SUGAR CANE: POTENTIAL OF THE ECONOMY, SOLIDARY WITH THE ENVIRONMENT.

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Abstract

The Eearth, in the last years has been suffering by the pollution, it has been produced by different situations, so today many part of the planet had lost biodiversity and wildlife. The most notable consequence is seen in the frequent and exaggerated changes in the climate. Global warming is one of the most serious problem in the planet that is why it is necessary to implement actions and methods that are friendly to the environment. In order to decrease emissions of greenhouse gases and toxic chemicals that harm the Earth and therefore its inhabitants. For those reasons it can be set as one of the friendly solutions environment, the implementation of sugarcane (ethanol) as the basis for production of fuel element. Which produce less negative impact on the environment, because "the life cycle of bioethanol from sugar cane emits about 85% less CO2 than gasoline from oil, according to data from reports of the World watch Institute and the International Energy Agency (Corral, 2008).

The paper analyses the production of the use of the ethanol of sugarcane in order to decrease the pollution, furthermore determinate the impact which means the use of it in the Colombian´s competitiveness.

Key words

Pollution, sugarcane, ethanol, environment, carbon dioxide.

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1.1.1. List of symbols and abbreviations

1.2. List of symbols

€. Indicates the Euro currency symbol

(US) **$.** Indicates the currency symbol Dollar.

(COP) **$.** Indicates the currency symbol Colombian peso.

1.3.List of abbreviations

CONPES. National Council of Economic and Social Policy.

AMUMAS. Multilateral Agreements on the Environment.

TLC. Free trade Agreement.

OMS. World Health Organization.

USDA. Department of Agriculture of the United States of America.

Admón. Administration

Act. Account

Dr., Dra. Doctor

Dir., Dir. [a] Director, director

etc. Etcétera

Frm. Signed.

Gral. General.

Our . our

n. º o núm. Number

pág. Page

Ref. Reference

sec. Section

Ser. Service

Mr, mrs. Mister, lady

You you

Introduction

Over the years, the planet Earth has been receiving large changes, mostly negative because of pollution. Pollution is a phenomenon that is destroying a large part of the ecosystems and biodiversity around the planet, today it is possible to feel, for example in Colombia, that the climate is totally different than it was twenty years ago, long droughts are experienced And cruel and strong winters for months, there is no stability or any climatic cycle. This is due to different circumstances, including: high levels of carbon dioxide (CO2) in the ozone layer, as well as the presence of methane, nitrous oxide and other gases that environment. These chemicals are produced by highly polluting activities carried out in developed and developing countries, such as the implementation and use of hazardous substances with the environment, the use of nuclear weapons, mining and the use of Fossil fuels, the latter being one of the activities that generates more pollution, for its massive use by humanity.

That is why we have been implementing raw materials other than oil for the production of environmentally friendly fuels, with oil being the most used for the production of fossil fuels; For example, the use of maize, sugar cane, cereals and even beet derivatives have been used by the European Union. (Corral, 2008) These materials significantly reduce carbon emissions, making them excellent options to implement and mitigate the environmental damages caused by fossil fuels.

It should be noted that "at present, three countries have developed significant programs in their principal mills for the production of bioethanol as fuel: the United States, from corn, Brazil and Colombia, both from sugarcane" (Businessreview , 2011), Colombia being among the main

Producers of sugar and exporters in the world, according to data from the International Sugar Organization (ISO) (Businessreview, 2011), being able to own as one of the main producers of bioethanol in the world, as is currently Brazil, Positive in the economy at the national level.

2. Formulation of the project

2.1. Background

Latin America has been a producer of sugar cane for decades, countries such as Cuba, Brazil, Colombia and Venezuela have dedicated themselves to growing and exporting sugar cane products, mainly sugar and panela. For years sugar cane has been constituted as an indispensable element in the feeding of millions of Latin Americans. According to the United Nations Organization for Agriculture (FAO), panela production is one of the most traditional rural agroindustrial activities in Latin America and the Caribbean, and the world production of this product is around 13 Million tons per year. (Gonzalo Rodriguez, 2004) This practice has been developing for a considerable time, mainly by peasant communities located in different regions of the country, whereby their production has become one of the most traditional rural agro-industries. (Money, FTAs open the doors to the Colombian panelist sector, 2012)

Ethanol has been used since the beginning of the seventies of the last century, because of the energy crisis of those years, its fundamental use has been as a substitute for gasoline because its mixtures increase the octane in an additional way and allows to reduce The use of tetraethyl lead, which has carcinogenic action. In addition, the total substitution of gasoline with alcohol allows the reduction of carbon monoxide and nitrogen oxide in the exhaust gases, which are highly harmful.

At present, its use has increased again, and although there was a period of decrease of its production and use, from 2000 and due to the necessity of reduction of the use of the fossil fuels

and the oxygenation of the gasolines to decrease Emissions of greenhouse gases and their use in blends with gasoline has become mandatory practice in the countries that signed the Kyoto treaty. (Fracisco Diez Torres) That is why the fuel industry seeks to raise profits, leaving aside the possible consequences that bring consumption and the production of products that are not environmentally friendly.

In Brazil, Professor Adalberto Pessoa explained that on the grounds of the world oil crisis that lived in 1975, the Brazilian government promoted the Pro Alcohol program, which was aimed at producing ethanol as a fuel for automobiles. At present, he said, in Brazil ethanol production is a success since more and more "Flex-fuel" cars are being produced to which traditional gasoline or ethanol can be put or mixed in any proportion, According to the request of the motorist at the time of filling his tank at the service stations. (Universia, 2009)

In Colombia, the world's most modern plant for the production of ethanol in the municipality of Zarzal, Valle del Cauca, was inaugurated in 2015. This plant has a production capacity of 400 thousand liters per day of biofuel, the distillery will have a Annual production capacity of 110 million liters per year, providing sufficient energy for different sectors of the national economy. (Heraldo, 2015)

2.1.1. State of art

The use of biofuels as a substitute for petroleum products has its supporters and critics, bioethanol as an environmentally friendly fuel brings with it the reduction of 85% of CO2

compared to gasoline from petroleum, according to data extracted from Worldwatch reports Institute and the International Energy Agency. Bioethanol produced from cereals in Europe or the United States generates 30% less carbon than gasoline and that produced from beet in the European Union has a 45% reduction. That is to say, the considerable reduction of emissions of greenhouse gases in the environment is perceived, obtaining better quality of life for the inhabitants of the world. However, there are also voices that are against the use of food as fuel, while there is so much hunger across the Earth; The European Union after studying an analysis of the Agency for Renewable Fuels of the United Kingdom, called the Gallagher Report, which recommends that the objectives of these green fuels be halted by 2020 until their sustainability can be ensured. It has been a few months since being part of the climate change solution to become the focus of all criticism. (Corral, 2008)

The World Bank conducted a recent secret study, which was published by The Guardian newspaper, which stated that the impact of fuels can account for 75% of the price increase of maize and wheat, excluding That figure the vegetable substitute of the gasoline from the sugar cane. In fact, this product is the only agricultural raw material that has not increased in price since 2006, while the average increase in other foods has been 83% in the same period.

