



## Market Research for A Block's Company with Addition of PET Spraying

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### ABSTRACT

**Abstract.** The constant growth of the population has caused the massive use of elaborated products based on (PET) polyethylene terephthalate, generating considerable problems for the country, between soil pollution. PET containers arrived in Mexico in the middle of the 1980s had a great acceptance among consumers. Nowadays, our country is the main consumer of bottled beverages. It is estimated that in Mexico consumed around 800 thousand tons of PET per year, with an annual growth of 13% (Secretariat of the Environment and Natural Resources, 2006). PET is new material, seeking to integrate into the industry of the construction, for this a market study was developed with the objectives of establishing a panorama of the environment established to introduce the block. The research model employee was quantitative descriptive. The collection of the information was done through the survey, having as a population object of study the municipality of Chetumal, Quintana Roo corresponding to 79,081 economically active people, with a sample of 381 observations. The consumption of block for construction is in quantities between 100 and 1000 by purchase. Substitute materials are bricks and wood. The potential block demand is 37,869 pieces.

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### 1. Introduction:

Pollution has constantly damaged the planet, so the quest to reduce these components has become daily. Having a practical use for certain pollutants, such as PET, has achieved a host of products in various sectors. On the other hand, you can have efficient use of this material without having to relocate it in the market with another presentation of contaminant. Which has been reached recycle certain materials such as debris, products of demolitions, ashes, containers of "Treta pack", the polyethylene terephthalate (PET) among others to incorporate them into a new Lifecycle.

PET containers arrived in Mexico in the mid-1980s having a great acceptance among consumers. At present, our country is the main consumer of bottled drinks. It is estimated that in Mexico they are consumed around 800 thousand tons of PET per year, with an annual growth of 13% (Secretariat of the Environment and Natural Resources, 2006).

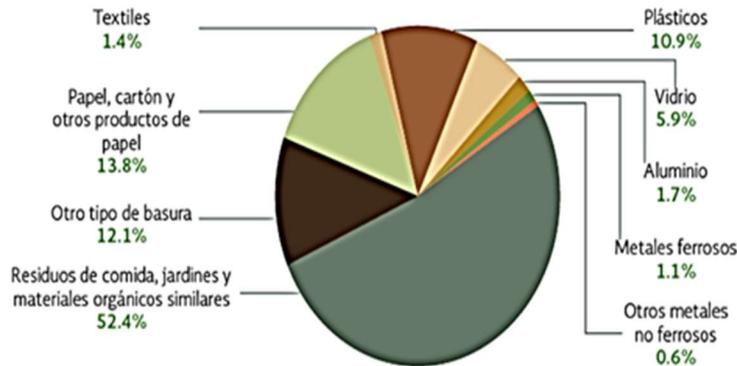
It is important to offer a suitable proposal that helps reduce a large amount of this material based on developing and improving in quality certain materials of construction,

using technologies and materials without great environmental impact; by reducing the expenditure on energy and raw materials used to produce the products, achieving low cost and simple production process.

Such proposal implies creating innovation to a product for construction, made based on plastic, contributes to the reduction of two of the country's major problems, that they are, the excess of PET (Graph II) and the lack of houses with resistance to impacts environmental, mainly low-income families. For such a proposal is important to take into account the research that has been done according to the Standards Mexican officials for the construction industry that is not found any reference on the use of PET.

PET is currently an easy material to acquire and within the market, it is obtained at an accessible price since in the locality it is innovative. The reuse of PET will serve for the reduction of environmental impact, so it is derived as a new way to give it a new use, preventing it from causing massive damage to the planet.

PET is a new material for construction which seeks to generate sources of employment in the locality, it is also desired to induce new and current generations a culture



**Graph 1.** Solid urban waste in Mexico.

Source: Prepared from the General Directorate of equipment and infrastructure in urban-marginalized areas, Sedesol. Mexico, 2013.

correct recycling, the significance of separating the garbage and putting it in place appropriate.

Based on the increase in PET waste in Quintana Roo (Table “1”), it is decided to incorporate in the middle of the construction industry the plastic and thereby reduce the exploitation of quarries for obtaining the fine aggregate as this is a non-renewable resource, reduce excess PET and

The market study establishes the starting point for the optimal determination of the feasibility of the project under development. Being able to identify and analyze more needs the most important indicators in the current dynamics in the market of the Commercialization of materials of construction.

