by Plastics* developed at local schools of Pisco.

As an example of recycling the kit of materials made with recycled plastic bottles was very useful, as shown the students could see (and touch) a backpack, a tablet case and a handbag that use to be plastic bottles: 30 bottles in the case of the backpack, 20 bottles for the handbag and 10 for the tablet case (Figure 11) .



Figure 11. The kit of objects made with recycled bottles were very useful during the lecture program *The Marine Pollution by Plastics*.

It is important to note that the contents of the lecture were designed to cover 20 – 25 minutes and with examples close to the reality of students and teachers. Posteriorly, to verify if the central ideas were well understood, a short game of questions and answers was applied, using the ecologic roulette (Figure 12). This evaluation system was well received by the students who enjoyed the experience, losing the natural fear to answer questions as part of a conventional evaluation.



Figure 12. The questions and answers game to reinforce the concepts after the lectures *The Marine Pollution by Plastics*.

Besides informing about the plastics and its effects on the marine life and the environment, the lecture seek that both students and teachers were emotionally linked with the problem of marine plastic litter, understanding how people living far from the beach and the sea contribute to the problem by using plastics every day at home. Thus, from all the examples, the most revealing one was that of the plastic sponges: every day, when washing dishes and tableware a small sponge is used; eventually the sponge become softer and that is because small particles of plastic are released and flushed through the drainage, this happens in every house. Many cities does not have systems

for treatment of waste waters, and even in these cases, the filters at the treatment plants do not trap the sponge particles, that end in the ocean and cause damages to marine life.

Other local examples of the effects of the plastics included the resident dolphin with the large plastic bag in its dorsal fin, and the study in the beach of Paracas showing that even though the sand looked clean it contained large amounts of microplastics. For examples of recycling a mention was made of the case of students from Arequipa who won the 2019 national prize by creating a construction brick using plastic bottles. These experiences were combined with those at the global level, where people are doing to reduce, reuse and recycle plastics, which motivate students and teachers to learn that they are part of a global movement to mitigate the problem of marine pollution by plastics. At the end of the lecture the students were invited to make questions and comments; this part was very interesting as several students proposed solutions to the problem. For example, they propose solutions to eliminate the plastics accumulated in the landfills: some proposed burning, what was opposed by other; some proposed the use of worms that decompose the plastics such as the styrofoam, or some devices that concentrate the sunlight to help the plastic degrading faster, among other.

The questions formulated by students and teachers were diverse and include among other: what substances harmful for humans may plastics contain? What species are most affected by the marine pollution by plastics? What can be done for the plastics degrading faster? What ecosystem is most affected by plastics? Who created the plastics? How much plastic get into the ocean every day? It is possible to clean the ocean from plastics? What percentage of the total litter are plastics? What is going to happen in 200 years if the marine pollution by plastics continues? Is diminishing the production of plastics worldwide? What countries produce more plastic pollution? Are the glass containers pollute less? How a plastic bag is made? How the fibre of recycled bottles is made? What organisations in Peru are in charge of the plastic problem and recycling? Is tortoiseshell a type of plastic? Hoe the plastic is made? Where it is come from? When the plastic pollution problem started? How w the plastic can become degraded? What the bottle lids are used for? Where can I buy a cotton bag? Where can I buy metal straws? How to reuse plastics? (Figure 13)



Figure 13. No questions from students were left behind during the lectures *The Marine Pollution by Plastics*.

4.3. Pilot experience for the use of water bottles at local schools to reduce the use of disposable plastic bags, cups and straws

A total of 2,000 water bottles of 500ml were produced, with the message “*I use less plastic*”, with the logos of ACOREMA, Deutsche Umwelthilfe y Rapunzel Naturkost del HAND IN HAND Fund, Schweinswale y GRD (Figure 14).



Figure 14. The water bottles used produced for the pilot experience with local schools in Pisco to help reducing the single use plastics.

This pilot experience was aimed to reduce the use of disposable plastics (plastic bags, cups, and straws), frequently used at the schools, in this case turning to the use of water bottles. In this context it was possible to motivate the José de la Torre Ugarte School, one of the institutions with more students in the Pisco province, to participate and lead the initiative, recruiting two other state schools: the Hilda Bringas School and the Pedro Pablo Castro Peláez School for replicate the pilot experience.

