



Original Article

Public policies for population management of dogs and cats and social indicators of the Curitiba Metropolitan Region in Brazil

Políticas públicas de manejo populacional de cães e gatos e indicadores sociais da Região Metropolitana de Curitiba no Brasil

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ARTICLE INFO

Article history

Received 16 June 2019

Accepted 23 September 2019

Keywords:

Abandonment

Collective veterinary medicine

One health

ABSTRACT

The objective of this study was to map public policies for population management of dogs and cats in the Curitiba Metropolitan Region (CMR) and to assess their correlations with social indicators. The data used consisted of answers from questionnaires sent via email to public managers of 14 municipalities of the CMR, and data from the Brazilian Institute of Geography and Statistics (IBGE) and Parana Institute for Economic and Social Development (IPARDES). Nine of the 14 municipalities (64.29%) had public policies for population management of dogs and cats, and five (35.71%) had no such public policies. Six (42.86%) municipalities had no other public policy related to population management of dogs and cats, besides population management; and eight (57.14%) had other public policies. The three indicators that had significant and positive correlation with the existence of these public policies were Total Gross Domestic Product (GDPT) (0.028), Income Inequality (GINI index) (0.039), and Human Development Index (HDI) (0.039). However, the decision for the implementation of public policies related to animals depends on the local government because investments on these policies are not considered in the municipal tax revenue.

RESUMO

O objetivo deste estudo foi mapear políticas públicas para manejo populacional de cães e gatos na Região Metropolitana de Curitiba (RMC) e avaliar suas correlações com indicadores sociais. Os dados utilizados foram respostas de questionários enviados por e-mail a gestores públicos de 14 municípios da RMC e dados do Instituto Brasileiro de Geografia e Estatística (IBGE) e Instituto Paranaense de Desenvolvimento Econômico e Social (IPARDES). Nove dos 14 municípios (64,29%) possuíam políticas públicas para o manejo populacional de cães e gatos e cinco (35,71%) não possuíam tais políticas públicas. Seis (42,86%) municípios não possuíam outras políticas públicas relacionadas ao manejo populacional de cães e gatos, além do manejo populacional; e oito (57,14%) possuíam outras políticas públicas. Os três indicadores que apresentaram correlação significativa e positiva com a existência dessas políticas públicas foram Produto Interno Bruto Total (PIBT) (0,028), Desigualdade de Renda (índice GINI) (0,039) e Índice de Desenvolvimento Humano (IDH) (0,039). No entanto, a decisão para a implementação de políticas públicas relacionadas a animais depende do governo local, pois os investimentos nessas políticas não são considerados na receita tributária municipal.

Palavras-chave:

Abandono

Medicina veterinária do coletivo

Saúde única

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INTRODUCTION

The growth of dog and cat populations is a common disorder that causes problems for the animals, environment, and human health (GEDEF, 2017). Large population of stray animals, including semi-domiciled or abandoned dogs, is found in the Curitiba Metropolitan Region (CMR), state of Paraná, Brazil, as well as in many Brazilian municipalities (MOLENTO *et al.*, 2005; RODRIGUES, 2008; CATAPAN *et al.*, 2014; MOUTINHO, NASCIMENTO and PAIXÃO, 2015).

Public policies for population management of dogs and cats are created in attempt to mitigate problems related to them, according to the priorities of each municipal government. The current specific legislation for population management of dogs and cats in Brazil is described in the Law 13.426 of March 30, 2017 (BRASIL, 2017).

Some municipalities of the Central Urban Cluster (CUC) of the CMR have public policies for population management of dogs and cats. However, no mapping of these public policies nor information about their correlations with social indicators are found.

Therefore, the objective of the present study was to map the public policies for population management of dogs and cats in municipalities of the CUC of the CMR, in the state of Paraná, Brazil. In addition, these public policies were correlated with social indicators—degree of urbanization, number of inhabitants, and municipal tax revenues.

MATERIAL AND METHODS

Study area

The study was carried out from May 2016 to July 2017, considering 14 municipalities in the CUC of the CMR—Almirante Tamandaré, Araucária, Campina Grande do Sul, Campo Largo, Campo Magro, Colombo, Curitiba, Fazenda Rio Grande, Itaperuçu, Pinhais, Piraquara, Quatro Barras, Rio Branco do Sul, and São José dos Pinhais.

