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"Agricultural development in Latin America and its influence in climate change"

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ABSTRACT

In this paper I will describe what is an agro-industry, its different classifications and types; also explain the reasons for being of an agro-industry, as well as the damage it causes in our atmosphere produced by these human installations. One of the most discussed topics in this project is climate change, which triggers a series of phenomena such as the greenhouse effect and the direct passage of ultraviolet rays . I will also compare the different Latin American countries, their agricultural productions, their annual income and the percentage of damage to our ozone layer.

You can also find a description of the consequences produced by this effect, in the living beings that inhabit this region, and even in the economy of a country. In this monograph, different solutions are offered to avoid or reduce the damage caused by the agro industries, to the minimum; and in some way to raise awareness among workers of these to carry out their work correctly and not harmful to our environment.

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INTRODUCTION

This work is a research about the effect on the environment exerted by the various techniques used in agro-industries of Latin American countries, and is intended to inform people and owners of agricultural enterprises on this issue, to seek a way of eliminating the damage caused to our atmosphere and thus avoid a number of drawbacks that could affect the health of the inhabitants of these regions.

Our atmosphere is the only thing that protects us from ultraviolet rays and other space objects; several studies have been conducted on the amount of methane gas that is detached from the feces of cattle, this component causes wear to the point of causing unexpected changes in the climate and burned by the sun, both in the vegetation and in the skin of human beings.

Many scientists and ecologists ignored this issue, leaving it almost without importance. The problem is that the agro-industries causing a 43% damage to the ozone layer, thus being one of the main causes of wear. Studies conducted by the University of Oxford say that if in the agricultural fields will be monitored over the amount of stool defecated by livestock, would reduce dramatically the rate of dry crops, which would increase the quantity of agricultural products for both the internal and external market, which would give us an increase in the economy of the region.

It is important to know about this topic in our country because unfortunately we are losing little by little, our Earth's atmosphere, and somehow try to correct methods of raising cattle. In this paper we are going to address issues such as, what are the Latin American countries with the greatest livestock production and that amount of methane release every one of those animals.

Also consider different solutions that can be applied in some of our Ecuadorian agro-industries, which are separated according to their price and accessibility.

Chapter I

Agro-industry

1.1 What is agro-industry?

It is a type of industry related with the agriculture. If we want to know what an agro-industry really is first we have to separate the word in two different meanings. An industry consists in an infrastructure and a group of workers that transform the raw material in products. And the agriculture are the activities that we do to take care of the soil where we get that raw material.

So an agro-industry is a combination of the process that we make to harvest raw material and then take it to a group of men in charge to transform it on a product that will be sold in the common markets. Some of them are for exported to other countries.

Many Latin-American countries are very advanced in the area of agro-industry, because it is one of the few business that gives its owner a lot of money, but as it is very good for increasing the incomes, it is harmful to our atmosphere. This type of work is considered one of the reasons why we are losing the ozone layer and causing a lot of trouble to the living beings of our planet.

1.2Classification according to their productivity in Latin America

According to some researches there are several agro-industries in Latin America that produce about 25% of the total amount of farm products in the world, being one of

the most serious causes of the greenhouse effect of our planet. The most important Latin-American regions are Uruguay, Paraguay and Argentina, which are considered the responsible of the bad techniques used at the time of working in the agro-industry.

1.2.1 Uruguay.

According to the National Meat Institute in October, Uruguayan beef was placed on average at US $ 4,290 per ton, the production of 2.9 million calves this year is a record and that of the next two years will remain high. Uruguayan livestock has the largest vaccine population in history, and not only that. The number of cattle in Uruguay will continue with an accelerated growth after the next years, which will put an arduous challenge ahead. For the first time since Hernandarias, the Eastern Banda of Uruguay harbored 12 million cattle in mid-2017.

