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Mexico: Minimizing Environmental Degradation Associated with Industrial Agricultural Practices

Problematic:

Latin America has many social problems; some of the most important are poverty and hunger, and that's because the governments don't take care of their available territory, or because they sell it to private companies which use the land for many things but never to plant. According to the world fact book of the Central Intelligence Agency (CIA) (August, 24, 2012), Mexico is the fifth largest country in America and the thirteenth in the world with 195,255,000 ha of which only 13% is for agricultural production of corn, radish, mango, watermelon, hot pepper, coriander, soy, and other vegetables and fruits.

According to INEGI (Instituto Nacional de Estadistica y Geografia) during 2009 México planted 21,832,754 ha of which only 18,688,835 ha were harvested, if Mexico has 252,436,736 ha left to produce, that land should be used for planting. The main problem is the budget, that is destined to agriculture and the work on the field. As it is shown in the chart below, Mexico destined in 2010 $ 4,670,193.9 (USD) divided into 32 Mexican states, it give us $ 145,943 (USD) which is useless for its real purpose.

Concepts	2010	2010	2010	Real	Variation (%)	
					2010-2011	2011-2012
Programmable Expenditure of Public Budget		**2,948,129.8**	**2,904,093.8**	**3,130,308.8**	**-5.3**	**4.1**
Government Programmable Expenditure		**1,784,597.9**	**1,796,433.33**	**1,896,658.7**	**-3.2**	**2.0**
Independent Bouquets		**53,370.7**	**59,846.7**	**74,054.2**	**7.8**	**19.6**
Legislative Power		9,918.0	10,210.3	10,987.2	-1.0	4.0
Judicial Power		33,892.2	38,035.8	45,832.8	7.9	16.4
IFE		8,670.5	10,499.0	15,953.9	16.4	6.8
CNDH		890.0	1,101.7	1,280.3	19.0	12.3
Administrative Bouquets		**848,859.9**	**860,213.6**	**883,407.3**	**-2.6**	**-0.8**
Presidential Budget		2,305.8	1,786.6	1,986.6	-25.5	7.4
Government		14,276.6	16,386.1	23,537.5	10.3	38.8
Foreign affairs		8,997.7	5,823.5	6,106.4	-37.8	1.3
SAT		43,218.7	38,992.5	44,612.4	-13.2	10.5
SEDENA		52,596.9	50,039.5	55,611.0	-8.5	7.4
SAGARPA		71,672.1	73,821.3	61,612.0	-1.0	-19.4
SCT		75,586.6	86,420.6	70,440.4	14.5	-21.2
Economy		15,704.8	16,507.3	17,978.6	1.1	5.2
SEP		225,696.4	230,684.6	243,311.2	-1.7	1.9
IMSS/ISSSTE		86,765.6	105,313.9	108,998.9	16.7	0.0
SEMAR		18,415.7	18,270.2	19,676.7	-4.6	4.1
Total Budget Expenditures		**3,677,116.3**	**3,720,461.4**	**3,977,999.8**	**-2.7**	**3.3**
Minus		321,828.3	281,565.9	330,092.7	-15.9	13.3
Public Budget of Net Expenditure		**3,355,288.0**	**3,438,895.5**	**3,647,907.7**	**-1.5**	**2.5**

The heritage foundation. (2012, March 17). *El Presupuesto Federal en Gráficos (2012) de Estados Unidos*. Retrieved september 2, 2012, from El Presupuesto Federal en Gráficos (2012) de Estados Unidos: http://libertad.org/presupuesto-federal/

The census of 2010 by INEGI about how many families lived in poverty conditions gave 23,176,797 million; which were divided into two categories: urban (the ones living in the cities) and rural (the ones living in the countryside). They were divided into other three categories: food, capacities, and indigenous or patrimonial. The families that were in the rubric of food were the ones that do not have the necessary

amount of money to buy basic food requirements. The ones that were in the rubric of capacities cannot afford proper education, health, and the basic food requirements, and the majority indigenous or patrimonial, that cannot afford their home, education, health, basic food, transportation, and dressing. Each year the number in the countryside is lower and the number in the cities grows, because the work in the countryside is not well paid, so the farmers have to make a decision between crossing the border or going and try in the city. This census shows the real situation of poverty and poor investment on the field that Mexico is dealing with and the reason the country cannot advance.