The principal and teachers of the José de la Torre Ugarte School outlined strategies and rules for the use of the water bottles, involving the students and their parents in the activity to reduce the use of plastics at the school. The strategies and rules were:

Strategies:

- Raising awareness about the use of the water bottles to students and their parents, involving a written compromised signed by the parents (Annex 1).
- Distribution of the water bottles to the students.
- Monitoring in the use of the water bottles by the school Environmental Committee.

Rules:

- The water bottles would be delivered to each student for whose their parents returned the signed compromise.
- Each bottle should be marked with the student full name, grade and class.
- Loss of the water bottle should be immediately reported.
- During the visits to the school the use of the water bottle in 70% of the students monitored would be considered acceptable.
- The Principal office would acknowledge the classes with higher percentage in the use of the water bottles, contributing so to the use of disposable plastics.

The water bottles were delivered free of charge to students, teachers, administrative personnel, and the operators of the school store at the 3 participant schools and distributed as follows:

Name of the school	Number of water bottles distributed
School 22455 José de la Torre Ugarte	960
School 22462 Hilda Bringas Quintanilla	710
22544 Pedro Pablo Castro Peláez	220

Through the water bottles experience was possible to reduce the use of single use (or disposable) plastics in the participant local schools. It should be also noted that the School 22455 José de la Torre Ugarte has been granted with the Green Flag, a prize granted at the national level by the Education Ministry, due to their environmental achievements. This school also published the water bottles experience at its Facebook page, highlighting the importance of such initiative. The publication includes photographs of the lectures, and some comments of the teachers, pointing the use of the water bottles is now a common practice among students (Figures 15, 16 and 17)



Figure 15. Water bottles distributed at the José de la Torre Ugarte School as part of the pilot experience to help reducing the single use plastics.



Figure 16. Water bottles distributed at the Hilda bringas School as part of the pilot experience to help reducing the single use plastics.



Jose De La Torre Ugarte

24 de junio ·

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Implementando medidas en nuestra escuela para reducir el uso de plásticos a través de la utilización de tomatodos y bolsas de tela. Nuestro agradecimiento a la ONG ACOREMA por el apoyo en estas prácticas ambientales.



1 like

2 comentarios

Me gusta

Comentar

Compartir



Karina Moreno En educación fisica todos usan su toma todo

Figure 17. The pilot experience with water bottles to help reducing the single use plastics published at social networks by the José de la Torre Ugarte School.

Water bottles were also distributed to other strategic allies (Figure 18):

- 30 to the Official Tour Guides Association (AGOTUR) in Pisco.
- 40 for the personnel of the Paracas National Reserve.
- 15 to the personnel of the System of Islands, Islets and Guano Points National Reserve.
- 5 to the personnel of the Tourism Direction, Paracas Municipality.



Figure 18. Distribution of water bottles to tour operators (top) and local guides (bottom) at Paracas.

4.4. Production, publication and distribution of the booklet: The Marine Pollution by Plastics. Basic Information for Primary School Teachers

4.4.1. Production and publication. A total of 1,000 issues of the booklet: La Contaminación Marina por Plásticos. Información básica para docentes de Primaria (The Marine Pollution by Plastics. Basic Information for Primary school teachers) were printed. A PDF version of the document was also produced for reading and download free of charge at the ACOREMA website (www.acorema.org.pe), in the section Educational Platform/ Educational materials at the link: http://www.acorema.org.pe/documentos/La_contaminacion_marina_por_plasticos-Informacion_basica_para_docentes_de_Primaria_2019.pdf (Figure 19). The booklet in its PDF version is attached to this report. The logos of ACOREMA, the Hand in Hand Fund (Deutsche Umwelthilfe / Rapunzel Naturkost), Schweinswale e.V. and Gesellschaft zur Rettung der Delphine e.V. (GRD) were included.

While the contents of the booklet were developed before the lecture program, the questions made by the students and teachers during the lectures were useful to adjust the contents and to include information not considered at the beginning; this is the case of the toxic substances present in some types of plastics, the countries contributing substantially to marine pollution by plastics, the origin of the word “plastic” and other related to its degradation, when the problem with plastic started, etc. In this manner, it was possible to compile in this guide information verified, updated and required by teachers of Primary school (children aged 6 to 12 years) to work marine pollution by plastic issues at class.