The CUC was the chosen area because it is a densely populated urban area with industries, infrastructures, and residences. In addition, it has heterogenic municipalities regarding development. The CUC has a total area of 1,449.06 km², and 2,466,760 inhabitants concentrated (97.73%) in urban areas (COMEC, 2016).

Data collection

A survey of the municipalities in the CUC of the CMR was carried out, including agencies that are responsible for execution of public policies for population management of dogs and cats, mainly the municipal departments of health,

environment, agriculture, and food supply, or other departments, depending on the municipality (in the case of inexistence of a specific department for this issue).

Fourteen municipalities were surveyed through a questionnaire sent by email to these agencies. In addition, the respondents from these agencies filled a consent form, as determined by the ethics committee for research with human beings.

The questionnaire consisted of nine questions—two open and seven multiple choice—that provided information from the municipalities about: 1 - existence and perception of stray dogs and cats; 2 - existence of public policies for population management (castration/sterilization) of dogs and cats; 3 - existence of other public policies related to dogs and cats (vaccination of animals; temporary/permanent shelters; education in responsible care; adoption; identification and registration through microchip, tattoo, or collars; control and inspection of breeding and trade; rehabilitation assistance of animals at risk or suffering abuse; or other public policies); 4 - partnership of the municipal government with NGOs, independent guardians, universities/colleges, and private veterinary hospitals or clinics, or other partnerships for the implementation of public policies; 5 - existence of financial support from the municipality administration to partners that perform castration and other services; 6 - opinion about the work of NGOs and reduction of problems related to stray dogs and cats; 7 - existence of a municipal law, decree, or normative act regulating public policies related to dogs and cats; 8 - date of the municipal law, decree, or normative act that regulates public policies related to dogs and cats; 9 - estimation time for the creation of public programs related to dogs and cats.

In addition, official data from the Brazilian Institute of Geography and Statistics (IBGE, 2017) and the Parana Institute for Economic and Social Development (IPARDES, 2017) were collected. These data consisted of numbers of populations, degree of urbanization, total gross domestic product (GDPT), GDP per capita (GDPpc), GINI index (income inequality), municipal tax revenue, and human development index (HDI).

Data processing

The quantitative variables evaluated were: 1 - number of inhabitants; 2 - degree of urbanization; 3 - GDP total; 4 - GDP per capita; 5 - GINI index; 6 - municipal tax revenue; and 7 - HDI. The qualitative variables evaluated (questions of the questionnaire) were: 8 - existence of public policies for population management of for dogs and cats; 9 - existence of financial support from the municipal government to partner institutions that perform castration or other services; 10 - influence of NGOs in the reduction

of stray dogs and cats; 11 - existence of laws that regulate public policies related to dogs and cats.

The qualitative variables were interpreted by Content Analysis (GERHARDT; SILVEIRA, 2009), and the quantitative variables by the Spearman's correlation (SIEGEL; CASTELLAN JR, 2006) at 95% of probability, followed by the Student's t-test. The correlations were analyzed in the Statgraphics Centurion XVI12 16.1.11 (Copyright © 1982-2010 StatPoint Technologies, Inc. Virginia) (STATGRAPHICS, 2017). Spearman's correlation was used ($p = 0.05$) because of the qualitative variables. The qualitative variables were codified so that the tests could be performed. The HDI values were classified and transformed into a quantitative variable. The other results obtained by the questionnaire were tabulated, interpreted, and described, using Microsoft Office Excel (2013).

The HDI ranking ranges from zero to one and classifies regions in low (up to 0.499), average (0.500 to 0.799), and high (above 0.800) development (PNUD, 2014). The GINI index is a social indicator that measures the degree of income inequality between social classes and varies from zero to one—the closer it is to zero, the better the income distribution. For example, a GINI of 1 is one extreme, representing the highest concentration of income among few people in a population (WOLFFENBÜTTEL, 2004).

Ethical aspects

This work was approved by the Ethics Committee for Research with Human Beings of the Pontifical Catholic University of Paraná (PUC-PR) (no. 1.533.066/2016).

