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Sanitary Exhaustion in Abreu e Lima City: The shocks caused in Timbó river

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ABSTRACT

A good sanitation structure for some city is concerned with sound health and to ensure a good quality of life for people by keeping out healthy water. At the same time, it guarantees the preservation of the environment. This research showed sanitary shortages and shocks caused by untreated rejection in the Timbó River. The results indicated that the young city Abreu and Lima was not built with sewage treatment plants to treat sewage produced in houses, before rejecting, only one district studied has an STS. It was observed in the studied districts that the produced sewage is illegal rejected in the brook, in the moat and in the Barro Branco river in the district of Caetés III, arriving at its final destination in the estuary of the river Timbó, causing impacts on the fauna, flora in its spillage exhibiting The urgency in the intervention of the government's environmental protection institution and the population.
Keywords: Sewage, Sanitary conditions, Timbó River.

Exaustão sanitária na cidade de Abreu e Lima: os choques causados no rio Timbó

RESUMO

Uma boa estrutura de saneamento para alguma cidade está voltada com a medida sólida da saúde e para garantir uma boa qualidade de vida às pessoas, mantendo fora a água saudável. Ao mesmo tempo, garante a preservação do meio ambiente. Esta pesquisa mostrou escassez sanitária e os choques causados por rejeição sem tratamento no rio Timbó. Os resultados indicaram que a jovem cidade Abreu e Lima não foi construída com estações de tratamento de esgoto para tratar os esgotos produzidos em casas, antes de rejeitar, apenas um distrito estudado possui um STS. Observou-se nos distritos estudados que o esgoto produzido é ilegal rejeitado no ribeiro, no fosso e no rio Barro Branco no distrito de Caetés III, chegando ao seu destino final no estuário do rio Timbó, causando impactos na fauna, flora em seu derramamento exibindo a urgência na intervenção da governamental da instituição de proteção ambiental e da população.
Palavras-chaves: Esgoto, Condições sanitárias, Rio Timbó.

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Introduction

Abreu e Lima City was separated and emancipated in 1982, 34 years ago. Thereafter, Abreu e Lima had a considerable progress in the urban populated, however, how in the majority cities that form the metropolitan region of Recife, has a precarious historical in respect of publics politics implementation and actions in support of the sanitation sector. (GALINDO e FURTADO, 2001).

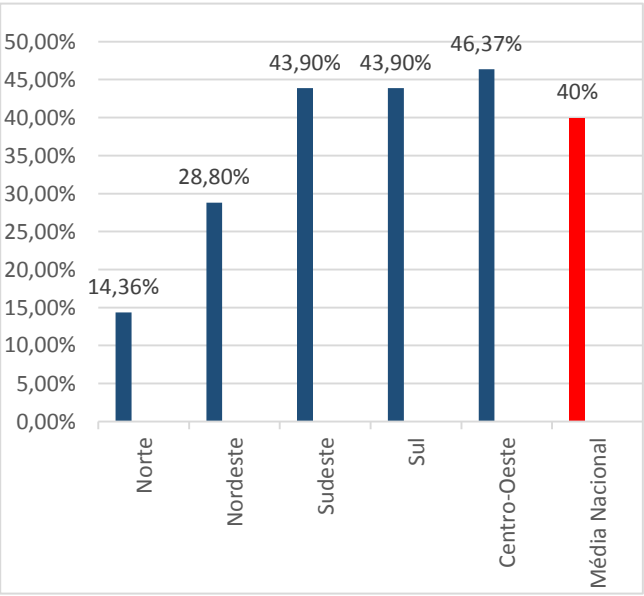
The responsibility of water supply, recollection, treatment and final disposal of sewage at city is of the Companhia Pernambucana de Saneamento (COMPESA). It is an stock Corporation and the mixed economy, with public utility, linked government of the state of Pernambuco, through department of infrastructure of the state of Pernambuco, have the state as your biggest shareholder (COMPESA, 2016).

The lack of sanitaries measures of regulatory agencies of the sanitation and the population propelled the inappropriate launch in the domestic sewage directly on the ground, or receptor hydrous body closest residences, resulting disease transmission, and the environmental degradation (MANUAL FNS, 3° Edition).