The World Bank report argues that biofuel production has distorted the food market in three ways, firstly because it diverted a significant portion of the grains that could be used in food production with more than a third of maize North American now used to produce ethanol and about half of the vegetable oils in the European Union going to biodiesel production. Second, farmers were encouraged to reserve their land for the production of biofuels. Third, it led to

financial speculation in the price of grain, which has resulted in the generalized increase in prices. (BBC)

Similarly, proponents of ethanol presume a 30% reduction in exhaust emissions of monoxide emissions, and a 50% reduction, compared to gasoline, of particulate matter that causes cancer. In addition to that, ethanol is also an oxygenator and neutralizer of gasoline emissions. Its proponents say there is a positive energy balance, generating practically twice as much energy as that used in production. Scientists David Pimentel of Cornell University and Tad Patzek of the University of California at Berkeley are drastically opposed to this idea. In 2005, they reported in a study that, in general, corn ethanol uses 29% more fossil fuel energy in its production than the fuel produced by it. Wharton management professor John MacDuffie said the best way to make ethanol is from non-food sources such as millet grass, which has provided promising breakthroughs in the development of enzymes that separate plants into sugars after turning it into fuel . (Knowledgeatwharton, 2013)

2.2.Problem statement

In recent years it has been perceived as the man has been the polluting agent number one of the environment, being the same man who has had to endure the one that until now is the greatest overexposure to environmental pollution of which it has had registration. According to the World Health Organization, in recent decades there has been an increase in deaths related to exposure to atmospheric pollutants, in addition to the increase of artificial chemical compounds in the environment. Due to the above, the greenhouse effect produced by the large amount of CO2 and released to the atmosphere irresponsibly, coupled with the misuse of resources, has been deteriorating the ozone layer over the years, allowing more and more The passage of ultraviolet rays and greatly harming the earth and people. However, awareness about the preservation of the environment, health and human life is increasing, so that humanity itself has initiated an investigative process in order to adopt practices that aim to care for the environment in the execution of activities that Pollution, since that depends on human life and all the species that inhabit the Earth, understanding that it is not an easy task, since there are factors and figures at a global level that prevent the adoption of clean measures, such as It is consumerism, nuclear war and savage capitalism.

As for the economic aspects, it has changed the point of view a little, because although man perceives environmental management as an act of protection to the environment, he also perceives it as something in which he can receive lucrative profits. At present Colombia has a good production of alternative fuels to the oil as it is the ethanol derived from the sugar cane.

Although biofuel production is profitable and beneficial to both the community and the national economy, the Colombian government has not provided adequate budgetary support for the

progress of plants and methods to generate biofuels that contribute to the progress of the national economy and International competitiveness.

Over the years you can observe the damage caused to the environment by the use of fossil fuels, not to treat this problem with more friendly options with the planet runs the risk of global warming becoming uncontrollable and irreversible, Bringing with it losses and infertility of soils necessary to extract human sustenance.

The government should implement regulations that promote increased use of biofuels to help mitigate damage to the environment in ways that also promote economic and social development of the country, invest in subsidies to farmers, generate better production spaces and Guarantee the maintenance of such facilities.

For the above mentioned, the following question arises: does Colombia have the support of the government to improve the infrastructure and production practices that put the country as a strong competitor in the international market?

2.3.Justification

This research aims to investigate how the agroindustrial sector is currently focused on fuel derived from sugar cane in the national market, this will allow to know the factors that influence the competitiveness in this sector in Colombia. Additional this project is exposed with the need to know opportunities that are being generated in the sector in the international markets such as Central America; Especially South America. The purpose of the study is to implement knowledge that strengthens the training processes and implementation of new techniques that enhance its internal and external growth in the market. In order to achieve an ability to be more profitable compared to potential competitors from other countries.

Therefore, the formulation of this research is clearly focused on the impacts of positive change that can generate the commercialization of fuel derived from sugarcane to the environment and human health. Also constructing this as a project as a personal motivation in relation to the negative environmental and health impacts that are causing the exploitation of the soil, the use of fossil fuels derived from petroleum as a source of nonrenewable energy is showing great signs of exhaustion. Medium term will not be able to meet global demand. (Inter-American Institute for Cooperation on Agriculture, 2007)

2.3.1. Theoretical justification

Through this research, we intend to investigate how the sugar cane agroindustrial sector is located at the national level, with the purpose of using this as a base for the production of

environmentally friendly fuel. In addition, the research proposes the need to empower the productive sector of sugar cane, with the purpose of harvesting and producing with double purpose, produce sugar and its food derivatives, as well as the production of bioethanol, in order to improve competitiveness Of the sector versus the oil sector.

2.3.2. Social Justification

The fundamental importance for society of this research is the result obtained at the time of implementing bioethanol as a replacement for fossil fuels, since it reduces by more than half the production of carbon dioxide, improving considerably the quality of Life of the people, the flora and fauna of the country. In addition, to increase the economic projections of the country, since the cultivation and processing of sugar cane for the production of biofuel generates an international appeal, as well as increased exports of the final product.

2.3.3. personal Justification

The ability to investigate procedures and methods that mitigate the consequences of pollution in the environment are very important for the country, because Colombia because of climate change has suffered food crises due to droughts and torrential rains for long periods, Is very important as International Business students, since you can secure all the knowledge gained during the study of the career.

2.4.Objectives

2.4.1. General Objective

• Analyze the impact of the use of fuel based on sugar cane (ethanol) and the competitiveness of the sector within the Colombian economy.

2.4.2. Specific Objectives

• To determine the supply and demand of biofuel based on sugar cane in the Colombian market.

• Analyze the projection of sales of biofuel based on sugarcane in Latin America.

• Examine the national investment policy for the sugar cane agroindustrial sector.

2.5.Goals.