Area:

The State of Puebla is located at the east-center side of the country. It is one of the most industrialized states of the Republic just behind Monterrey, Guanajuato, Queretaro, Guerrero, and Mexico City. According to the government, it's total population is of 5,000,000, people distributed in 216 municipalities. The most populated city is the capital, the city of Puebla, which holds 1,539,819 inhabitants being the fourth most populated city n the country. From 5 million inhabitants only 601,680 are indigenous that belong to five different groups: Nahuas, Totonacas, Mixtecas, Popolucas, and Otomíes. Only the Nahuas and the Mixtecas are native from the state, the Otomies are from Hidalgo, the Popolucas from Oaxaca and the Totonacas from Veracruz. Nahuas and Otomies are concentrated in the northern side of the state, near Hidalgo, and generally they are established in the small municipalities and in the poorest ones, eventhough the Nahuas and the Mixtecas are the ones with the biggest populations. Mixtecas live in the West, near Tlaxcala. The Popolucas established near the state of Oaxaca in the South and the Totonacas are in the East near the state of Veracruz. (2011, Gobierno del Estado de Puebla, Estadisticas del Estado)

Juan Galindo is the 91st municipality of the state, and one of the smallest; it is the birthplace of hydroelectric facilities in México with the construction of a dam in 1905, it has a town and a human settlement. Right now, the one in poverty conditions is the human settlement located in the hill of Necaxalteptl, called the community of Necaxaltepetl with its 4 km^2 it only has .5 km^2 to plant coriander, corn, chiltepin (a type of pepper), and radish. Due to the fact that they live in the highest part of the hill they depend on two factors: rain and a wellspring. The population of the colony, which is a Nahua community, had descended from 1000 to 800 people living there according to the municipality records, because of the lack of work 200 people went to another place to live.

Objectives

1.- To help the Nahua community of Necaxalteptl to learn how to build a vertical field and start a production of radish, coriander, chiltepin, and amaranth to start the process of becoming a self-sufficient community.

2.- To introduce in the region amaranth as a flour to do mixed tortillas with one of the regional plantations (radish, chiltepin or coriander) and include it in the regional market or diet.

3.- To improve the market of the region by planting in each season a different type of plant: spring, coriander, summer, amaranth, autumn, chiltepin, and winter, radish.

4.- After introducing amaranth in the region, to start the process of expansion and go to the nearest towns of Tenango de las flores and Canaditas to expand the project.

Proposal

A vertical field is an economic hydroponic plantation, eco-friendly, that is used to produce plantations in places were there's not much space or were the field is damaged and unfertile, it's created in recycled bottles and applied in big cities were the lack of space is a problem to plant something. However, a variant can be made in plastic trash bags, it produces more plants and is more efficient in rural spaces.

Bottles: Using recycled bottles, it is possible to create an economical vertical small garden, taking the bottle backwards filling it with black land, making some holes and using the vegetables mentioned in the objectives. The production will start in spring and will not stop until the end of the year.

Trash bags: The concept with a trash bag is basic to do, only a recycled trash bag is needed. The empty bag should be filled with black soil and fertilizer so the plants can grow better. To make the process easier for the plant it's also needed to do some holes in the perimeter of the bag without breaking it completely, just small holes. Then it is only necessary to have the seed. When the plant grows, it will find the way though the holes. The capacity of the bag depends on how many holes can be created, it is important to say that the holes need to have some separation among them. This plantation needs the same care as if it was in normal land.