According to NBR 9648/1986 the sanitary sewage is the pour the liquid resulting of domestics and industrial activities, also calling effluents or wastewater.

According to the study TRATA BRASIL INSTITUTE 2015, at national measure 40% of sewage produced in the country is treated. Figure 1 shows sewage treatment percentage in relation to each Brazilian region.

Figure1: Sewage treatment produced for region



Source: Trata Brasil study: "Ranking of sanitation 2015".

Connecting to amount of Brazilian capitals launch R$ 1.2 Billion cubic meters of sewage in the nature (Trata Brasil, 2015).

The sanitary exhaustion system is designed for allocate appropriately human waste, providing diseases control and prevention, and environmental impact caused, in the ground and in the hydrous body (BRAGA, 2002).

Types of Sewage picker system are:

- Unitary, collecting storm water, domestic sewage and industrial waste in the unique collector.
- Separator, collecting domestic and industrial sewage.
- Mixed, is designed to receive sanitary sewage and a portion of storm water (BRAGA, 2002).

The system is constituted for building collector that removes the residences sewage, sewage collector in the street that gather residential waters of the house, the trunk collector which take the sewage to the manhole, that is used to the sewage nets cleaning and inspection (DACACH, 1984).

The effluent is transported by declivity, when the topography is unfavorable and to the outflow, is necessary a sewage treatment station, to the pumping of residues until sewage treatment station (Nuvolari, 2011).

According to resolution CONAMA nº 430/2011, the effluents of any polluting source, can be only launch directly or indirectly in the hydrous bodies, after proper treatment, obeying strictly the standards established in this resolution.

Estuaries are transitional environments between the continent and the ocean, where the river Waters meet the sea, have high degree of biological productivity due the nutrients, plants and algae diluted in the waters (MIRANDA, 2002).

Timbó river Waters occupies 1.397 ha area in Abreu e Lima city, comprehensive also Igarassu and Paulista cities. The watershed suffer environmental degradation constant because human action, is busy in his environment for house and industries, both facilities contributed to the effluents discards in natura in the river body. The full extent is protect by state law nº 9931 of 11/12/86, it's considered as a hydric bodies more fertile and a main income sources for the population of the city (CPRH, 2003).

The goal of this study is analyze the problematic of sanitary exhaustion in the urban place of the city, having object of study the districts Caetes I, Caetes II, Caetes III, Downtown, Fosfato and Matinha and in outworking of this precarious sanitary exhaustion

the impacts are caused with final disposition of this effluents in the estuary of Timbó River.

Materials and Methods

The search had been realized in the Abreu e Lima City, located metropolitan mesoregion and in the Recife microregion of Pernambuco state. The city occupies the total 126.193 Km² area with total 94.429 habitants population. Therefore 86.635 urban populations and 7.804 rural populations (IBGE). The estuary of Timbó River located in Paulista, Igarassu and Abreu e Lima cities, covered total 9.296,41 ha area, therefore 1.397 ha in the Abreu e Lima city.

Theoretical and qualitative research

This task was developed and based in bibliographic research, articles and in national laws, visit to Department of public Works in the city, in addition to check official sites like Companhia Pernambucana do Meio Ambiente (CPRH), Base de Dados do Estado (BDE), Instituto de Geografia e Estatística (IBGE).

The experiment was realized August 29 to October 14, 2016, consisting raise and study data about sanitary exhaustion in the districts of Caetes I, Caetes II, Caetes III, Downtown, Fosfato and Matinha, identify the points of clandestine launch of sewage, and the environmental impacts caused for sewage dumping in natura in the hydric body of Timbó river.

The dynamics of qualitative search will occur in the following way: To Interview 10 habitants houses, of main streets at districts in study, with goal to understand the dynamic of habitants in relation to domestics effluents launch without adequate treatment. It was realized the following questions: 1) Local where is launch the residual water of hygiene of the interviewer residence; 2) If the house has septic tank and 3) If the Interviewer knows what is sanitary exhaustion system.

Results and Discussion

There are three main goals of SES, they are hygienic, social and economic reasons.

From the point of view of hygienic, is the control and elimination of several diseases of hydric contamination.