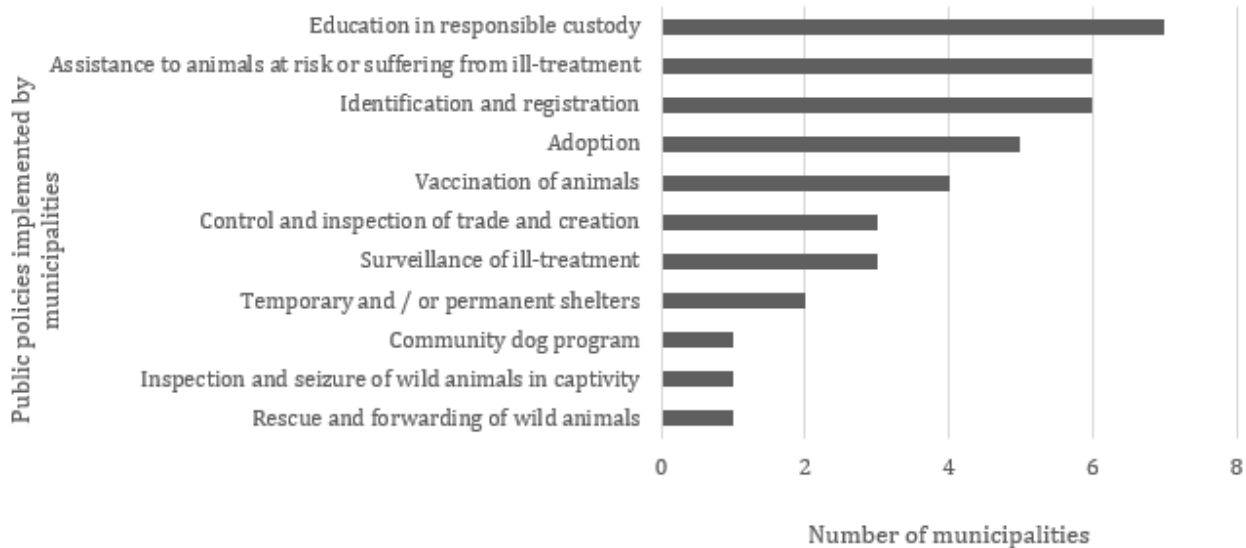
RESULTS

Regarding the existence and perception of stray dogs and cats, 100% of the municipalities had stray dogs and cats, and 71.43% ($n = 10$) of the municipal agencies answered about the origin of public policies for population management of dogs and cats, whereas 28.57% ($n = 4$) of them did not opined on this issue.

The first question of the questionnaire, about the existence and perception of stray dogs and cats, was answered by 71.43% ($n = 10$) of the respondents, giving their opinion about the origin of the animals on the streets. The answers obtained showed that stray dogs and cats are semi-domiciled ($n = 1$) or community-dwelling or abandoned ($n = 1$) animals. When these animals are abandoned and released on public places, they cause problems to the city, risks to residents, and risks related to public health and safety ($n = 1$). Some respondents stated that the population of stray dogs is decreasing ($n = 1$), and attributed the general growth of dog and cat populations to the absence of responsible care ($n = 1$), cultural issues ($n = 2$), lack of joint efforts of society and municipal government ($n = 1$), and lack of awareness on this issue ($n = 2$). The solution or mitigation of this problem was reported to be depended on a joint work, because this responsibility lays on several sectors: municipal government, society, veterinary class, and universities.

Most municipalities (64.29%; $n = 9$) reported having a public policy for castration of dogs and cats, and 35.71% ($n = 5$) reported not having it. Regarding the existence of other public policies related to dogs and cats, 57.14% ($n = 8$) of the respondents reported having other policies, which are presented in Figure 1.

Figure 1. Municipalities that have different public policies for population management of dogs and cats.



The number of different public policies (n = 39) (Figure 1) was higher than the samples (n = 8) because the groups were composite, i.e., a municipality can have two or more public policies. Only two municipalities had two different public policies: one including education in responsible custody, and identification and registration of animals; and other including rescue and care of animals at risk or suffering maltreatment, and temporary or permanent shelters for animals. The maximum number of public policies related to population management of cats and dogs found in a sample was eight, which included vaccination of animals; education in responsible custody; adoption program; identification and registration of animals; care of animals at risk or suffering maltreatment; maltreatment oversight; rescue and relocation of wild animals; and inspection and seizure of captive wild animals. Six of the sampled municipalities included four or more public policies related to animals.