The way of making this project bigger is by doing it in the entire town. Necaxalteptl has 300 houses, if every house could hold on his external walls 50 modified bottles and each house has 4 external walls. It will be 60,000 bottles for the entire town, with the capacity of harvesting or producing 3 to 4 radishes, a bunch of coriander, three plants of chiltepin each one with 10 peppers per bottle or amaranth. If each plastic bag can hold a minimum of 20 plants and each house of Necaxaltepetl can maintain 4 bags then it will be 1,200 bags each one with 20 plants it would be 24,000 of them. In addition to the ones harvested in the bottles, it would be 84 tons of plant production. Half of it could go to the town so they could eat properly by starting the process of making flour from the amaranth mixed with coriander, radish or chiltepin creating a new flavor and the other half could go to the regional and state market.

In that case, the town would probably be sustainable and self-sufficient. Maybe the process would be a little slow but it would work and it would activate the working field in the zone. Because the other part of the project is including a non- governmental organization, for example "*Techo*" that works in Latin America fighting poor ways of living that exist in the entire continent. They are specialist in building houses and teaching how to read and write in marginal communities. With their support and volunteering work, they would be the perfect supervisors or watchers of the project and motivate the people of the town, the organization could give each family, an economical incentive until the field gives its fruits and trade begins.

The second supervisor could be the missioners, which have natural leadership, and because of their training in the church, they are capable of being part of the people and give help when it is needed. Many of them are an important base in indigenous society, they are people that can be trusted, and maybe they cannot give any economic incentive but they might help in the trading process by talking with the pastor of the church in Necaxa, the main town, and re-open a trade road between both communities.

It is very important that one of the watchers supervises the first steps of the project or else the possibility of losing everything is high.

Products

With the exception of coriander and radish, which are from Europe and Africa, the amaranth and the chiltepin are 100% Mexican and each one of them has some special qualities:

Coriander (*Coriandrum savtivum):*

Normally it's used in guacamole and in green sauce; it is traditional in Mexican snacks. Its fruits are aromatic as well as its leaves, which cannot be cooked, or they will lose its smelling essence.

In addition, it has some health benefits for example it is stimulant and serves as an antispasmodic it can also be chewed an eliminates the bad breath and the smell of the arm pits.

It can be dehydrated and its flavor and properties will remain intact along the years.

Amaranth:

From the family of the grass, there are 80 species of amaranth worldwide but only three are from Latin America (from Peru and Mexico) those three have the highest nutritional aspects. Only the following three are the only ones that can produce grain to manufacture flour.

"Amaranthus Caudatus": The most nutritional and complete of all the 80 species of the amaranths can be found in two places on Earth: Peru and India. Mexico is importing seeds of this plant to start its production and exportation. In the *Andes* it is better known as *kiwicha* and the entire plant is edible. In the Indian cuisine it is better known as *pak khom* and it is used as tea. It is also a very adaptable plant with a characteristically red color. It grows 3 feet and it has the ability of growing inside a house and survive the coldest of winters in the outside, its nutritional value is: vitamins (A,B,B2,B3) it also has Calcium and Phosphorous.

"Amaranthus Cruentus": Best known as *huatli* or *alegria* in Mexico. One of its many uses is for flour to do the typical candy called *alegria* it can also be used to create *tortillas, tamales, molotes, tacos,* and it is combined to do beverages maintaining its properties.

"Amaranthus Hipochondriacus": It is an ornamental plant, edible, and sometimes combined with its sister *Amaranthus Cruentus* it is used to do *alegrias* and other candies in Mexico. It is recognized in England also as plant of Wales because of its beauty. Some other benefits are: it fights diarrhea, obesity, hypertension, osteoporosis, diabetes, constipation, kidney failure, liver failure, and malnutrition and may be used as fodder, fertilizer, and crop bed for farm animals.

Hot pepper or chiltepin

Also known as *chiltepe*. It is a pepper used in all Latin America. It's harvested when it is still green so it can be dehydrated and it is used as a spice in soups and tacos. It is particularly small but extremely spicy and hot.

Conclusion

There are 9,854,301 indigenous people in Mexico. They represent 9% of the country population and most of them live in extreme poverty, the objective of this project is to help them to be self-sufficient, to stop the government's abuse towards those communities, and to create a new conscience in the Mexican way of thought. The facts are very clear; the governments that had ruled over the past 100 years became lazy and only worried about themselves. Now the only way of achieving some success is by having some initiative.

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