About the structure, the teacher guide comprised 3 sections:

- *First section: THE PROBLEM.* Introduced the marine pollution as a global environmental problem, dangerous and complex, generated by people, and how the consumption habits regarding plastics has been pivotal for the dramatic increase of this threat. Also, it discussed its global realm, showing the areas where marine litter concentration is higher and the reasons why, the problem in Peru and particularly in Pisco. Under the title: “A long and harmful permanence” the process of decomposition and degradation of plastic litter is described, including the factors that accelerate or delay the process, and pointing in some inaccurate information about biodegradable plastics. The characteristics of plastics, its presence in daily life, its origin and the raw materials used in its production. A special discussion is made about the classification of plastics by their size (macroplastics and microplastics), the type of plastics with currently higher production in the world and their use, as well as the presence of toxic substances present. The last part of this section deals with the single use or disposable plastics.
- *Second section: IMPLICATED.* It covers the cause of the problem of the marine pollution by plastics, highlighting the fact that the problem is generated by

LA CONTAMINACIÓN MARINA POR PLÁSTICOS

Información básica para docentes de Primaria



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Figure 19. Front page of the booklet: *The Marine Pollution by Plastics. Basic information for Primary school teachers*, produced and distributed as part of the project.

- humans of different ages and occupations sometimes inadvertently, sometime intentionally or by omission. There is a discussion about the sources for plastic litter in the oceans and coasts. Also there is review of the consequences of the marine pollution by plastics has on humans and the coastal marine environment (habitats, ecosystems and marine species). Several examples are described for a better understanding of the problem.
- *Third section: ACTIONS.* Includes a summary of several initiatives carried out by diverse actors or community groups (entrepreneurs, governments, consumers, among others) at diverse scenarios (global, regional, local) to help reducing the marine pollution by plastics. This is shown under the title: “A positive worldwide effort”. Of importance is the mention to the Law N° 30884, which regulates the disposable plastics, recently issued in Peru (December 2018). This legislation includes an article about the plastics that should not be taken to the beaches and natural protected areas in the country, and the responsibility of the Education Ministry regarding educate, provide training and raise awareness about this law and the problem of marine pollution by plastics. At the end, “Act responsibly” presents a series of actions that teachers, students, and all the people should apply in their daily life to help mitigate the problem. Emphasis is made in the need of reducing the personal use of plastics, especially those known as disposable plastics.

The booklet includes pictures and illustrations. Most photos show the marine pollution by plastics at the local level, the same in the case of the actions carried out by students. For example, the front page shows two images: the upper photo corresponds to one of the resident dolphins at Paracas Bay (Pisco) dragging a large plastic bag; this was an example of how the problem affects the marine biodiversity. The lower photo is a beach in the fishing village of San Andrés (Pisco), with its typical fishing boats but surrounded by plastics. In another example, the section Actions closes with a picture of school children with “Take care of our beaches” sign. In the Acknowledgements section, a picture is shown of a local resident of San Andrés dedicated to the plastic recovery for recycling, an emergent way of life that sees the problem as an opportunity of generating incomes and helping to mitigate it. Finally at the back of the booklet there is a local beach as should be this and other beaches, free of plastics.

The booklet The Marine Pollution by Plastics. Basic information for Primary school teachers, has come in the precise time in that Peru joins to the increasing list of countries including among its public policies the promotion of a responsible production and use of plastics, and to improve their management. In this sense, on 18 December 2018 the Law N° 30884 was issued. This legislation regulates single use plastics that include the disposable plastics. Moreover, it incorporates as a priority in the environmental national agenda the problem of the marine pollution by plastics. Thus, the booklet produced as an outcome of this project represents a real and opportune contribution. It complements the efforts deployed in Peru to revert the global problem of plastic, and represents an educational tool in support of the formal educational sector, especially for the level of responsibility that the law demands from the Education

Ministry to educate, develop capacity building and raising awareness about this serious problem.

4.4.2. Distribution. The printed version of the booklet *The Marine Pollution by Plastic. Basic for Primary school teachers* was distributed free of charge mainly to actors of the educational sector, but also to other key actors, as detailed:

Educational sector:

- 795 booklets were delivered to principals, teachers, assistants and administrators of 51 schools from four districts in the Pisco province (Pisco, San Andrés, Paracas and Túpac Amaru Inca). Some issues were also designated to the school libraries (Figures 20 and 21).
- 15 booklets were for the local dependence of the Education Ministry in Pisco (UGEL-Pisco); in this case, a set of leaflets (Annex 2) was used to communicate to more schools and teachers about the availability of the booklet in its digital version at the ACOREMA website.



Figure 20. Distribution of the booklet : *The Marine Pollution by Plastics. Basic information for Primary school teachers*, to teachers of local schools of Pisco.