Regarding the partnership of municipalities with NGOs, independent guardians, universities/colleges, hospitals, or private veterinary clinics, 42.86% (n = 6) of them reported having no such partnerships, and 57.14 % (n = 8) reported having some. The number of partnerships exceeded the number of municipalities because some of them reported having more than one partnership, including universities and colleges (n = 4), NGOs (n = 2), hospitals and private veterinary clinics (n = 4), contracts or agreements for services, such as castration (n = 1), and independent guardians (n = 4).

Questions five and six of the questionnaire were treated as variables and subjected to correlations with other

indicators; they were about the existence of financial support from the municipality administration to partners that perform castration and other services, and opinion about the existence of NGOs and reduction problems related to dogs and cats on public roads. However the answers obtained for the question about existence of financial support from the municipality to partners that perform castration and other services, were yes (n = 6), no (n = 4), and I don't know (n = 2), or no answer was obtained for the question (n = 2). Regarding their opinion about the existence of NGOs and reduction of problems related to dogs and cats on public roads, the answers were: yes (n = 6), no (n = 6), and I don't know (n = 2).

The question 7, about the existence of a municipal law, decree, or normative act regulating public policies related to dogs and cats, showed that 64.29% (n = 9) of the municipalities have relevant legislation, and 35.71% (n = 5) of them have no such legislation.

According to the answers to question 9 (If there is no law, decree, regulation, or normative act regulating public policies related to dogs and cats, is there any project for the creation of a program related to dogs and cats?), five (35.71%) municipalities had projects for the creation of legislation related to dogs and cats, and nine (64.29%) had no such projects. The five municipalities that had no legislation on this issue were those that had the provision of bills and actions related to dogs and cats. The nine municipalities that had no projects on this issue were those that already had laws, decrees, or public policies related to stray animals.

Table 1. Quantitative variables. Number of inhabitants (NI), degree urbanization (DU), total gross domestic product (GDPT), gross domestic product per capita (GDPpc), GINI index (GINI), municipal tax revenue (MTR), and human development index (HDI) of 14 municipalities of the Curitiba metropolitan region, Brazil, obtained from the IBGE and IPARDES.

Municipality	NI ¹	DU (%) ²	GDPT ³	GDPpc ³	GINI ²	MTR ⁴	HDI ²
Almirante Tamandaré	114,129	95.82	1,269,345,000	11,375	0.4402	135,720,213	0.699
Araucária	135,459	92.51	8,558,227,000	65,153	0.4637	813,522,653	0.740
Campina Grande do Sul	42,187	82.44	1,037,769,000	25,038	0.4434	97,111,709	0.718
Campo Largo	125,719	83.80	3,757,564,000	30,688	0.4535	266,089,455	0.745
Campo Magro	27,884	78.68	289,166,000	10,653	0.3984	62,912,355	0.701
Colombo	234,941	95.42	4,359,160,000	18,963	0.4196	324,871,475	0.733
Curitiba	1,893,997	100.0	78,892,229,000	42,315	0.5652	7,073,105,810	0.823
Fazenda Rio Grande	93,730	92.96	1,689,770,000	18,641	0.4922	172,557,653	0.720
Itaperuçu	27,131	83.54	443,103,000	16,803	0.4062	not available	0.637
Pinhais	128,256	100.0	5,157,399,000	40,994	0.5082	297,695,990	0.751
Piraquara	106,132	9.07	1,097,829,000	10,679	0.4307	169,243,737	0.700
Quatro Barras	22,353	90.38	1,235,878,000	56,853	0.4915	80,046,140	0.742
Rio Branco do Sul	32,369	71.92	1,225,469,000	38,186	0.4759	76,192,919	0.679
São José dos Pinhais	302,759	89.66	23,220,247,000	79,268	0.4599	896,435,266	0.758

Source: IPARDES (2017), ¹IBGE 2016 estimates, ²IBGE 2010 Census, ³IBGE 2014 (R\$) and ⁴2015 (R\$).

The municipality managers that intend to have legislation regarding dogs and cats reported public policies, including agreement with universities, creation of an animal protection service, and population management of dogs and cats that are at the elaboration phase; and castration service, animal health and welfare projects, mitigation of animal traction vehicles, and animal trade and breeding regulation.

The quantitative analysis of the official data from the IBGE and IPARDES showed the number of inhabitants, degree of

urbanization, total GDP, GDP per capita, GINI index, municipal tax revenue, and HDI of each municipality (Table 1). The HDI of all municipalities was classified as average, except Curitiba, which presented a high HDI.