1.2.2 Paraguay.

The meat industry in Paraguay has been boosted significantly in recent years. The Guaraní country has opened markets and its products have become renowned throughout the world. Therefore, the number of cattle increases every year. According to World Bank estimates, in 2015 there were 6,639,000 people in the country. At the same time, a memorandum from the Ministry of Livestock estimates 14,465,581 heads of cattle in the territory during 2014. The ratio is 2.17 cattle per Paraguayan.

1.2.3 Argentina.

In 2014, according to the population estimate of the Institute of Statistics and Censuses (INDEC), 42,669,500 people lived in the entire territory of the country, published by the newspaper La Nación, which listed 51,500,000 bovines during that year. This implies 1.2 per inhabitant of the southern country. Unlike Uruguay and Paraguay, in Argentina the existence of head of cattle was reduced. Official data estimated that 39,356,383 of the human population in 2007 corresponded to 58 million cattle in the country: at that time there were 1.4 cows per person.

1.3 Index of consumption and aggression to the environment

Because the human beings consume different types of raw materials, the factories and agro industries are in constant work, being one of the most frequent reasons for the loss of our atmosphere. “We humans consume a ton of raw material every day that the agro-industries have to produce a lot of those materials, causing constant damage to our atmosphere” (Goodall, 2010, p.345).

From 2010 to 2017, there have been different variations in the food consumption of the Latin-American population. Within the first 5 types of crops and livestock are: beef, wheat, chicken breast, eggs and rice.

The production and raising of cattle is above 35 million for each of the cities mentioned above, thus being the most important reason for the operation of an agro-industry and

also the cause of the greenhouse effect of our atmosphere. This happens thanks to the fact that each one of the cattle releases, when defecating, a 35% percentage of methane gas that is stored in our atmosphere and destroys it causing the problems that are commonly known as: thaws, skin cancer, burns, forest fires, etc. The same also applies to the other type of animals like chickens or pigs.

For the care and distribution of vegetables and fruits we have a production above 25 million for each of the cities mentioned above, this includes the production of rice and wheat. The reason why this is a problem is because to process and distribute these crops it takes several weeks of work within the agroindustry, which releases an amount of 67.5% of carbon dioxide that destroys the ozone layer and causes the consequences mentioned in the previous paragraph.

Chapter II

Climate change

2.1 Amount of stool produced by cattle

As we mentioned earlier, it is estimated that an amount of 25 million cattle are raised annually in the Latin American region. The amount of feces varies per day, being on average about 5 times per cow. Each of these, at the time of defecation, releases a 35% amount of methane gas that affects our atmosphere, thus being the most frequent cause of its degradation. We also have to consider other types of cattle like chickens and pigs that also

emanate an amount of methane to the ozone layer, being not just one problem but three. “Some agricultural engineers do not take into account the seriousness of the release of methane gas into our atmosphere and do not know the good that they would do if they learned the necessary techniques for good cattle breeding” (Johnson, 2009, p.32).

2.2 Effects on the environment

There are several problems that affect our environment, between them we have forest fires, thaws and even skin cancer; but the one that we are going to study deeply is climate change. We all know what will be the climate of a day thanks to the weather channel, but what if it were unpredictable and harmful to our health?. Scientists of the University of Cambridge have discovered that the damage produced in our atmosphere is one of the main reasons why this phenomenon happens.

This change in climate is due to the fact that the deterioration of our atmosphere allows solar rays to pass directly over areas such as oceans and glaciers, thus causing a massive amount of evaporated and subsequently condensed water that will fall on land in which human beings we sow and harvest our raw material.

Another reason why this phenomenon occurs is that the waste from the farms, like manure and rotten food create an excessive volume of gas that rises to our atmosphere and mixes with the rains creating what is commonly known as rain acid, which is harmful both to living beings and to the soils and lands that we have.

This problem brings with it a series of “sub-problems” that affect in different fields, our environment and the living beings that inhabit it. Some of them will be explained below.