The present work will be limited temporarily mainly on the supply and demand of sugar cane as biofuel in 2015 in Colombia mainly, in order to know and establish the economic dynamics that this type of business has in Colombian territory, Latin American economies for the purpose of making instructional comparisons between countries. The above in order to know with the greatest possible certainty the economic and environmental impact generated by the use of ethanol as an alternative fuel.

2.6.Methodological framework

2.6.1. Method

The method implemented for this research work is the deductive method, since through scientific research, information was sought and collected from different perspectives, authors, scientific studies, official figures about the implementation of sugar cane for the manufacture of biofuel, As well as its economic behavior in Colombia.

2.6.2. Methodology

Firstly, sufficient information about sugarcane was collected as a base element for the production of environmentally friendly fuel in order to know the different positions that exist in terms of the use and implementation of this biofuel In different parts of the world, in addition to the above, economic information was sought, along with official figures, where it will capture everything related to the demand and supply that exists of this product.

Subsequently, the different economies in countries of the world were studied, in which the cultivation and processing of sugarcane for the manufacture of biofuel is implemented and increased, as well as interpreting and analyzing its projection in Colombia and the Americas Latin America, likewise, gathered necessary information about groups and organizations that are against the use of sugar cane as fuel, allowing to analyze the pros and cons of the project. Finally, we sought and analyzed the agro-industrial policies that are in force in Colombia regarding the cultivation and investment in sugar cane, as a food product, as well as fuel.

1. Execution of the project.

1. 1. Biofuel by means of sugar-cane: Supply and demand.

The world economy today turns out tobe subordinated to the oil, this one hasturned into determin ant factor for thegrowth or decrease of the economy, atpresent, many countries of the world areh aving economic problems thanks to thefall in the price of oil and the growth inthe price of the dol lar. Also, the oiltogether with its derivatives hasgenerated a quite significant pollutantwave in the planet Earth, situation thatdeteriorates every day with the quantityof poisonous gases that come principallyfrom the air, fluvial, terrestrial andrailroad transport, in addition to the useof the oil or its derivatives in bigindustries.

For the situation previously describedand thanks to the search of alternativeraw material to the oi l to produce fuel, several countries of the world havereceived the idea and the process ofusing ra w material such like the corn, beet, wheat, sugar-cane,
betweenothers for the making of friendly fuelwith the environment, in order tocontribute with thi s one and in additionto having another important economicactivity.

Now then, in the Colombian case from2005, companies began with theproduction of the ethanol insuroccidente of the country, then for theobligatory nature to mix 10 % of alcoholin the gasoline , ethanol began takingplace more and expanding to Bogota. Today Colombia is the “ major thirdproducing alcohol country in America, after the United States and Brazil ” (Oakwood, s. f). It is necessary to stand out, that Colombia has diminished theexports of sugar in average of “316. 000 tons ” (Oak wood, s. f). to countrieswhere he does not enjoy tariff benefits, replacing the exportation sugar withalcohol, extending then the briefcase ofthe sugar sector, generating majorstability to t his union that he hassuffered with the course of the years.

Nevertheless, it is important to exhibit, that there has not been significant thereduction of product ion of sugar inColombia, the cultivation area has beenextended and at present one speaksabout 2 0 % of the productive activity ofthe sugar sector devotes itself to theethanol production. Accordi ng to theAssociation of Sugar-cane (Asocaña), ”

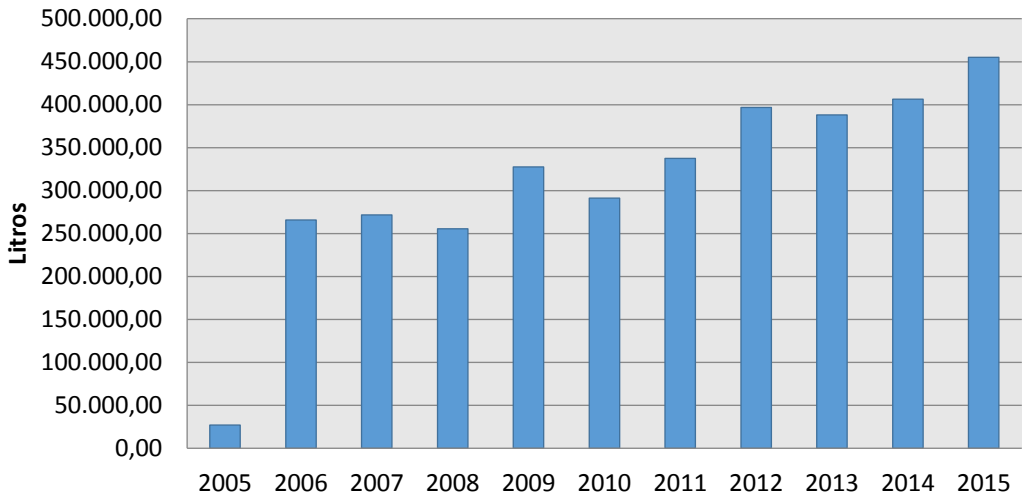
The current ethanol production inColombia is equivalent to havediscovered a well of oil of 16. 000

barrelsfor day superior to the production ofseveral of the wells that Ecopetrolexplores, with the a dditional advantageof which the cane is renewable while awell in Colombia has a useful life that inaverage it does not overcome 15 years” (Oak wood, s. f).

Following the previous thing, Colombiahas come increasing the ethanolproduction during the las t years, that isto say, the offer of the alcohol has beenextended greatly, sample of it isreflected in the information given by theNational Federation of Biofuels ofColombia, in which it establishes t hatthe production of biodiesel extractedfrom the palm of oil, it was ofapproximately 490 thousan d tonsduring 2012, that it represents anincrease of 45 % with regard to theregistered one for the y ear 2010, whenit reached the 338 thousand tonsnumber. For his part, the alcoholproduction fuel (ethanol) was ofapproximately 362 million liters in theyear 2012, compared with 2010, theproduc tion increase becomes of 24.

3 %of 291 million liters brought in this year. The previous results, they wereovercome, after the construction of theplant of production of ethanol in theVale of the Cauca, with both public andpri vate resources, turning in the plantthe biggest Latin America, thanks to theplant and the strengthe ning of the sugarsector, the offer and the demand hasincreased. In the following graph, theethano l production is reflected inColombia.

Image 1. Production of Ethanol2005-2015



Source: Proper making from NationalFederation of Biofuels of Colombia

Although the international trade of biofuelis not of big size and is provided withbarriers of excha nge due to the existenceof subsidies of production, one hopes thatin the medium-sized term it should growsince many countries will not be able tofulfill domestic demand with int ernalproduction.