The statistical test (Spearman's correlation) established correlations between the 11 variables studied. Table 2 shows the *r* values (Spearman's Correlation) and significance of correlation between variables, with *p* values lower than 0.05.

Table 2. Correlation matrix of the group of variables studied. Spearman's correlation coefficients for number of inhabitants (NI), degree of urbanization (DU), total gross domestic product (GDPT), gross domestic product per capita (GDPpc), GINI index (GINI), municipal tax revenue (MTR), human development index (HDI), existence of public policies related to cats and dogs (PP), existence of financial support from the municipality to partners that perform castration and other services (FS), quality of the work of NGOs on reducing problems related to stray dogs and cats (NGO), and existence of a municipal law, decree, or normative act regulating public policies related to dogs and cats (LAW) in 14 municipalities of the Curitiba metropolitan region, Brazil.

	NI	DU	GDPT	GDPpc	GINI	MTR	HDI	PP	FS	NGO	LAW
NI	1	*0.57	*0.88	0.42	0.30	0.95	0.66	0.42	0.28	0.33	0.19
DU	0.57	1	*0.72	0.34	0.51	0.58	0.56	0.46	0.64	0.00	0.02
GDPT	0.88	0.72	1	0.71	0.62	0.93	0.81	0.61	0.56	0.19	0.25
GDPpc	0.42	0.34	*0.71	1	0.68	0.53	0.71	0.38	0.42	0.00	0.41
GINI	0.30	0.51	*0.62	*0.68	1	0.35	0.60	0.57	0.71	0.14	0.36
MTR	*0.95	*0.58	*0.93	0.53	0.35	1	0.74	0.49	0.27	0.28	0.07
HDI	*0.66	*0.56	*0.81	*0.71	*0.60	*0.74	1	0.57	0.78	0.43	0.41
PP	0.42	0.46	*0.61	0.38	*0.57	0.49	*0.57	1	0.61	0.16	0.55
FS	0.28	0.64	0.56	0.42	*0.71	0.27	*0.78	0.61	1	0.25	0.10
NGO	0.33	0.00	0.19	0.00	0.14	0.28	0.43	0.16	0.25	1	0.21
LAW	0.19	0.02	0.25	0.41	0.36	0.07	0.41	0.55	0.10	0.21	1

* Significant at 5% probability of error by the Student's t-Test.

The analysis of the correlations between the variables enables to rank numerically the three indicators (GDPT = 0.028, GINI = 0.039, and HDI = 0.039) that presented statistically significant and positive correlation with the existence of public policies for population management of dogs and cats (Table 3).

The HDI ranges from zero to one, i.e., the closer to one, the better. The GINI index, which measures the degree of concentration of income among social classes, also varies from zero to one; but, the closer to zero, the better the income distribution.

Table 3. Ranking of classification of municipal indicators—GDPT, GINI, and HDI (lowest to highest)

Municipality	GDPT	Municipality	GINI	Municipality	HDI
Campo Magro	*289,166,000	Campo Magro	*0.3984	Itaperuçu	*0.637
Itaperuçu	*443,103,000	Itaperuçu	*0.4062	Rio Branco do Sul	*0.679
Campina Grande do Sul	*1,037,769,000	Colombo	*0.4196	Almirante Tamandaré	0.699
Piraquara	1,097,829,000	Piraquara	0.4307	Piraquara	0.700
Rio Branco do Sul	*1,225,469,000	Almirante Tamandaré	0.4402	Campo Magro	*0.701
Quatro Barras	1,235,878,000	Campina Grande do Sul	*0.4434	Campina Grande do Sul	*0.718
Almirante Tamandaré	1,269,345,000	Campo Largo	0.4535	Fazenda Rio Grande	0.720
Fazenda Rio Grande	1,689,770,000	São José dos Pinhais	0.4599	Colombo	*0.733
Campo Largo	3,757,564,000	Araucária	0.4637	Araucária	0.740

Colombo	*4,359,160,000	Rio Branco do Sul	*0.4759	Quatro Barras	0.742
Pinhais	5,157,399,000	Quatro Barras	0.4915	Campo Largo	0.745
Araucária	8,558,227,000	Fazenda Rio Grande	0.4922	Pinhais	0.751
São José dos Pinhais	23,220,247,000	Pinhais	0.5082	São José dos Pinhais	0.758
Curitiba	78,892,229,000	Curitiba	0.5652	Curitiba	0.823

* The municipality has no public policy for population management of dogs and cats; GDPT = total gross domestic product (R\$); GINI = GINI index (income inequality); HDI = human development index.