2.2.1 Deterioration of the ozone layer.

It is called the ozone layer, or ozonosphere, the area of the Earth's stratosphere that contains a relatively high concentration of ozone, gas composed of three oxygen atoms (O3). "Relatively high" means a few particles per million, much higher than concentrations in the lower atmosphere but still small compared to the concentration of the main components of the atmosphere.

Scientists say that the wear of the ozone layer is due to the gases found in the air such as methane and carbon dioxide, which forces the ozone particles to separate and leave gaps in their layer, which allows the passage of ultraviolet rays directly on Earth. Among the most harmful effects we know are skin burns, cancer, inflammation of the cornea and conjunctivitis.

2.2.2 Erosion of fertile soils.

Within the effects on the environment we find one that perhaps we do not take much into account, however it is the main reason for the amount of crops lost annually, and also the loss of land that could be used for future plantings; we are talking about the erosion of fertile soils. First of all, an eroded soil is one that has lost all its fertile qualities and therefore cannot be

planted there; this happens due to three factors. The first is the direct passage of ultraviolet rays on these soils, forcing them to dry and lose nutrients necessary to develop life in it.

The second is due to the changes in the climate, produced by the same deterioration of the ozone layer, forming acid rain that destroys the vegetation and annuls all possible life in that terrain. Another possibility is an excessive amount of rain that will overflow the water levels accepted by the crop and cause them to drown, causing them to die and also not allowing them to be planted there again.

2.2.3 Greenhouse effect

The greenhouse effect is a phenomenon that causes ultraviolet rays to create heat waves and these in turn stay locked in our atmosphere generating more and more heat, to the point of generating problems such as overheating of soils and thaws. For many human beings it does not matter, but the greenhouse effect is the main cause of the loss of the natural habitats of animals, leaving them without a place to live. measures have already been taken in this regard as zoos of species in captivity or even moving animals from one habitat to another, but it will never be able to repair 100% the damage caused by excess heat on our planet. The main cause of this phenomenon is the storage of unnatural gases in the last layer of our atmosphere, thus blocking the heat output of this. Among these gases is methane, carbon dioxide, chlorine particles and boron particles.

2.3 Effects on the population

The governments of different countries have spent a lot of money trying to preserve, in the best way, the health of its inhabitants such as: vaccines for H1N1, fumigation of

forests and crops, hygiene campaigns, etc. But what they still do not realize is that this inverted amount is useless if they do not pay attention to the damage they are doing to the ozone layer. Being such a big problem, it has different derivations that affect different fields of our society. Among those are the economy and health. All of them threaten the destruction of our society and all those who inhabit it.

2.3.1 Fall of the economy.

At the moment of losing a land and all its fertile capacities to be able to sow in it, at the same time a lot of money is being lost.

Many people do not take into account the amount of money that is used when planting or raising livestock. It is established that among the 3 countries of Latin America, with the highest cattle and vegetable production, a number of 25 million livestock and crops are approached that are sold annually in the domestic market or exported, and produce an incredible amount of income to each of them. The previously mentioned countries; it is estimated that it is over $ 336,000,000 dollars each year. If we think about what would happen if all those crops and animals died unexpectedly and inevitably, we would realize that we would be losing an extremely important amount for each country.

That means that the country would lose prestige and that it would no longer be recognized internationally with a stable economy. It will also cause seizures within government activities, they would have to use money destined for other works in order to recover the lost, the

taxes would rise and salaries would have to be lowered in order to prevent the economy from breaking and the balance to be lost.

Different government activities will have to be stopped, among the most common are: road construction, hospital financing, salaries, and others. Which would cause the inhabitants of those countries to get angry with their model of government and opt for a re-election of their leaders, which would not benefit any of our leaders.

2.3.2 Impact of public health.

As already mentioned, the destruction of the ozone layer causes problems in the lives of the beings that inhabit the regions affected by the unexpected changes in climate. Among the most common problems in people are burns on the skin, caused by both ultraviolet rays and the direct fall of acid rain in the human body.