In developing the market study, it is intended to

Table 1. *Final disposal of urban solid waste PET by state, 2008 to 2009.*

Entities federative	Controlled sites		Uncontrolled sites more recycling.		Total generated	
	2008	2009	2008	2009	2008	2009
<b>Total National</b>	380,535	391,500	183,450	183,375	563,985	574,875
<b>Quintana Roo</b>	3,840	4,035	570	570	4,410	4,605
<b>Veracruz</b>	11,325	11,640	19,215	19,410	30,540	31,050
<b>Yucatán</b>	4,875	4,950	3,555	3,645	8,430	8,595
<b>Zacatecas</b>	2,910	3,000	2,535	2,595	5,445	5,595

give an economic option of various finishes to the homes of the poor people.

Taking into account the quantities of PET that are contaminating the soil of the state, it was decided to reuse it and use it as a substitute in a percentage of one of the fine aggregates of the concrete blocks, this is because the blocks are used for the creation of walls of houses, fences, infrastructures is of great importance trust with society, providing the security of offering a product made with high quality indexes, manufactured with the appropriate raw material and with an accessible price, is one of the goals of the company, to which it is essential to determine the sources of supply of the main materials, without having to extend to areas outside the scope.

Offer society a product for the construction sector, taking into account that is an indispensable consumable for the creation of new homes, it becomes a starting point to determine if this will have the expected acceptance, this because nowadays it is sought to have durable constructions and that maintain their resistance to face the various natural phenomena that face day to day.

establish a current panorama of the environment established to introduce the block with PET, defining to whom it is directed, who have the ability to buy, how many people will be interested in the product and how much they will be willing to pay for it. Also, determine the competition, know who offer related products, the characteristics of these and the interest they achieve in the public. The analysis of such information will allow knowing the number of units that would be it is necessary to produce in order to cover the demand for a certain time.

**2. Methodology:**

The research model used was the descriptive model with sampling probabilistic. The information was collected through a survey designed with filter questions, closed and multiple selection.

**2.1. Study area:**

For the determination of the study area determined the total population of the municipality of Othón P. Blanco, of which only has been selected to the economically active population (EAP), noting that it is defined as those people of 12 or more years of age, who have the ability of working



or doing any economic activity and who are in a position to do so (National Council of the Population, 2018).

Contemplated this, it was considered for the object of study 79,081 inhabitants in the municipality, which they were stratified in the localities to obtain results with greater reliability.

Table 2. *EAP of QROO, distributed in Localities.*

Location	Total population, older than 18 years of age.	Economically active population.
<b>Total municipality</b>	<b>297,516</b>	<b>79,081</b>
Chetumal	151,243	69,001
Álvaro Obregón Viejo	169	52
Allende	868	284
Buenavista	585	260
Cacao	2,056	626
Calderitas	5,326	2,158
Esteban Baca Calderón	222	64
Caobas	1,412	501
Cocoyol	1,019	344
Limonos	2,535	894
Chacchoben	728	257
Los Divorciados	1,118	301
San Francisco Botes	580	164
Francisco Villa	882	304
Huay-Pix	1,649	622
Jesús González Ortega	620	190
Juan Sarabia	1,093	374
Laguna Guerrero	654	240
Mahahual	920	481
Nachi Cocom	833	261
Nicolás Bravo	4,011	1,364
Palmar	950	339

2.2. Target Population:

The target population of this study is in the economically active population, which has the income to build and acquire materials from construction, focusing on urban and rural areas of the municipality. According to previous, the target population reached 79,081 inhabitants.

2.3. Calculation of the sample:

For the estimation of the size of the sample, it has been calculated, taking as a reference to the economically active population in the localities, that is to say, the 79,081 inhabitants. For the sample design is carried out a probabilistic sampling, of the simple random type, with a finite population, having a standard deviation of 95% with a permissible sampling error of 5% therefore, for the calculation of the sample the following formula will be used:

$$n = \frac{\sigma^2 N pq}{e^2 (N - 1) + \sigma^2 pq}$$

Where:

$\sigma$  = confidence level.  $\sigma = 1.96$

N = universe or population. N = 79,081

p = probability in favor. p = 50%

q = probability against. q = 50%

e = estimation error (precision in the results). e = 5%

n = number of elements (sample size). n = (?)