DISCUSSION

The problems for implementing public policies, either for animals, health, education, or security, lie on several factors, such as economic development and availability of financial resources (CANEPARO, 2014). The present study did not investigate possible causes or explanations for the absence of public policies for population management of dogs and cats in Campo Magro, Itaperuçu, Campina Grande do Sul, Rio Branco do Sul and Colombo.

Moreover, the municipal tax revenue is not always readily available by municipal managers for public actions (BRAGA *et al.*, 2017). In addition, some municipalities have financial/budgetary problems that affect even the maintenance of basic public services, such as health, education, safety, and the salary of public employees. According to Frey *et al.* (2017), some public policies may be unfeasible due the scarcity of public financial resources.

Public policies for dog and cat population management are important because the growth of dog and cat populations causes sanitary, social, and environmental problems. Dogs can cause several injuries when not controlled, such as: spreading of zoonoses, physical aggression (injuries caused by aggressive behavior), road traffic accidents (SHIMOZAKO, 2008; FERREIRA, 2009), and disturbances caused by noise and dirt (ICAM, 2007). In addition, the welfare of these animals is compromised as they are victims of malnutrition, maltreatment, diseases, and injuries (ICAM, 2007).

Regarding public policies for animal birth control, Biondo and Morikawa (2014) pointed out four pillars of population management (education, castration, abandonment, adoption), and that public policies for responsible custody (education) and contraception (castration) are the most efficient in a municipality that has no cases of abandonment of dogs and cats, nor the need to conduct adoption campaigns. Community programs can complement public policies related to stray dogs and cats. The Community Dog Program, which is found in several regions of Brazil, involves public agencies and strengthens the bond between the dog and the community; a guardian is registered and assumes some attributions of an owner, thus, reducing the absence of a

definite owner (RÜNCOS, 2014).

Thus, this issue was separated in the present study into two questions. One about the existence of public policies for population management (castration/sterilization) of dogs and cats. And the other about the existence of other public policies related to dogs and cats: vaccination of animals; temporary or permanent shelters; education in responsible guardian; adoption; identification and registration by microchip, tattooing, or collars; control and supervision of trade and breeding; and care (rehabilitation) for animals at risk or suffering abuse.

Despite the legislation present in nine municipalities, the existence of veterinary doctors in the municipality for animal-related services was not investigated. Moreover, programs for animal population management can also be created and regulated by ordinance or decree, so that they are first made viable and later implemented as a law. The municipality of São José dos Pinhais, for example, created the Canine and Feline Population Ethical Control Program in 2010 through a municipal decree (No. 035 of March 2, 2010) (DECRETO, 2010), which is still a decree, not a law.

Although public policies have shown short-term positive results, they should be planned as long-term policies (SOUZA, 2006). Curitiba has a specific law since 2007 (No. 12,467 of October 25, 2007), which prohibits the maintenance, use, and presentation of animals in circuses or similar shows in the municipality and provides other measures (BRASIL, 2007). Curitiba had the oldest, and Campina Grande do Sul, the most recent legislation. The law in Campina Grande do Sul (Complementary Law no. 19, of July 22, 2015) describes measures related to animals (chapter V) (BRASIL, 2015). Curitiba suspended dog collection and euthanasia services in December 2005 (ROSA, 2017), replacing these services with other public policies (PREFEITURA, 2009). The state of Paraná has a law (Law No. 17422 of 12/18/2012) that addresses ethical control of dog and cat populations in the state (BRASIL, 2012).

Several orderly, short-, medium- and long-term measures need to be implemented for an effective, humanitarian, and sustainable program for management of dog and cat population. These measures include: education in

responsible guard and animal welfare, animal identification and registration, reproduction control, zoonoses control, animal trade control and regulation, legislation, surveillance, governmental commitment, attention to social and health issues, waste and food control, appropriate veterinary services, empowerment of local leaders, and temporary care center management (GEDEF, 2017).

The responsibility for resolving stray dog issues involves several sectors of society, which denotes the importance of public policies for management of dogs and cats. Addressing stray animal problems is an interdisciplinary task and should be divided between society, minimally represented by animal welfare NGOs, veterinary doctors, and public authorities, including public health departments and other divisions (SANTANA; OLIVEIRA, 2006; BORTOLOTTI; D'AGOSTINO, 2007; OIE, 2013).