For many this does not represent a serious illness, since it can be treated and cured in due time; but what the common denominated of people does not take into account is that this type of burns almost always ends in skin cancer, being thus one of the most serious consequences that the human being knows. To avoid this terminal illness it is necessary that the people know the measures of prevention against skin burns, which are: always use sunscreen, carry a UV blocking umbrella, and use a cap.

Among the problems brought about by climate change is the intoxication of crops and livestock that society consumes daily. Many times agriculture does not take into account the factors that affect animals and plants for human consumption, which is why they send the raw material to the factories and these to the markets without previous revision. This causes people who consume this food to get sick, which can trigger a series of traumas or even death. That being the case, the people would have to spend more money to cure their illnesses than buying food that we usually trust will be good for our health.

2.3.3 Unemployment.

The most common problem in the farms and industries is the loss of work and personnel due to the shortage of agricultural products to send to the market. If for any reason, the crops and livestock were affected by the change in climate, and nothing could be saved; the agricultural companies would start having problems with their employees because they could give them work or salary for that period of time, then they would enter into what is known as bankruptcy and they would have to close. This will cause thousands of people who depended on that company to lose money and start having problems with their economy.

Many people will go into poverty due to lack of wages and will begin to suffer different needs such as hunger, thirst, lack of clothing, loss of homes, illnesses due to lack of hygiene, and others.

Chapter III

Solutions

3.1 Collection team

One of the quickest and least expensive solutions of all is to hire a trained team to collect all these waste that the farms and factories leave when they carry out an agro-industrial process.

Generally, a cleaning team costs us $ 300 per person depending on how many hours you work and the type of material that will be collected, that is, if it is harmful to health or not. These people will be responsible for collecting in a certain area the waste left by animals and plants that give off harmful gases to our atmosphere, and thus avoid their destruction and possible future problems. The equipment will have the machinery and special places for the transfer of the waste, then dispose its use for the creation of other human goods such as manure, fertilizer or even acids extracted from bovine feces.

3.2 Cleaning area

Within the farms a controlled space is designated for the raising of cows, pigs and chickens. This place must be done on artificial terrain that allows the floor to be removed, as if it were a synthetic soccer field or a carpet, to be able to take with it all the waste that the animals leave there. After having picked up the giant carpet, it is discarded in a place where the gases it contains do not affect the environment and can be eliminated without any complications. Again this artificial floor is placed, and the cattle is moved to it again.

It is necessary to have two artificial terrains at once, since it is impossible to determine at what moment the cattle will defecate while changing the new "carpet". It is estimated that the price of these artificial flats is estimated at $ 10 thousand dollars per 10 hectares, the price may vary depending on the land and the region in which the farm is located.

3.3 Dissolve through acids

Scientists at Harvard University have determined that one of the best ways to eliminate waste generated by factories and farms is through powerful acids to dissolve them. “We must thank the ancient scientists who discovered within the field of chemistry several compounds that allow us to destroy the matter and relieve us a bit of the work of its collection” (Matthews, 2003, p.12).

Of the acids known to dissolve organic matter are: the hydrofluoric acid and the sulfhydryl acid. These are the most common that depopulate carbon atoms and make them liquid for easy transportation. For the use of these chemicals, permission must be requested from the government, then a designated area must be obtained to take the waste and dissolve it with the previously mentioned wastes; for this you will need a highly qualified team so that there is the least amount of possible accidents. Finally, the substance obtained from this decomposition must be taken to fields where it is treated and stops being harmful to the environment.

3.4 Training campaigns

For each of the members of a farm or industry that have the task of raising or sowing species of animals and plants, training should be done to prevent them from making mistakes that cost the atmosphere a bit less of their layer. For the good realization of this process

should instruct these people, with techniques that reduce the damage that involves raising livestock and plant vegetables. Among the best known are: sow in the ideal place, keep a limited amount of livestock by sector, handle well the schedules of food of farm animals, try to collect as much as possible the waste of livestock. This is the easiest and fastest way to make the different types of raw materials work correctly in each agroindustry without making any harm to our environment.