In social view, provide improving the lives, for the population, recover the esthetic of the streets and remove the bad smell coming from sewage.

In the economic aspect, have great environmental improvement; improve the animal husbandry in rural area (NUVOLARI, 2011).

The districts analyzed in the field research, have water supply with rationing and garbage collection for public service, however, they have a great deficiency in the final collection, treatment and destination of the domestic sewage.

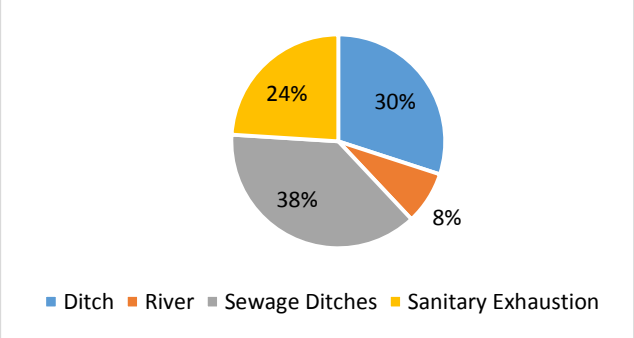
For each district studied there is one different type of final disposition of the generated effluents. In the delivery of results of field research were used in the following questionnaires:

Questionnaires used

1. Local where is launched the wastewater of hygiene of the Interviewer residence.

The residents interviewed, 30% launch the water used of hygiene in the ditch in front of the own property, 8% at Barro Branco river, regarding Caetes III district, 38% in sewage ditches and 24% of the interviewed the sewage is collected netlike sanitary exhaustion, according the figure 2.

Figure 2: Launching site of waste water of the houses

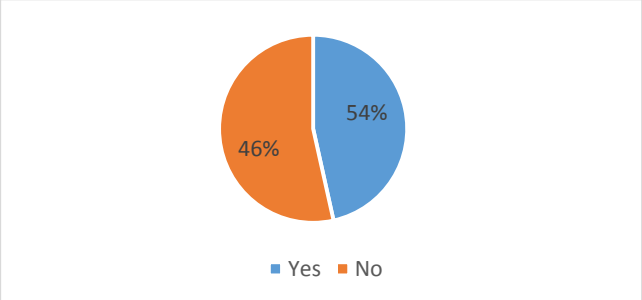


Source: Authors, 2016

2. If the house has septic tanks.

It was identified in the search that 46% of the interviewed have septic tanks in the residence and 44% don't have septic tanks (Figure 3).

Figure 3: Percent of the house that have septic tanks

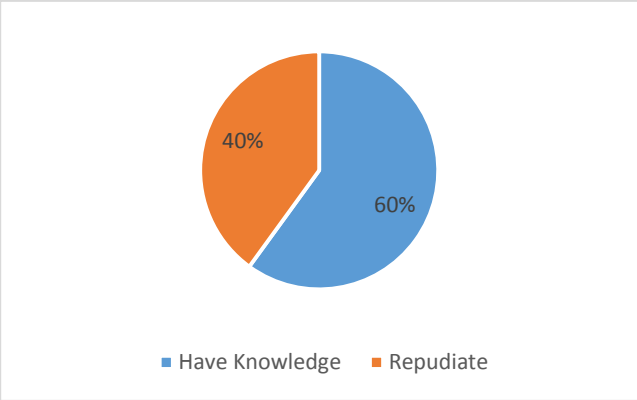


Source: Authors, 2016.

3. If the interviewed knows what Sanitary Exhaustion System is;

In relation knowledge of the population 40% of the interviewed know what sanitary exhaustion is, 60% repudiate (Figure 4).

Figure 4: Knowledge of the population about what is sanitary exhaustion



Source: Authors, 2016.

The department of public works has a public tender for exhaustion of septic tanks of low income house. This service is realized as follows: The resident asks the exhaustion to the department, and a department worker goes with the truck to exhaust the pit, and refer to the Central of Waste treatment of Igarassu (CWT). Its charger the service in the CWT per each truck of sewage to be treats (DEPARTMENT OF PUBLIC WORKS).