Estimating dog and cat population in a location is useful for animal population management, understanding the routine of the study area and adapting public policy projects. The collection of this data can be done by applying questionnaires, and the evaluation of the effectiveness and impacts of the proposed actions is important before and after the interventions. Therefore, defining the type and coverage of intervention is needed, as well as propose goals and indicators to evaluate the progress of the implemented measures (GEDEF, 2017).

Several strategies can be adopted by municipalities regarding public policies for dogs and cats. The coverage of public policies is dependent on other indicators, especially education—the higher the educational level, the lower the need for investments in prevention, for example. Moreover, places with better basic sanitation have better indicators of basic health (FREY *et al.*, 2017). Thus, considering the municipalities evaluated in the present study, the correlation found between castration policies and HDI values showed that municipalities with public policies for dog and cat castration have residents and municipal managers with higher education levels, which would explain the existence of such policies.

This result is based on the three pillars that constitute the HDI: health (long, healthy life measured by life expectancy at birth); education (access to information measured by composite indicators of education of the adult population and the school flow of young population); and income (life standard measured by the per capita income) (PNUD, 2010).

Braga *et al.* (2017) found a correlation between HDI and municipal tax revenue for the presence of public policies related to economic development, health, and education.

However, Guimarães and Jannuzzi (2004) report that the

HDI has little effectiveness to evaluate the impacts of public policies, especially regarding the results and quality of the implemented multidimensional actions.

The correlation between HDI and existence of castration programs in the municipalities evaluated in the present study showed a trend of low-HDI municipalities (the higher the better) having no castration policies.

Considering the interdependence of the variables and the existing correlations presented in Table 3, municipalities with a GDpT over R\$ 1,037,769,000 presented public policy for population management (castration) of dogs and cats.

GDpT is a macroeconomic indicator that measures the flow of income generated in a location over a period to assess income generation, distribution, and use (SILVA, 2011). GDpT is often criticized by researchers because the use of this indicator alone as a determining factor to plan public policies does not serve as a measure of people's well-being (ORGIS, 2010).

The results showed a correlation of existence of public policy for dog and cat population management with GDpT and HDI. Municipalities with GDpT above R\$ 1,037,769,000 (value found for Campina Grande do Sul) and HDI above 0.679 (value found for Rio Branco do Sul) have castration policies. The exception was Colombo, which has a GDpT of R\$ 4,359,160,000 and no castration policies.

The Gini index is a social indicator that measures income concentration in a group to indicate the difference between the incomes of the poorest and richest people. Numerically, it ranges from zero to one; the closer to zero, the similar the income distribution, with one being the extreme that denotes greater income concentration for few people in a population (WOLFFENBÜTTEL, 2004).

The correlation between Gini index and existence of public policy for dog and cat population management was not conclusive, as the municipalities with the three best (lowest) indexes had no castration policies.

Explanations for the correlations between degree of urbanization and existence of public policy for dog and cat population management were expected, but these variables presented no correlation. However, correlations between degree of urbanization and number of inhabitants, GDpT, municipal tax revenue, and HDI were found.

The number of inhabitants was expected to correlate with existence of castration policy, but these variables presented no correlation. However, there were correlations of the number of inhabitants with degree of urbanization, GDpT, municipal tax revenue, and HDI.

A correlation between municipal tax revenue and existence of public policy for population management of dogs and cats was also expected, i.e., richer municipalities having public castration policies; but the results showed no correlation between these variables. However, the municipal tax revenue presented correlations with number of inhabitants, degree of urbanization, GDPT, and HDI.

CONCLUSIONS

Most municipalities in the Central Urban Cluster (CUC) of the Curitiba Metropolitan Region (CMR), state of Paraná, Brazil, have public policies for population management of dogs and cats, which benefit humans and animals since the growth of dog and cat populations is a recurring problem found in all studied municipalities.

The existence of public policies for population management of dogs and cats is correlated with the municipalities' GDPT and HDI; municipalities with high GDP and average HDI presented such policies.

Despite the correlations of GDP and HDI with the existence of public policies for population management of dogs and cats, the implementation of such public policies depends, mainly, on the municipal government. However, when these regulations are created by the State, municipal governments must implement them, as is the case of the Brazilian Law for population management of dogs and cats (13,426, on March 30, 2017).

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