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Final Destination Diagnosis of Solid Waste Generated in Rural Settlements in the Sertão of Paraíba, Brasil

Elisângela M. da Silva[1], Valmir C. M. de Arruda[2], Roberto de S. Miranda[3], Rosângela G. Tavares[4] & Alessandro P. F. de Queiroz[5]

* Corresponding Author: elisa_maria18@hotmail.com
Todos autores contribuíram de forma igualitária

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ABSTRACT

The increasing use of natural resources, the advancement of technology, changes in the needs established by the modern population, constituted by cultural aspects contribute significantly to the increase of solid waste generation in the urban and rural environment, thus necessitating more and more of adequate disposal end. Therefore, the objective of this work was to diagnose the final destination / treatment of the solid waste generated in two rural settlements, located in the municipality of Pombal-PB. Field visits were made in the settlements, in order to know the forms of solid waste disposal. It was possible to verify that more than 80% of the residents of the settlements, burn waste as an alternative for the disposal / treatment of solid waste. With this result, it was observed the need for an environmental awareness regarding the sustainable disposition of these residues in rural settlements.

Keywords: Solid waste, environmental pollution, environment

Introduction

The continuous and increasing use of natural resources, the advancement of technology, changes in the needs established by the modern population, constituted by cultural aspects contribute significantly to the increase of solid waste generation. The accelerated process of population growth often occurs in a disorderly way, intensifying deforestation and causing the transformation of the natural environment. When combined with concentration and income inequality, these factors potentiate the consequences, resulting in environmental degradation, disturbances and social insecurity and precarious housing conditions. (JESUS, 2009; SILVA et al, 2011).

Solid waste results from the daily activities of man in society. The main factors that govern its origin and production are basically: the population increase, the intensity of industrialization and the increase of the consumption capacity. The increase in population requires a greater increase in the production of food products and direct consumer goods. The attempt to attend this demand causes the raw materials to be transformed into finished products, ready to be consumed, resulting in larger amounts of waste, which, when improperly disposed, causes a series of negative impacts to the environment (SILVA, et. al, 2009; PINHEIRO et al., 2016).

According to Federal Law No. 12.305 of 2010, which establishes the National Solid Waste Policy, solid wastes are:

"material, substance, object or good disposed resultant from human activities in society, whose final destination is proceeding, it proposes to proceed or is obliged to proceed, in solid or semi-solid states, as well as gases contained in containers and liquids whose peculiarities make it unfeasible to be disposed of in the public sewage system or in water bodies, or require for this, technical or economically unviable solutions in the face of the best available technology".

The lack of planning in Brazilian communities makes it possible for inappropriate waste disposal practices to become more common, such as the

1,3 Center for Agroindustrial Science and Technology, UFCG, Pombal, Paraíba, Brazil.
2,4,5 Rural technology department, UFRPE, Recife, Pernambuco, Brazils.

waste disposal into water bodies, directly on the ground, and incineration, causing environmental, social and economic impacts.

Currently there is great concern regarding the issue of solid waste produced in rural communities, as these are not covered by garbage collection. This concern is highlighted in areas of rural settlements, because in these, a change in the form of occupation and use of the soils is observed, where some activities are developed collectively and others are individual. In addition, there is an increase in the resident population, concentrated or not in agricultural districts, that generate large amounts of residues from their domestic activities (SILVA et al, 2011; FERREIRA et al., 2016).

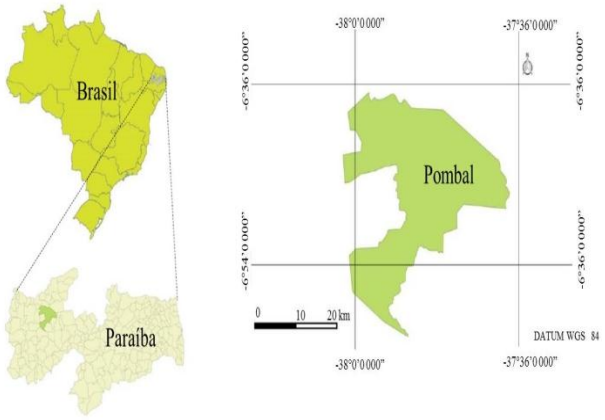
The present study aimed to diagnose the final destination / treatment of the solid waste generated in two rural settlements, called São João II and Jacú, located in the municipality of Pombal-PB, in the sertão of Paraíba, Brazil.

Material and Methods

Area of study

The work was developed in the rural settlements of São João II and Jacú, located in the municipality of Pombal - PB (Figure 1). The municipality of Pombal is inserted in the physiographic zone of the lower Sertao do Piranhas, in the mesoregion of the Paraíba sertão. The settlements studied are part of the Agrarian Reform Program for Land Credit of the Instituto Nacional de Colonização e Reforma Agrária (INCRA).

Figure 1 - Location of the municipality of Pombal - PB.



Source: Adapted from Araújo et al, (2016).

Characterization of the Settlements

The São João II settlement is a project financed by the National Land Credit Program, occupies an area of 266 hectares, has two accesses, one by BR 230, after the urban perimeter of the municipality of Pombal - PB, covering 9 km; The other by BR 427, direction Pombal - Paulista - PB, totaling 12 km from the seat of the municipality, located on the right bank of the Piranhas river. The association is composed of 15 families, occupying an individual area of 17 ha. The acquisition process of the settlement was implemented on December 22, 2001.