The values of "p" and "q" are considered 0.5 and 0.5 because the values will maximize the standard value, giving the most unfavorable conditions that could be given in the calculation of the sample size.

$$n = \frac{(1.96)^2 (79,081) (0.50)(0.50)}{(0.05)^2 (79,081 - ) + (1.96)^2 (0.50)(0.50)}$$

$$n = \frac{75,918}{199} = 381 \text{ encuestas.}$$

As the study is carried out in a municipality with different localities, we proceed to make a stratification, this to have data really reliable.

$$ksh = \frac{n}{N}$$

$$ksh = \frac{381}{79,081} = 0.004817$$

381 observations were distributed proportionally in each of the strata, as indicated in table 3.

Table 3. *Real sample stratification.*

Location	Economically active population (fm)= 0.004817	Sample
<b>Total municipality</b>	<b>79,081</b>	<b>381</b>
Chetumal	69,001	332
Álvaro Obregón Viejo	52	0
Allende	284	1
Buenavista	260	1
Cacao	626	3
Calderitas	2,158	10
Esteban Baca Calderón	64	0
Caobas	501	2
Cocoyol	344	2
Limonos	894	4
Chacchoben	257	1
Los Divorciados	301	1
San Francisco Botes	164	1
Francisco Villa	304	1
Huay-Pix	622	3
Jesús González Ortega	190	1
Juan Sarabia	374	2
Laguna Guerrero	240	1
Mahahual	481	2
Nachi Cocom	261	1
Nicolás Bravo	1,364	7
Palmar	339	2

2.4. Instrument:

In the construction of the instrument, a nominal scale measurement level was used. Includes questions with two categories (dichotomous), and categorical (three or more categories) in development, using closed questions with several response options in which You must choose one, these types of questions make it easier to generate answers. The instrument was validated with Cronbach's alpha.



### 3. Results

The information obtained in the application of the diagnostic surveys of the market in the municipality of Othón P. Blanco, covering all market locations objective, the results are displayed following the structure of the surveys and the logic initial of the elaboration of the questions.

The market diagnostic survey has 24 questions that are analyzed and interpreted in table 4, the concentrated results of the diagnosis are presented.

Table 4. Results of the preliminary diagnosis in the target market.

N°	Variable	Trend	
1	Gender of respondents.	a) Women	47%
		b) Men	53%
2	Age of respondents.	a) Under 18 years	19%
		b) 19 to 29 years old	25%
		c) 30 to 39 years	27%
		d) 40 to 49 years	10%
		e) 50 or more	19%
3	Occupation of the respondents.	a) Professional	27%
		b) Housewife	17%
		c) Worker	25%
		d) student	23%
		e) Other	7%
4	Marital status of respondents.	a) Single	32%
		b) Married	43%
		c) Other	25%
5	What type of material do you use for House construction?	a) Block	73%
		b) Partition	5%
		c) Tepetate	5%
		d) Brick	7%
		e) Adobe	10%
6	How would you evaluate the block?	a) Of great usefulness	55%
		b) Quite useful	26%
		c) Not very useful	3%
		d) I never use it	16%
7	What do you look for when acquiring a product as the block?	a) Quality	44%
		b) Price	46%
		c) Designs	10%
8	Do you use the block?	a) Building of housing	55%
		b) Wineries	26%
		c) Construction of buildings	3%
		d) Dividing walls	16%

9	What features do you look for when using the block?	a) Resistance	59%
		b) Size	25%
		c) Quality	16%
10	What size do you consider convenient for a block?	a) Standard 15 * 20 * 40	64%
		b) Standard double 30 * 20 * 40	25%
		c) Thinner 12 * 20 * 40	11%
11	What kind of texture would you prefer in the block?	a) Smooth	48%
		b) Porous	25%
		c) With design	16%
		d) With color	5%
		e) Indifferent	7%
12	Would you use a block with added ecological?	a) Yes	32%
		b) Do not	25%
		c) Perhaps	43%
13	Do you know the construction materials that contain PET?	a) Yes	19%
		b) Do not	33%
		c) Very little	48%
14	Did you know that one of the benefits of PET is that its durability is greater than 200 years? Therefore, it influences the lifetime of blocks with PET.	a) Yes	48%
		b) Do not	52%
15	How much would you be willing to pay for the block with PET based on the standard size?	a) \$8.00	36%
		b) \$10.00	34%
		c) \$12.00	27%
		d) \$15.00	2%
16	What price would make you think that the product is not of good quality?	a) + \$3	1%
		b) + \$2	4%
		c) + \$1	3%
		d) - \$1	75%
		e) Other	17%
17	Please list, in order of importance, the factors that consider when making a purchase.	a) Quality	43%
		b) Price	34%
		c) Quantity	2%
		d) Brand	1%
		e) Familiarity	20%
18	Where did you buy the block?	a) The compadre	29%
		b) Tiger	31%
		c) AGBLOC	36%
		d) Calderites materials	4%
19	What would change in the	a) Quality	44%
		b) Weight	20%