4. Hygienic practice and structures per districts Districts of Caetes I, Caetes II and Caetes III

The development of the urban nucleus of Abreu e Lima intensified onwards the 1974, with the building of the Conjunto Habitacional Popular Parque Residencial COHAB, covering Caetes I, Caetes II and Caetes III districts. (PUBLICATIONS CPRH/MMA-PNMAII).

According to the inspector of Gerencia Norte Metropolitana da Compesa (GNM), in the building of the housing complexes, it was implanted the SES, Sanitary Exhaustion System and a Sewage Elevator Station, Its off for over 5 years. The effluents of both districts walk to this elevator station, located in the 40 street in Caetes III, a fact is that there is no sewage treatment station in the districts described. Occasioned the launch of the generated sewage in the Timbó River.

Even in Caetes III, there is a population invasion in the Barro Branco Riverbanks, this river pass in the middle of the district, it doesn't have system of sewage collect, the residents of the houses move in the river the residuals water of stools, urine and personal hygiene through of tubes of PVC (Figure 5).

Figure 5: Elevator Station- Caetes III

Source: Authors, 2016.

5. Fosfato District

Boa Esperanca District, Popular Fosfato, It was populated disorderly and irregular way. The houses were built at hills and valleys, providing poor infrastructure and caused slide during heavy rains. For example Alto Jose Bonifacio hills.

It was observed in field search several aspects in relation sanitation, the district doesn't have storm drainage, neither sewage collect, and the effluents are launch in two areas: In a valley that meet in the middle of the district, where accumulated sewage, rain water and the trash. Other area of launching is the sewage ditch located in Rio Parana Street in front of Centro Comunitario Prof. Vanda Maria de Santana (CECOM) (Figure 6).

Figure 6: Sewage Ditch – Fosfato

Source: Authors, 2016.

6. Downtown District

The Abreu e Lima downtown in known because BR-101 North, It has a strong commerce located at Duque de Caxias Principal Avenue.

Although be the center of district It doesn't have sanitary exhaustion, caused the launch of the effluents in sewage ditches, however, different to the other districts, and in each house has a septic tanks. The streets have manhole to receive storm water (Figure 7).

Figure 7: Sewage ditch – Centro

Source: Authors, 2016.

7. Matinha District

Part of the district doesn't have sanitary exhaustion system adequate, the waters of hygiene are launch in the gutter, and the houses have septic tanks.

On the other hand in Matinha district has a sewage treatment station, in the new housing complexes. For 5 years, receiving the effluents of five condominium located between Desterro and Matinha districts, at BR 101 margin in Abreu e Lima, they are: Conjunto Residencial Dom helder Camara, Conjunto Residencial Josefa Muliterno, Conjunto Residencial Leonildo Pessoa da Silva, Conjunto Residencial Antonio Alexandre de Lima, in the total the STS treat the effluents of 2,304 apartments. (Site Abreu e Lima City Hall, 2012)

When visit STS it was observed that the functioning of the same is of 7 days in a week. The effluent treated and disinfected is launch in the stream near STS.

The STS in Matinha district is unique at the city, only comprehensive the housing complexes. Observed the following process for disinfect of the sewage before go to the final destination, in this case a stream near treatment station.

The effluent *in natura* occur the preliminary treatment, It pass to the railing removing the thick materials, avoiding the clogging and obstruction of the following units (Figures 8 and 9) (PIRELI, 2006).

Figure 8: Entrance of sewage in the STS

Source: Authors, 2016.

Figure 9: Railing of thick materials

Source: Authors, 2016.

After, the sewage is launch by bombs in the tanks of primary decantation, where exist the separation of the solid, it is sludge, and the liquid, the effluent even gross, this process is made by means of decantation (Figures 10 and 11) (PIRELI, 2006).

Figure10: Pumping of sewage

Source: Authors, 2016.

Figure 11: Discharge of sludge in the tank of decantation

Source: Authors, 2016.

In the secondary treatment organic matter, viruses and bacteria are removed, through chemical reactions, this process can be Aerobic or Anaerobic (PIRELI, 2006). After passing through the settling tank the sewage is directed to the sludge drying bed (Figure 12).

Figure12: Drying sludge bed

Source: Authors, 2016.