The settlement economy is based on subsistence agriculture with planting of corn, beans and tubers. For the commercialization, the settlers produce irrigated bananas that are commercialized in natura form, in addition to some fruits such as: Acerola, guava, mango and cashew, which are benefited in the fruit pulp agroindustry, which was agreed by the Program to Combat Rural Poverty (PCPR) of the Cooperar Project of the State Government.

Regarding the Jacú settlement, this project is implemented by INCRA and is located in the municipality of Pombal - PB, 8 km from the municipal head office, access is made by BR - 427 in the direction of Pombal - Paulista - PB. The association was formed on August 20, 2003, is composed of 40 family units, distributed in an individual area of 14.5 ha.

The soil presents good conditions for the exploration of crops such as: beans, corn, arboreal and herbaceous cotton, cashew nuts and sweet potatoes. It presents suitable characteristics for the cultivation of the following fruits: watermelon, cashew nut, coconut, guava, papaya and mango, in addition to the native fruits cajá, cajarana and umbu.

The vegetation is composed of the trees (Angico, Aroeira, Catingueira, Cumaru, Carnaúba, Coaçur, umburana de cheiro, Juazeiro, Jucá, Jurema-branca, Jurema-preta, Mandacaru, Marmeleiro, Mufumbo, Mororó, Oiticica, Pau-d'árco, Pereiro, Xiquexique, Pinhão brabo, pinheiro do mato, Maniçoba.

Survey of data

In order to carry out this work, field data were collected through visits to rural settlements, photodocumentation and informal conversations with a member of each settled family, for both settlements, in order to know what forms of final disposal / treatment of Solid waste generated in their homes.

Results and Discussion

During the field visits made in the settlements, the presence of residues thrown out into the open and near the residences, as well as the banks of rivers and reservoirs. Figure 2 shows the presence of open-air waste near the residences in the São João II settlement.

Figure 2 - Open-air solid waste.

As can be verified, this practice in the settlement potentiates the emergence of vectors responsible for causing various types of diseases to man.

Figure 3 shows the residues being burned as a form of treatment in the Jacú settlement.

One of the most observed practices in the settlement is the burning of waste, such as plastics, wood, paper and other flammable materials. This occurs in this community because garbage is not separated and discarded inappropriately, corroborating soil, air and water contamination, as well as causing other disturbances to the residentes. With burning, chlorine-containing materials such as Polyvinyl chloride (PVC) -type plastics can cause the formation of highly toxic and carcinogenic compounds (BRAGA et al., 2002).

Figure 3 - Solid waste burning point.

This shows the great importance of making the community aware of the vulnerabilities imposed by the lack of destination and appropriate treatment of the waste generated in the rural settlement areas, increasing the risk of contamination and / or pollution of natural resources, thus causing serious problems for the environment Environment, productivity and human health.

In the Brazilian context, the collection of solid waste in rural areas is insufficient in most of the country. According to the National Household Sample Survey (PNAD) in 2015, in Brazil, waste collection covered only about 30% of households. Still according to the survey, about 65% of solid rural waste presented other destinations, such as burned, buried or thrown in the open, among others. The northern and northeastern regions are those that present the most critical situation when compared with the other regions of the country. This fact is justified by the inefficiency of public policies directed at rural areas.

In Figures 4 and 5, the main forms of final destination / treatment given to solid waste in the São João II and Jacú settlements, respectively, are presented.

Figure 4 - Final destination of solid waste in the São João II settlement.

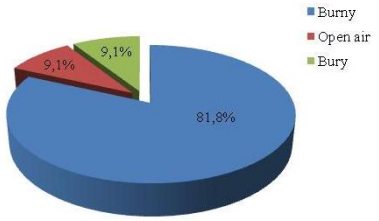
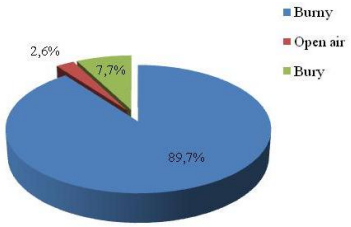


Figure 5 - Final destination of solid waste in the Jacú settlement.



As verified (Figure 4), approximately 82% of residents of the São João II settlement burn their waste as a final destination / treatment alternative and 9% either throw it out into the open or bury the waste. Concerning the Jacú settlement (Figure 5), it can be seen that around 90% of the inhabitants burn the waste as an alternative destination, another 7.69% bury it and 2.56% throw the solid waste out into the open. SILVA et al. (2014), studying rural communities, found that 93% of the people interviewed burned the solid waste produced in their homes.

In the settlements studied it was verified that the residents do not execute any controlled practice of treatment and final destination / treatment of their solid residues. Based on this, it is proposed that the settlers reduce the production of waste through the better use of the products consumed and the recycling, providing significant improvements in the quality of life of the families.

Organic waste, such as crop residues, animal manure (equine, swine, cattle and poultry), food waste and agro-industries can be used as an excellent organic fertilizer (biofertilizer). In this way, besides producing natural fertilizer, the producer improves the sanitation of the property, eradicating the bad smell, the proliferation of flies and reducing the pollution of the water resources. Organic waste can also be used in agriculture, more specifically in the practice of composting.

Based on this, it becomes necessary to raise awareness about the problems caused by solid waste produced in these communities, as well as to find alternatives for the disposal and treatment of waste that can not inevitably be reused or minimized; Seeking in this way, the environmental sustainability in each settlement.

Conclusions

It is verified that in the São João II settlement, as well as in the Jacú settlement, the main form of final destination / treatment of the solid waste generated is the burning, presenting values close to 82% and 90%, respectively.

From this result, it was observed the need for an environmental awareness regarding the sustainable disposition of these residues in rural settlements.

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