In accordance with the previous graph, itis possible to analyze that the ethanolproduction in Colo mbia has grownsubstantially,

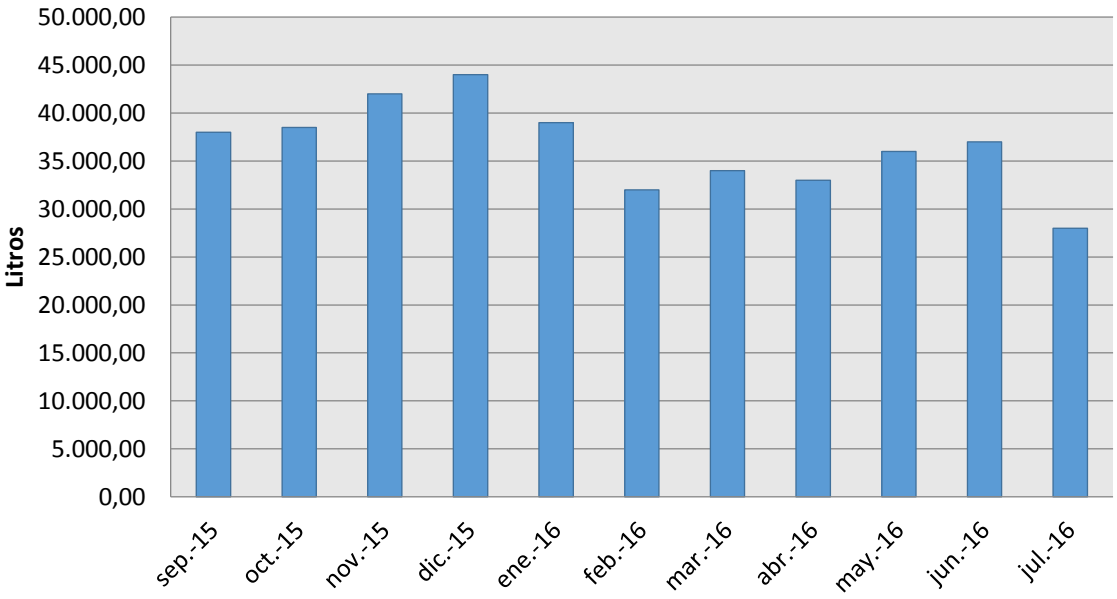
but not only the offer iswide, of equal way, the demand it is, thebiofuels use compared to the foss il fuelshas represented an increase, nevertheless in the last year it hasdecreased the sales of liters of ethanol,

but without to be considered to be anotable fall inside the sector; theimplementation and use of f uels withthe environment to a great extent owesto the contamination, since there hasbeen the foc

us of attention of theinternational community last decades, the Protocol of Kioto established the way across which the emission of CO2must diminish in the ambience, as wellas the gases greenh ouse effect thatevery day have spoiled in planet Earth.

The following graph of the FederationNation of Biofuel of Colombia, it shows howthere have ch anged the sales of liters ofethanol in the last year.

Image 2. Sales of Ethanol



Source: Proper making from NationalFederation of Biofuels of Colombia.

In accordance with the graphspreviously exposed, it is necessary toestablish that the supply and d emand ofethanol like biofuel has had a quiteimportant growth, for what it meanseconomic growt h in sugar areas, as wellas also it allows the revenue and theopening new work places in the coun try, for example it generates at present 30 thousand direct work places and 60 indirect thousand o f which 85 % belongsto persons of the rural area, reducingthe valuation of unemployment as thep overty depending on the case. On theother hand, thanks to the growth of theoffer and the demand the investmentquota on the part of multinational andnational companies also has been majorand

the imports of gasoline to thecountry have reduced from 60 thousandbarrels per day to only thou sand barrelsper day. (Fedebiocombustible, s. f).

1. 2. Biofuel projection by means ofsugar-cane in Latin America.

In the following paragraph américa willgive himself a global description atsouth level and there will be analyzedthe cases most representative ofproduction and sales of biofuel bymeans of sugar -

cane. Firstly, thisproduct has been revolutionary lastyears, has had big reception on the partof se veral countries of Latin America, inside which there stand out Colombia, Brazil, Bolivia and Me xico like bigproducers of this one and in turn, ethanol exporters.

1. 2. 1. Process of securing of ethanol.

For the ethanol production, there isnecessary the implementation of diversechemical and physica l processes, as wellas the specific knowledge of the topic, inaccordance with the Research center ofthe Sugar-

cane in Colombia(CENICAÑA), the process of securing ofethanol is composed by five stages, w hich are the following ones:

1. Raw material adequacy, in the firstprocess, they are mixed and prepare theraw material (c lear juice, cane syrup andhoney B) so that the miscellany ofresultant food expires with th especifications needed in thefermentation (sugar content, solid andtemperature).
2. Fermentation, this is a biochemicalprocess carried out by the yeasts inwhich the present s ugar in the foodmiscellany is transformed into ethanoland dioxide of carbon, principally. Itconstitutes the stage of major care, forbeing in the one that generates theinterest product

. In this stage specifictemperature conditions must manage, pH, concentration of sugar an dnutrients, for the development and goodperformance of the yeasts.

3. Distillation, it is the operation ofseparation of liquid miscellanies in itsprimary constituen ts, by means ofboiling points differences. This skillmakes use that every substanceevapor ates to a different temperaturefrom others. It is carried out in columnswhere the temperat ures difference isachieved adding heat in the fund withteams called rekettles, while, on th e toppart or top, the currents are withdrawnand cooled by teams named condensers.
4. Dehydration, it is the stage of theprocess of production of ethanol fuel inwhich one thinks about how to obtain aproduct of high concentration of ethanol(> 99.
   5 % v/v) withdrawing theremaining water, well be by means ofadsorción skills for molec ular sifters, orusing other skills as the azeotrópicadistillation, extractive distillation orperv aporación.
5. Vinaza concentration, it is the stage oftreatment of the vinaza produced in thecolumn des pojadora; it is realized bymeans of evaporating Flubex, teams onwhich the vinaza concen trates from 8 %and 15 % up to 25 % and 45 % by means ofevaporation of the water conta ined in thecurrent. It uses as a fluid calefactor thesteam of leakage of cauldrons.