The tertiary treatment is used the anaerobic filter, consist in reduce the quantity of BOD (biochemical oxygen demand), before arriving to the last process in the tank of pumping of caustic soda and chlorine, stem from tank the effluent before dark color out transparent color, clearer to the receptor body, the stream (Figures 13 to 15) (PIRELI,2006).

Figure 13: Tank of filtering of sewage

Source: Authors, 2016.

Figure 14: Punping of caustic soda and chlorine

Source: Authors, 2016.

Figure15: Out of treated sewage

Source: Authors, 2016.

8. Estuary of Timbó River

Studies relational to the environmental impact recurrent of solid materials, in coastal zone, are several disseminated and famous, however they are realize with great attention in the marine environments of beaches, the search about estuaries and mangroves are rare. This attention be more indispensable, admitted the mangroves are among the environments more cautious and fragile of the nature, and their preservation need to be of extreme urgency. (NANNI, NANNI E SEGNINI, 2005)

The Estuary of Timbó River is popular known by population for mangrove, It's formed for the following rivers: Barro Branco, Arroio Caetes and a creek next nascent. It has the following zones of environments protection: Mata de Congaracari, mata de Sao Bento and Mata de Jaguarana (CPRH, 2003). A monitoring realized by CPRH, in 2008, show the quality of the water in the Timbó river basin, take as a basis the quality standard, discriminated in the normative resolution of the CONAMA 357/05, that dispose about classification of the bodies water and guidelines to your framework, establish the conditions and standard of launch of effluents, and give other measures. Look the following results:

- The results of two sample collection in relation to the parameters: Total phosphorus, dissolved oxygen and coliform term lenient don't attend the limit of the class 2 fresh water of the resolution;
- The total of iron found in the water is non-compliant resolution, because of the characteristic of the ground.
- Arroio Desterro River and Timbó River in the stretch monitored, characterized fresh water appropriate for irrigation.
- Note the enrichment of the watershed of Timbó River for nutrients, recurrent of results between hypertrophic and overcome trophic (PUBLICAÇÕES CPRH/MMA-PNMAII).

According fishermen it is shallow, this characteristic can be connect to the strong environmental impact calling sanding-up, caused for deforestation of mangrove for construction of several industries, house, and others. The rest of effluents caused because lack of infrastructure of the cities, found in mangrove, it's the main action of the environments impacts (CABRAL, 2001).

Other way of environmental degradation of mangrove is the reducing of level the wealth, generally occur in dry season, and risk the quality of water for dilution factor, mainly that there was no treatment of urban sewage and industries (FEITOSA, 1999).

According study data (CPRH,2003), there are thirty great industries, medium and small size in Timbó River, whose areas of producing are related to the textile area, metalworking, plastic material products, drinks, mineral, mechanic and food products, pertaining to the Igarassu, Abreu e Lima and Paulista district. The coverage of industrial activities in the margin of Rivers and Estuaries, have a great aggravating for the sustainability of the small-scale fishing, because they have change the natural environment of the middle (BELARMINO, DA SILVA, RUFENER E ARAÚJO, 2014). Centralization of effluents in the middle of sludge recurrent of residences and industries rest, near to the estuary, cause a great difficulty of the development of fishing activities, because fishermen and crustaceans take the plunge of contamination for pollutants resulting human activities (PAIVA, SILVA, FERNANDES, 2010).

Alguns benefícios ou serviços que o manguezal proporciona a comunidade:

The mangrove protecting the areas of habitation against storms, and the dynamic of erosion of tides;
There is exact conditions of reproduction aquatic and soil fauna;
Around 95% of the marine foods that the men catch, they are produced in the mangroves;
Plants with big roots are natural filter retention of sediments (NANNI, NANNI E SEGNINI, 2005)

Conclusion

Observe necessity of urgency sanitary exhaustion for population, because lack of planning, generated inappropriate environment to the habitants, achieved with strong decadence of resident with low-income.

The importance of the Timbó River preservation goes aside from ecological perspective, because several people of the population located in its environment, remove its support of mangrove, across small-scale fishing and crustaceans. In this perspective, the degradation of environment cause economic and social impacts (SILVA, 2006).

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