	products of existing manufacturers competitors?	c) Design d) Colour e) Price	14% 9% 14%
20	If the block with PET addition already had been released, you would use it instead of other similar products manufactured by competing companies?	a) 100% b) 75% c) 50% d) 25% e) 0%	37% 32% 22% 5% 5%
21	If you do not plan to use the product, please indicate why.	a) Price b) For the materials c) Ecological d) Security	33% 35% 14% 14%
22	If the release date of our product was today, would you recommend it to others?	a) Yes, in short. b) Yes c) I'm not sure d) Do not e) No,	24% 54% 16% 3% 5%
23	Apart from the product, what factors influence the purchase decision?	a) Experience of others customers. b) The staff. c) Advertising d) Warranty e) Packaging f) Other (please describe it)	49% 34% 13% 5% 0% 0%
24	What would increase your potential interest in the new block?	a) Resistance b) Quality c) Price d) Consistency	50% 30% 12% 8%

### 3. Conclusion:

The survey of the defined population revealed that those who acquire most of the Construction materials are men with 53%, considering a range of age between 30 and 39 years with 27%. The main consumers are concentrated in professional with 27% and workers with 25%, likewise, with 43% the married people are chosen to build buildings, thinking about having a secure estate.

73% of the surveyed population uses the block preferentially, of which 64% handle the standard measure (15 \* 20 \* 40 cm) for the realization of their constructions, and 55% consider that construction blocks are a very useful material.

At the moment of carrying out their works, therefore, when considering acquiring this material, 46% of the population is concentrated in the purchase price,

and 44% requires that they be blocks with the sufficient quality for these buildings because 55% of respondents use this material for the construction of their homes, preferring that said product be smooth without designs or distinctive colors, this decided with 48%.

On the other hand, the results of the surveys show that 52% had no knowledge of the properties of PET, the advantages that it can offer in its use, likewise the 48% of the population mentioned that they did not know that there are materials with additions, substitutes and aggregates of ecological materials. Among the prejudices existing in the materials of construction and its additions of certain aggregates, 43% of the respondents mentioned that they would consider using a block with PET, and 32% indicated that they would use this product, and 37% expressed that, if the block had already been launched, they would acquire it.

Considering these results, it is concluded that there should be more publicity regarding the advantages of using these products, as well as showing the population that said block complies with the specifications of the standards, therefore, quality products are provided.

This is because 35% of the respondents mentioned that they would not buy the block for the materials used in its preparation, on the other hand, having proof of the reliability of the product their perspectives would change. With this, 54% of the surveyed population indicated I would recommend this product.

Regarding the price, 36% agree that the correct price should be \$ 8.00, and 34% mention that, with the benefits provided by the product, they could pay \$ 10.00 Contemplating the base price (\$ 8.00), respondents indicated that if the product had at least \$ 1.00 less, would be considered of quality, causing this uncertainty and questioning the reliability of the material.

In the municipality of Othón P. Blanco, Quintana Roo, there are trading companies of construction materials, which are the ones that lead the market, the main the competitor that the product would face is the AGBLOC company (Aggregates and Blocks de Chetumal), monopolizing 36% of respondents. With respect to the competition existing, 44% of the inhabitants indicated that of the products that they offer would prefer to improve the quality, because sometimes the blocks turn out to be tornados, despostillados or senses.

Keeping customers satisfied is the best advertising and propaganda that a can achieve, as sustenance is that 49% of respondents mentioned that one of the factors that most influence your purchase decision is the experience that you have other clients, and that they recommend them.



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