It is like that, how across the processesmentioned previously, the ethanol isobtained. In Colo mbia today, “

thereexist six producing plants of ethanol, one in Elevated place, Vale of the Cauca; two in P almira, Vale of the Cauca; one inCandlemas, Vale of the Cauca; one inVirginia, Risaralda; o ne in Canta Claro, Port López, these produce about 1. 075. 000 of liters of daily ethanol” (Colombia).

For his part Brazil produces approximately “700 million liters of daily ethanol” (Petrobras, s. f). , thanks to theinvestments of the private sector in theconstruction of plants p rocesadoras andsowed hectares. Being both countries you promote in South America in the et hanolproduction.

1. 2. 2. Main producing ethanol countries in Latin America.

The sugarcane cultivation in differentcountries of Latin America, they haveincreased, and it h as been cultivated bydouble intention, firstly, for the nutritiveand second consumption as esse ntialelement to produce biofuel.

The first country in producing bioethanolwas Brazil, it has roots that go back tothe beginning of the colonization inBrazil. The favorable climate and the bigavailable extensions of ground did thatthe cane plantations were turning intothe base of the economy during the socalled cy cle of the sugar-cane, from theXVIth century. As fuel, the sugar-caneethanol began receiving importance atthe end of the twenties, mixed with thegasoline, an d happened to beconsidered to be an alternative to the oilderivatives during the world supplyi ngcrisis, in 1973. The throwing of theNational Program of Alcohol (Pró-Álcool), at the end of the seventies, marked the beginning of an energyprogram based on the ethanol. With thegovernmental incentives, in 1989 theywere already circulating in the countr ynearly 4 million vehicles moved byethanol, a third of the Brazilian fleet ofthat one then. Als o, in its trajectory toturn into a world commodity, thedevelopment of the so called celluloseet hanol, or of the second generation, itwill be fundamental. The main benefitwill be to increase the ethanol quantityproduced without extending the areaplanted with raw material.

For it, the strategy includes the use ofresidues, like the bagasse of cane, inBrazil the bets for t he ethanol of thesecond generation concentrate on thebagasse and on the straw of the cane, w hich are cellulose sources andrepresent two thirds of the energypotential of the head office. A ccordingto Juliana Vaz Bevilagua, coordinatingcommittee of TechnologicalManagement and PetrobrasBiocombustible, “In Petrobras, thestudies had beginning in 2004.

The main advantage of the bagasse is inthe logistics, then, as it is a question of aco-product of the cane that is alreadyavailable in the head office, there is noneed to implant infra structure ofharvest and of transport ⋯ Nowadays, avery good cane plantation produces 8 tho usand liters of ethanol per hectare. With the ethanol of the secondgeneration, the target is to i ncrease theproduction in up to 40 % withoutplanting one only more foot”

. Atpresent, the bagasse and the straw areused in the generation of steam andelectricity in the head offices, doing thatthey are autosufficient in energy. Somehead offices also export the ex cessiveenergy to the electrical network.

(Petrobras, s. f). , in addition to keepingon being the second producing countryof the world fo llowed by the UnitedStates, “

nowadays, Brazil producesevery year 27 million liters of ethanolfrom the sugar-cane.” (Pennsylvania,

2016). Although the heyday of thebiofuels is in growth, Brazil hasdiminished its production during the last6 years, shows of it, turns out to bereflected in the reduction in the plantsconstr uction for the ethanolmanufacture, “during 2013-

14, onlythree new ethanol factories wereconstructed, compared to the 30 of theperiod 2008-

2009. The yield of theconventional production stagnated inabout 6. 000 liters per hectare" (Pennsylvania, 2016).

Of the previous thing, it is possible toexhibit that even if the ethanol is aproduct with enough demand fordifferent countries, the reduction of theoil price has generated the preference tothe fossil fuels, opposite to the biofuels, this is one of the reasons for which Brazilhas diminished its production in the lastyears, highlighting that, although theproduction is less, this one keeps onbeing superior to the Colombianproduction.

In the same way, Brazil has been one ofthe states that more he has invested inthe ethanol production by means ofsugar-
cane, in addition to establishing, that the hectares cultivated for use ofbiofuel do not affect in the sugar-canecultivation like food, then, inSeptember,
2009, a decree approved bythe Presidency of the Republic createdthe Zoning Agroecológica of the Sugar-
cane (ZAE Cane), which regulates thesustainable production of the cane inBrazil and indicates the regions mostadapted for its cultivation. Thepreservation of the nature and thedecrease of the deforestation are part ofthe priorities of the ZAE Cane, whichdelimits the regions in which it ispossible to expand the cane plantationfor the ethanol production without usingirrigation mechanisms, which allows thesustainable growth together with thecultivation which ends to turn theminto food (Petrobras, s. f). . NamelyBrazil has been constituted as itpromotes in producer and exporter ofethanol so much of the first as of thesecond generation, without reducing thefundamental food agriculturalproduction for the country.

Another producing ethanol country bymeans of sugar-
cane, is Colombia, thisone has been becoming stronger withhappening of the years, in fact, at

present it is provided with the mostmodern producing ethanol plant in theworld (Herald, 2015), what influencespositively the national economy, also inthe numbers of employment in Colombia. Today in Colombia, thegasoline is mixed by ethanol, situationthat expands the pro duction and sale ofthe biofuel.

The country, it is provided with a wideethanol projection, nevertheless, in thespheres of the b usinessmen, they areafraid that imports originated from theUnited States, they were affecting thenational market, for the large number ofthe product in national territory. On theother hand, in Colombia the topic hasalready been analyzed and the firstpinitos have happened.

Of a side, the Bank of the Republic in2014 published a document (Drafts ofEconomy N° 8 36) where the topictalked each other and the tax appears tothe carbon like an effectivemeasur ement to control the climatechange and to avoid impacts in the IPCfor the changes of price of the food. Ofequal way, the Mercantile StockExchange is promoting a platform, which is rea dy, to trade carbonreductions on the voluntary market. Thecertificates emission is missing on ly. Thebest way of stimulating this market isdoing a demand or generating a cost, how, for ex ample, a tax to the emissionof carbon (Martinez, s. f). , done thatgoes to be a reality in the ne xt tributaryreform that will present the Presidencyof the Republic to the Congress of theRepu blic, where there interferes a newso called tax, green tax, which will turnout to be reflected in the gasoline anddiésel that the Colombian populationcompletes.

