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Mexico is a territory full of diversity. Oaxaca is one of the states with more landscape variation, abundant mountains, extensive deserts, flourishing woods and crystalline water sources. This panorama may seem fine and even a desirable place to live, but in 2008 CONEVAL (National Council evaluation of social development policy), a public organism specialized on measuring Mexico's poverty, found out that one of the states with the highest percentage of food poverty was Oaxaca with 38 percent of its total population found in this condition. Near to Sierra Madre Oriental and Cerro del Colibrí, there's a small town where food resources are incredibly low. This place is San Juan Tepeuxila and it is the poorest location in Mexico. It is located in Cañada Region and it is 1650 meters above the sea level. Based on a study made in 2010 by CONEVAL 97.4% of San Juan Tepeuxila's population is considered to be in a poverty condition. According to CONEVAL this region takes place in the list of the worst places to live in, being number 128 from 187 other international places. The population living in this town is part of the 11.2 million Mexicans that live in extreme poverty.

San Juan Tepeuxila's community is formed by 2 773 persons, from which 1 429 are men and 1 344 are women, reported in the year 2010 by INEGI, a governmental organization dedicated to population counting. In 2008, 18.2% of the Mexican population was in food poverty, meaning that they did not have enough income to purchase goods from the basic basket, even if they used their total income, in 2009 this figure increased to 25%. In San Juan Tepeuxila, 54.9% of the population suffers from food poverty and 24.4% more aren't able to eat for weeks. Food poverty produces most of deaths in that region.

The total surface of this town is 366.16 km², which is only 0.38% of the territory in the state of Oaxaca. This territory is full of deer, pumas, falcons, eagles, ocelots and rattlesnakes but none of them are seen as a food source for people in this town. This is because hunting was prohibited by the government, one of the reasons for which people have to wait until one of these animals die in order to obtain a source of protein. Another problem this population goes through is the exposure to bacteria and other diseases animals produce after death, this began to develop because they can't be well preserved.

Lack of food is one of the major causes of death but it isn't the only one that contributes to death. The quality in which people live is deplorable. Houses are made of long branches and mud; the space

between each branch is of about 1 to 2 cm. There is no door, just a whole in the middle of a wall big enough for someone to pass through, in most cases this whole is covered by a blanket, this way people try to prevent the rain to get in. But still this attempt is useless, water still goes through roofs, made only of sticks and leaves, getting inside the house, making the floor muddy because it is nothing more than dirt. There are only a few water drops that find their way in, but they are continuously entering, getting people inside the house wet and cold. In a corner, wood is piled and a pair of rocks is on top, they are used as a heater, where beans and corn are being cooked. A rooster, a hen and sometimes a turkey are living in that same house. The owners don't consume products brought by these animals; instead, they are sold to adjacent towns to have more profit. A broken mattress with only one or two dusty and broken blankets is the place where people can rest after a day of hard work and starvation.

A woman, 2 kids and sometimes a man are the members of a basic family found in this place. Mostly men leave this site trying to look for better opportunities for their families, most of them failing, others still trying. Schools are far away from this rural place, making it difficult for kids to have a formal education, learning only from their parents who, at their age, had to do the same, teaching them how to survive. According to information of CONEVAL from 2010, 30% to 35% of the population is unable to read and write. The cause of food insecurity in this place has nothing to do with the condition people live in, or the plants that are grown. Land in this town is actually extremely fertile; the main barrier is money.

Based on a study done by INEGI 1 out of 3.8 families in Oaxaca have a woman as an economic support. From these families 77.3% of them have a male figure as the main support, 22.7% has women. Even though there is still marginalization for women, they have become more independent and have taken control of their families when men are not present. This new achievement has gradually helped woman to gain equal rights and respect in the community.

Corn and beans are the main food and economic sources; some people can also cultivate avocado and pomegranate making them 1 dollar richer than the other members of the population. Every family grows these crops whether they are for their own consumption or they sell it to contiguous communities. A standard family composed by two adults and a pair of children, surviving from the cultivation of corn and beans, have an annual income of 148.18 dollars (1,960 Mexican pesos), meaning they get 31.22 dollars (413 Mexican pesos) per month, only 7.81 dollars (103.33 Mexican pesos) per week and barely 1.12 dollars (14.76 Mexican pesos) per day. That is 3.84 dollars (50 Mexican pesos) below the Mexican minimum wage, which is of 4.97 dollars per day (64.76 Mexican pesos).

Survival has become a common term in this region, people in San Juan Tepeuxila's main goal is getting to live for another day or at least helping their families to do so. By every 100g of black beans people consume 55.4g of carbohydrates, 21.8g of protein, 183mg of calcium and 4.7mg of iron are added to the human body. These summed up with 18.4g of protein from corn are the basic nutrition of a member of San Juan Tepeuxila.

Poisonous snakes are also part of this community, for which medical health care is highly required. The nearest medical clinic can only be reached by going through 4 hours of dirt track on a car or truck, walking to a hospital is not even considered as an option. Even if a bus happened to pass from time to time these tracks would be useless whenever it rains, it is nearly impossible to pass through them, mud gets stuck on truck wheels not allowing it to move forward.

Iron deficiency is the most widespread in rural areas, followed by Vitamin A and Iodine deficiencies, San Juan Tepeuxila is one of these rural areas. Lack of Iodine is the main cause to mental retardation and preventable brain injuries. These effects are mostly caused in fetus brains during pregnancy and in kids with a short age. Iodine deficiency elevates the mortality rate and abortions in many towns. Even though iodine deficiency is not the main cause of death in San Juan Tepeuxila, it is also a factor that affects women and children.