3.5 Special machinery

For this type of solution it is important to have the necessary tools to do so. It would require an excavator and a collection tube within the camps where the cattle and crops are concentrated, thus a total of 4 machineries; the difference between the two excavators is in their spoon, since one is to collect and the other to separate. The excavator goes over the field full of debris, either from animals or plants, and leaves the place clean to re-harvest or raise animals.

Then these waste go in a tube where it is stored until they are taken to a place responsible for decomposing and returning them as agricultural products such as: fertilizer and mineral processors. The people in charge of this place are highly prepared for any problem that exists with these harmful waste, they have pools where they concentrate the feces and break them down with chemicals, so that they can be returned to the sea and the nutrients obtained from that solution are used by the animals and plants that live in the water. These places are known as wastewater pools.

CONCLUSIONS

At the end of this monograph we can conclude that:

- Agro-industries are the places where agricultural processes are carried out and then they are manufactured through an industry. There are different types of agro industries in Latin America and the countries with more development are Uruguay, Paraguay and Argentina. we also take into account the consumption and aggression index on the part of the inhabitants of these regions, which affect the environment.

- The main causes of climate change are the bad techniques used at the moment of working in an agroindustry that cause negative effects both in living beings and in the social environment of a region. we also conclude that people are not aware of the damage they do when working in these places, thus being the biggest cause of the destruction of the atmosphere.

- There are different solutions to reduce the wear of the ozone layer, from the cheapest to the most expensive, maintaining a relationship of which is the most effective depending on the price and where it is applied.

RECOMMENDATIONS

At the end of this monograph, I recommend society, and especially agro-industry, to consider the different techniques, to work on a farm, which do not affect our environment and all the living beings that live in it. also that they should train all their personnel to perform a job free of all danger in the most efficient and ecological way.

I recommend Javier Particular Educational Unit to teach its students the effects that influence the atmosphere when we do not perform agricultural work as they should, so that future agro-industrial engineers do not make mistakes in the future that they later regret.

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APENDIX

Interview with Pedro Otero Loor (Agronomist - Chemist biologist - Professor)

1. What do you think is the first problem of agro-industries when raising animals?

   The big problem here is that the workers within the agro industries do not perform the work properly, being one of the reasons why our environment is destroyed.

   If this people notice the damage they are doing to our atmosphere, their attitude to this problem would be different.

2. How would you let the inhabitants of South America know the problem they are going through?

   I think that with some campaigns about how to perform well the agro-industry processes, and then verify if the techniques learned are used.

3. Do you think it is important to take care of the way of raising animals in agro-industries?

   Yes, because that is the main reason why we are losing our terrestrial atmosphere and if we made a change in that form of upbringing, it would greatly influence the reduction of the negative effects produced by this phenomenon.

4. What area, within an agroindustry, do you consider responsible for verifying these problems?

   The animal and plant breeding area of a farm.

5. What causes methane gas to the atmosphere?

   Blocks the ozone layer causing ultraviolet rays to concentrate in heat waves that never leave our atmosphere, creating the greenhouse effect.

6. What do you think would be a possible solution to all these environmental problems?

   That agro-industries use ecologically friendly techniques to avoid the destruction of our environment and all the beings that inhabit it.

7. Have you applied any of these methods of improvement in livestock?

   Yes, I have applied these techniques, which have been very favorable in the process of obtaining raw materials and future shipping to industries, without harming the environment.

8. If any of these solutions is applied, what would be the percentage of healing of our atmosphere?

   Every day our atmosphere regenerates by 20%, and is destroyed by 25%. If we reduce that percentage to values such as 5% or 10%, the recovery of our atmospheric layer will be 15-10% every day.