At present, about 40. 000 hectares ofplantations of sugar-
cane are dedicatedto the bioethanol production. Inaccordance with the study, a bigexpansion potential exists of up to 1,518million hectares, which are classified ashighly suitable, and up t o 3,4 millionhectares of classified areas asmoderately suitable. César'sdepartments, Cordova and Magdalenare identified like highly suitable areasfor the sugar-

cane cultivation, whilemost of the areas moderately suitable isin the Oriental piedemonte of t hemountain range of the Andes, in theGoal and Caquetá (Spectator, TheSpectator, 2015).

The third country with major ethanolproduction in Latin America, isArgentina, completing th is way threecountries in the top of the biggestproducers in the world, as the EconomicCommi ssion expressed it for LatinAmerica and the Caribbean Sea (CEPAL) "

Brazil, Argentina and Colombia are theonly Latin-

American countries thatappear between the main producers ofbioethanol and biodiesel of the world, according to information of the laststudy on biofuels" (CEPAL, CEPAL. ORG, s. f).

The Department of Agriculture of theUnited States, it has expressed that Thebioethanol prod uction in Argentina forthe year 2015 and 2016 is projected in800 and 900 million liters, respe ctively. Of these numbers materialize, onewould be in the presence of a realproductive record at national levelbecause in the year 2014 the Argentineproduction would have amounted to 6 70 million liters. According to theDepartment of American Agriculture, the increase would o bey the goodmargins of the sector,

because theproducers sell the oil companies atofficial and these prices they have beenreasona ble to increase the offer. In caseof the sugar-

cane, one hopes that theethanol production should keep onbeing more profitable than the sug arproduction, principally due to the lowinternational prices of this raw materialand the big lo cal volumes of productionthat enlarge the stocks.

In 2016, the USDA hopes that theArgentine sugar industry should providehalf of the producti on of bioethanol, while the factories that use grains (corn) would generate 50 % remaining. T heethanol industry based on sugar-

cane islocated in the provinces of the Argentinenorthwest, while most of the plants ofethanol

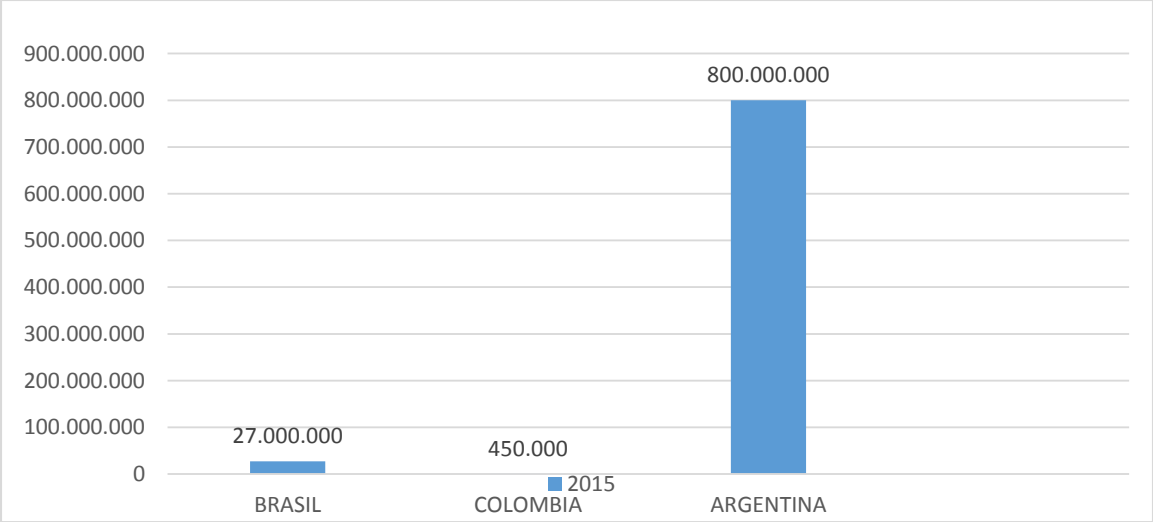
based on grains are placed inthe central part of the country, wherethe sowing is located and h arvests ofcorn and sorghum.

The USDA indicates, also, that in case ofthe bioethanol produced from sugar-cane, this product allows him to theingenuities to diversify its productionand have a producti ve alternative, depending on the size of the harvest andof the level of the international prices ofthe sugar. Argentina is autosufficient insugar and normally he arranges avolume of signific ant surplus to export(Frattini, 2015).

Nevertheless, one does not hope thatArgentina exports bioethanol in 2015 and 2016 principal ly because most ofthe provisions of the country areconsumed on the domestic market andthe local producers are focused insupplying the profitable local order. Also, the low international prices of theoil and the high local costs of productiondiscourage the exports. Once the courtr equirements were implemented in2010, the Argentine exports of ethylalcoholes fell down sig nificantly and theproduction surplus re direccionó tosupply the local requirements ofbioethan ol that are more profitable.

Before the order, Argentina wasexporting 60-80 million liters of ethylalcoholes (not for combustible use) peryear. The exports in 2014 tota lized 14 million liters, with Chile being the maindestination. The imports of bioethanolfrom t he countries of the Mercosur(including Brazil) are duty-free and theexternal countries to the block pay 20 %.The exports are burdened by 5 %, butthe y receive 4,05 % of reinstatement(Frattini, 2015).

Image 3. Sales of Ethanol ethanolproduction by means of sugar-cane (liters)



Source: Proper making

In accordance with the previous graph, itis possible to analyze the differences innumbers of prod uction of ethanol bymeans of sugarcane in the threebiggest countries of producers of LatinAmeri ca, the previous thing must beexamined set to the governmentalsupport that has grown in Argenti natowards the producing biofuel union, giving positive results, while in countrieslike Colombia, a stagnation is observedin the production because of diversefactors inside which there is the abse nceof state support and major incentives tobiofuels producers. For his part, Brazilproduces a con siderable quantity ofethanol of the first generation, focusingat present in the production of ethano lof the second generation, which wasexplained previously.

1. Agribusiness sector of sugar cane in Colombia.

The Colombian sugar sector is located in the geographical valley of the Cauca River, which covers 47 municipalities from the north of the department of Cauca, the central strip of the Cauca Valley, to the south of the department of Risaralda. In this region there are 225,560 hectares planted in cane for sugar, of which, 25% corresponds to lands owned by the mills and the remaining 75% to more than 2,750 cane growers.These growers supply 13 sugar mills in the region (Cabaña, Carmelita, Manuelita, María Luisa, Mayagüez, Pichichí, Risaralda, Sancarlos, Tumaco, Ríopaila-Castilla, Incauca and Providencia). Since 2005, five of the thirteen mills have attached distilleries for the production of fuel alcohol (Incauca, Manuelita, Providencia, Mayagüez and Risaralda). Thanks to the privileged climate of the region, and unlike in the rest of the world (except Hawaii and northern Peru), cane is sown and harvested during all months of the year. This agroclimatic condition, added to the technological advance promoted by the Research Center of

the Caña (Cenicaña), which works with the contribution of all the cultivators and mills, has led the region to specialize in cultivation and hold the leadership in productivity Worldwide: more than 14 tons of sugar per hectare per year (ASOCAÑA, sf).