Figure 21. Distribution of the booklet : *The Marine Pollution by Plastics. Basic information for Primary school teachers*, to teachers of local schools of Pisco.

With the distribution of the booklet it was possible to provide the local teachers with an educational material from which consult the information about a subject less known by them, but that needs to be disseminate to students, as it represents a national policy. The visits to schools during the distribution of the booklet revealed the acknowledgement from both principals and teachers, and their willingness to use this information in the school journey. In this way, through this project and its activities it has been possible to support the efforts of the National Education Ministry for improving the quality of teaching in Peru.

Government entities related to conservation of the marine environment and the biodiversity

- Chiefs, rangers, specialists and volunteers (in total 54) working at the Paracas National Reserve and the System of Islands, Islets and Guano Points National Reserve (south sector). These two marine protected areas are administrated by the Environment Ministry, through the Natural Protected Areas National Service (SERNANP).
- 10 booklets were delivered to the Director and inspectors of the Regional Production Direction (DIREPRO), local dependence of the Production Ministry.
- 10 additional booklets were distributed to the Pisco Port Authority (DICAPI), dependence of the Defence Ministry.
- 10 booklets were directed to the Mayor of Pisco and members of the Environmental Committee of the Pisco Municipality.

Tourism sector

- 43 actors of the tourism sector (local guide association and tour operators) and personnel from the Tourism Direction of the Paracas Municipality received the booklet. In both cases the receptors highlighted the importance of the information provided, since it will help them to reach their public (tourists and visitors) with recommendations about the better use and disposal of plastics (Figure 22).

General public

Through the operation of the ACOREMA website, it is possible to increase the coverage of actions and materials to a wider public. Most educational materials produced by the organization, including the booklet *The Marine Pollution by Plastics. Basic information for Primary school teachers* are published and are available for reading or downloading. In this way, people inside and outside the country can be reached and become aware by initiatives developed by ACOREMA, and have access to information that is vital for becoming involved in the conservation of the marine environment. While the booklet is mainly directed to teachers, it is suitable and can be known by other publics.



Figure 22. Distribution of the booklet : *The Marine Pollution by Plastics. Basic information for Primary school teachers*, to local guides (top) and tour operators (bottom) in Paracas.

4.5. Other activities

On late August ACOREMA received the visit of the team of the One Good Deed Project, an initiative implemented by two German bloggers that travel around South America supporting social work and local organisations; their trips and work are published in their blog and other social networks as Instagram. There was a chance for them to spend three days in Pisco, visiting ACOREMA and documenting the work carried out by the organisation, including the monitoring of the resident dolphins and, in this opportunity, the follow up of the water bottles pilot experience at local schools (Figure 23). Their own views, reflections and pictures about their visit are available at: <http://one-good-deed.net/2019/11/02/acorema/>



Figure 23. Visit of the One good Deed team during August 2019

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Annex 1. Document produced by teachers of the José de la Torre Ugarte School (Pisco) to compromise the parents in the water bottles experience.

 **¡Usa un tomatodo en tu lonchera!**

Torreugartino
defendamos el planeta

Yo.....
apoderado de mi hijo(a)
del grado "....." de la I.E. N°22455 "José de la Torre
Ugarte" me comprometo a que mi niño usará un tomatodo en
el cual traerá su refresco o lo comprará en el kiosco de la escuela.

Firma del Padre

**Reduczcamos ¡YA! el uso del plástico en la
I.E. 22455 "José de la Torre Ugarte"**



Annex 2. Leaflet distributed to the local Educational Management Unit (UGEL-Pisco) for disseminating information about the booklet *The Marine Pollution by Plastics. Basic information for Primary school teachers*.

INVITACIÓN

Te invitamos a visitar la página web de ACOREMA en: www.acorema.org.pe y en el menú ingresa a la Plataforma Educativa, luego al submenú Materiales Educativos. Ahí encontrarás, para leer en línea o descargar de manera gratuita, la cartilla (en formato PDF): **LA CONTAMINACIÓN MARINA POR PLÁSTICOS. Información básica para docentes de Primaria**. Se muestra su carátula en la siguiente imagen.



El mencionado material contiene información sobre un problema que forma parte de la agenda ambiental nacional. Además incluye detalles de la Ley N°30884 que regula el plástico de un solo uso y los recipientes o envases descartables. Comparte el link [¡Pasa la voz!](#)

Tus amigos de ACOREMA