In Colombia, in 2013, 2.12 million tons of sugar were produced from 21.56 million tons of sugarcane. Of fuel alcohol was produced 387 million liters, destined to the mixture with gasoline in an E8 proportion (8% ethanol, 92% gasoline), according to the mandate of oxygenation established by the government since November of 2005. At present Covering the entire national territory.

Domestic consumption of sugar in Colombia was 1.69 million tons, destined for 52% of direct consumption in households and 48% for the manufacture of foodstuffs, beverages for human consumption and other industrial products. In 2013, 671 thousand tons of sugar were exported, of which 66% went to Chile, the Caribbean Islands, Peru, the United States, Haiti, Mexico and Bolivia. The rest of the sugar was exported to multiple destinations around the world.

1.1.1 The production of ethanol-based sugar cane and employment.

The productive chain of ethanol generates a number of different jobs (skilled and unskilled, agricultural and industrial, direct and indirect, etc.), but the main impact on employment is perceived in sugarcane crops in the agricultural sector. In sugarcane crops the amount and type of labor required varies significantly depending on the level of mechanization of the crop. On the one hand, in traditional non-mechanized crops, labor intensity is higher because of cutting and most jobs are unskilled. On the other hand, mechanized crops are less labor-intensive and workers with a certain degree of technical knowledge are needed to enable them to operate the machinery in the crop. It is estimated that in a non-mechanized crop approximately 0.235 direct jobs per hectare are used (taking into account the tasks associated with land preparation, cultural work and harvesting),

while in a mechanized crop approximately 0.028 jobs are generated per hectare, 12% of all jobs generated in a traditional non-mechanized crop.

This is because manual harvesting requires approximately 40 people per hectare for 8 hours, while mechanized labor requires an average of 5 people per hectare for 4 hours. In Colombia, 25% of the crops are currently mechanized, but the tendency is for the cutting work to be mechanized more and more.

Fedesarrollo carried out the study "Socioeconomic impact of the Colombian sugar sector on the national and regional economy" in which it analyzed the employment dynamics of the sector. The study finds that the sugar sector is an engine of rural development and a generator of important employment both direct and indirect.

1.1.2 Production of biofuel vs food production.

Biofuels currently occupy a special place as a source of renewable energy, are considered important for energy security and a resource for the diversification of energy sources. Biofuels are also considered to contribute to agricultural and rural development, generating employment opportunities in associated sectors, ie agriculture, industry, infrastructure and research; As well as a way of helping to mitigate climate change by reducing greenhouse gas emissions from transport, generating less atmospheric pollutants at the local level. They are perceived as a means to increase the efficiency of food systems by increasing productivity, for example through the use of agricultural wastes and wastes, while generating additional income for farmers if they achieve better market access.

Biofuels have also raised concern about environmental problems including biodiversity, often due to conversion associated with monoculture, increased deforestation, threats to natural reserves, and increasing pressure on water supply And the quality problems of the same. In a report by the

high-level group of experts on food security and nutrition, they said that "in a context where there are currently one billion undernourished people in the world and, according to FAO estimates - and without regard Biofuels - food demand is likely to increase by 60-70% by 2050 due to demographic developments and the effect of economic growth.

There is also concern about the significant food and waste losses estimated by FAO (2011) in approximately one-third of the world's food for human consumption each year, equivalent to about 1.3 million tonnes (far more than The amount of corn currently used for ethanol production) "(Nutrition, 2015).

There is also a long-term concern that, if fuel prices rise faster than agricultural products, the long-term interest for land use for biofuel production will increase, with the potential risk On food prices and the amounts of biomass available for food.

1.1.3 Investment policy in the agroindustrial sector of sugarcane in Colombia.

Although the sugar sector in Colombia is of great importance in the national economy, there are few incentives offered by the National Government to this agroindustry. However, several incentives have been structured that help to advance and produce this type of product. According to the document of the National Council of Economic and Social Policies, CONPES 3510 has been granted to the sugar sector the following benefits mostly tributary:

1. E n xenci or income tax tard crops í or performance.
2. No exemption or sales tax (VAT) for biofuel intended for mixing with fuel f or fossils.

3. No exemption or the overall rate on fuel for fuels intended for mixing with fuel f or fossils.

Similarly, in the same document, the National Council of Economic and Social Policies, recommends to the government to offer incentives for biofuels in the following:

1. Agroindustrial Free Zones.

2. Stability Contracts Jur í dica.

3. System or import or export ny n "Vallejo Plan".

CONPES 3510 approved the policy guidelines to promote the sustainable production of biofuels in Colombia. This document highlights the following points:

A. Competitively increase the production of biofuels or sustainable n.

B. Promote productive development alternative for the occupation or formally n rural land.

C. Contribute to the generation or n of formal employment in the rural sector.

D. Position the pa í s as an exporter of biofuels from the consolidation or n of this agribusiness as a world class sector.

E. Diversify energy THICS basket of pa í s through production of biofuels or efficient n.

F. Ensure environmental or sustainable ñ PERFORMANCE.

G. An nalysis peri doctor or mixtures of increasing, necessitating the ruling or n by the Ministry of Mines and Energy ay mixtures to control the pa í s.

The foregoing in order to mark and provide the possibilities for the development of the sugar sector, which is affected many times by the stabilization of the price of sugar, and according to ethanol ethanol, is opening the way to the use of 100 % Of biofuel, since much of the sugarcane ethanol produced in Colombia is mixed with fossil fuel, gasoline, in order to obtain the tax benefits that the Government has offered.

However, according to the Sugar Cane Association, the production of sugar cane in Colombia does not receive any subsidy, if it receives incentives, but not subsidies as if they receive the coffee growers. The association states that competition in the international sugar market is unequal, since Colombian producers only have the general protection of the tariff of the Andean system of price bands, which varies according to international prices and sometimes reaches zero. While the world 's largest producers of sugar as Europe, the United States, Mexico, India, Brazil and Thailand have permanent and high tariffs in most cases, import quotas and domestic subsidies framed by ingenious policies to support their producers (Country, 2015).

Leaving aside government investment, the sugar companies, accelerate integration in a better position to face the domestic and international competition, so one of the most representative companies in the market, Mayagüez, signed an agreement to buy 60.5 Percent of the outstanding shares of the firm Carlos Sarmiento L & Cía. Ingenio San Carlos. The acquisition also responds to a plan put forward by the company, for 600,000 million pesos, to buy more production plants. It is one of the most representative companies of the Cauca Valley, which, although it started producing panela, is today an industrial complex that manufactures sugar, ethanol and organic fertilizer, and generates energy based on bagasse biomass. With this operation, Mayagüez SA will achieve a share of approximately 14 percent of total sales of sugar in the domestic market (TIME, 2014).

Also, the sugar Riopaila Castilla, launched the fuel alcohol distillery which claims to be the country's largest. It will have a production capacity of 400 thousand liters per day of biofuel. The project had a total investment of 133 million dollars; $ 74 million was allocated for the construction of the distillery and an additional $ 59 million was invested in the construction of an energy cogeneration plant. The latter will become the main source of energy for the company itself and will serve as an electricity supply for other sectors (Heraldo, 2015).

From the above, it can be stated that the sugar industry in Colombia has several incentives for the production of sugar and ethanol, but it does not receive subsidies in order to increase its productivity. On the other hand, the companies of the sector with their mills have Joined with others to capture the greater part of the national market and occupy a considerable position in the international market.

Regarding sugarcane as a base element for the production of ethanol, it must be emphasized that this sector of the economy is growing day by day and Colombia is currently in possession with Brazil, Argentina and Mexico, as the countries with the highest Production of ethanol in Latin America, increasingly opening the possibility of investing public and private investment capital, which benefits the national economy, therefore.

4. Findings.

Within the investigative process, there were several findings that could be found and outlined throughout the work. The main finding was the growth of the demand for biofuels in general and in the specific case, ethanol based on sugar cane, since it is a product that offers the environment greater benefits than fossil fuel, A reduction of more than 50% of the greenhouse gases that are the main gases that are deteriorating the ozone layer is estimated, in addition, of the increasing supply of the same; In Latin American countries such as Brazil, Colombia and Argentina, are focusing on the production of ethanol based on sugarcane to compete internationally with countries such as Germany, India, Thailand and the United States, which are potency in production And export of biofuels. The potential of Colombia as an ethanol producing country was also seen, finding that it owns the most modern ethanol production plant in the world, which will bring more development and investment to the sugar sector, thus offering more direct and indirect employment in ethanol. country.

Following the above, the production of ethanol based on sugarcane represents the implementation of thousands of people working on it, which was reflected in the figures of direct and indirect employment that companies require to be able to manufacture and produce ethanol, Which means that, with the possibility of providing more employment, poverty rates in areas where sugar cane is grown are considerably reduced.

However, even with the boom in ethanol production, the Colombian National Government's aid in the sector is few, the National Government has given incentives to ethanol producers who are mostly taxed, but the sugar sector also requires Subsidies to maintain the economy of the sector, since in many cases this is made difficult by the low prices of sugar, then there is the discussion that is currently in force, which is the production of biofuels is putting at risk food security Of the

world. As sugar prices are affected in this case and biofuel prices are increased, entrepreneurs would be focused on producing biofuels mainly because of the higher price, with a negative impact on food production.

5. Conclusions and recommendations.

5.1 CONCLUSIONS

According to the research carried out, it can be concluded that biofuels worldwide are being used more and more, mainly because they are cleaner with the environment, which helps to preserve and reduce the global warming that today affects the community international. Biofuels are being produced by various foods such as corn, oil palm, beets, sugar cane among others, which are less expensive than petroleum fuels.

At work he focused on biofuel ethanol based on sugar cane, which has been being produced by Colombia for decades. Ethanol in Colombia has positive projections in both supply and demand, Colombia is one of the countries with the highest production of ethanol in Latin America, followed by Brazil and Argentina. Thanks to the high demand of biofuel, in the last years three ethanol-producing plants have been built in the country to improve the quality and quantity of monthly liters of alcohol, the Riopaila Castillo organization, built with private public alliance, the production plant Of the world's most modern ethanol, taking a step forward with respect to South American countries, and like the organization Riopaila Castillo, other business groups have invested in the sector in order to occupy privileged positions in national and international sales. This has a positive impact on the generation of employment, since one of the great advantages of biofuel production is the large number of jobs that are generated both directly and indirectly, affecting poverty reduction, thus fulfilling part of the social function Which as companies have to materialize.

In Colombia, ethanol is produced mostly to be mixed with gasoline, as the National Government has issued a law in which it obliges refineries to mix gasoline with a percentage of ethanol, to minimize the negative impact generated by the gases Pollutants produced by fossil fuels.

Similarly, we must make a call to the international community for food production, as the United Nations Food and Agriculture, has on several occasions the chance of putting food security at risk Sectors of the world, as well as the elimination of biodiversity and ecosystems due to the cultivation and production of biofuels.

Finally, it is important to express that in Colombia the use of biofuels must be implemented, as it has been proven in other parts of the world, it is much cleaner and cheaper than those derived from petroleum, which would improve the quality of life of both The people and the animals that are in the zone of South America, understanding that the pollution is a phenomenon that is not static, but on the contrary expands by all the planet affecting to all the population. It should be emphasized that the implementation of biofuels must be responsible, so it is necessary to issue plans, programs and laws for the protection of hectares of land for food crops and to limit the hectares of land for the production of Biofuels, thus providing food for the Colombian population.

In this way, it can be established that Colombian sugar cane producers do not have the support of the National Government to improve the sugar infrastructure and ethanol production to improve the production practices, quantity and quality of cane derivatives of sugar. For this reason, Colombia's positioning in the international market as a strong competitor in comparison to other countries in the region is similarly non-existent in the medium and long term.

5.2 Recommendations

In order to reduce the pollution that so much affects the Planet Earth, it is necessary the implementation of clean energies with the environment; Energies such as solar, wind are energy samples that are friendly to the environment and offer the same result as the electrical energy that contaminates to a greater degree; The same applies to biofuels, the use of biofuels in the world must be increased, in order to reduce the gaseous pollutants to the ozone layer. Setting the highest recommendation, which is both environmental, social and food protection of the world 's populations, preventing the production of biofuels, generate the displacement of rural populations or food leaned back sob.

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