On the other hand, iron deficiency has also become a great problem. Approximately 4 to 5 thousand million people in the world suffer from anemia due to this deficiency. An anemic pregnant woman is in danger of suffering hemorrhages and sepsis while giving birth. Anemic mothers may also provoke a low weight in their kids when born or even premature birth. At the same time children born in these conditions are more likely to have a weak immunologic system, contract infections, knowledge problems, not getting an adequate physical development, and in the worst of cases, it may even cause death. In Oaxaca, 32% of children between 0 and 11 years old present an iron deficiency. It still hasn't become one of the reasons people in Oaxaca die, but it contributes together with malnutrition and other diseases.

According to figures given by FAO encountered in a study, 26% of children under 5 suffer from growth retardation and 31% suffer from vitamin A deficiency. By increasing the production of cereals such as corn, rice and wheat, and legumes, meat, milk, vegetables and fruits this problem can be eradicated or at least controlled. Because of San Juan Tepeuxila's population main diet consists on corn these issues are not as alarming as in other places, but yet it is still a problem people face in this town.

A viable option to increase micronutrients, protein and basically improve San Juan Tepeuxila population's diet is to cultivate prickly pears (*Opuntia lasiacanta*). This plant is a powerful source of food, not mentioning that it is also fast growing, and can survive either in desert or cold zones, even if

it belongs to the cactus family. It does not require a big amount of water, for what the investment to cultivate this plant is lower and the income higher for those who don't have the needed resources. The prickly pear can be able to survive from 8 to 15 days without being irrigated. In San Juan Tepeuxila rain is constant but it is never excessive, summer is the time of year were rain can last more than one day, but it is not enough to drown the prickly pears. For the times of the year when rain is not enough, rivers such as Río Grande, Río Cobos, Río de la Grana and ponds, to name a few water sources, surround San Juan Tepeuxila, were villagers can get enough water for them and for their crops.

Furthermore, San Juan Tepeuxila's ground is more than adequate for the development of this plant, this is because about 80% of the land is humid and clayey and the other 10% is desert, yet prickly pears can also be cultivated in both territories. The remain 10% claims to be unfertile and people are unable to grow crops in there, but another advantage of the prickly pears is that it stops the degradation of deforested ground, making it productive. This would make all the ground propitious to produce any kind of crop. The proper rank of temperature to grow this vegetable is between 16°C and 28°C, surviving with a maximum temperature of 35°C and a minimum of 2°C, otherwise these crops will die. The town's temperature throughout the year varies between 10°C and 18°C, making it a good scenario to plant. The growing of this plant is considered fast, it provides its product in 2 to 3 months since the plantation is effectuated. The first round will have between 3 to 4 prickly pears per plant, and as it grows up more crops will grow as well.

For every 86g of prickly pears there are 2.9g of carbohydrates, 1.1g of protein, 80mg of calcium, and 1.6mg of iron. It also contains 2g of fiber, which, in its insoluble form, prevents from constipation, hemorrhoids, and apparition of colon cancer. Soluble fiber can also delay nutriment absorption making them pass through blood gradually and keeping them for more time. Prickly pears contain a high source of vitamin A and C, it also has complex B, minerals, magnesium, and potassium, between other micronutrients making it a nutritious food source.

The prickly pears are not the only source of alimentation brought by the plant; it has also an edible fruit, which are known as "tunas". They provide approximately 20g of carbohydrates, 0.2g of fat and 3g of protein for every 100g of tuna, counting the seeds and pulp of this fruit. They also supply 22mg of calcium and 0.3mg of iron.

Other than providing micronutrients and protein, prickly pears are useful not only in the food ambience, it can also be used in a medical way, solving some of the problems this community encounters by not having medical services nearby. They can be used as a natural antibiotic because of the crassulacean acid plants have. Amino acids and fiber found on the prickly pears prevent the excess of sugar on becoming fat, controlling a person's cholesterol. Its sap, when applied directly into the skin, controls inflammation, bruises and also functions as a painkiller for burns. It also acts on a simple flu to lowering a high fever. It also combats against intestinal diseases such as killing worms.

A benefit from this plant is that any villager may cultivate it. People who possess a big amount of land may plant prickly pears in furrows, leaving 1 m between them and 25 cm between plants, this way they will have their own space to develop and properly grow. Villagers who don't own enough space to do furrows may also plant prickly pears next to their doors, or around their houses, this is because these plants can reach 5 meters tall. If these vegetables are planted in a way it surrounds a villager's house it won't only get food and economic profits for him/her, it will also create a sort of barrier against rain, preventing the entrance of water.

As in all plants plagues become an issue for those who grow them. Cochineals (*Dactylopius indica Green*) are the most common plague that invades prickling pears. San Juan Tepeuxila's villagers cannot afford to buy pesticides, but there are other solutions for this plague. In ancient times this type of cochineals were smashed and used as paint. If villagers retake this old fashion way of painting they could generate a new income, and use it to gain more food and seeds. By doing this practice, villagers won't only kill the plagues; this will also benefit them.

Families would be profited by prickly pears, not only in a manner where their nutrition would be improved, but also economically. If every family had around 8 to 10 plants of prickly pears, which they can obtain by taking their seeds from the desert without spending any money, their malnourishment problems would be solved in less than a year. A family integrated by 4 members would not only survive and be able to eat everyday but they will also generate a greater income that would allow kids to attend to school and even to sell prickly pears' products to towns nearby.

Prickly pears can also be preserved in brine, vinegar and can be made marmalade, lasting long enough to feed a family with less than 5 plants. They can also be mixed with corn getting as a result some sort of tortilla. Prickly pear juice can also be drunk containing all the vitamins and minerals it originally had. This plant can also improve hygiene in San Juan Tepeuxila; it can easily be transformed into an economic shampoo, not to mention becoming cheap but useful medicines.

Because of the high-speed growing of this plant, exporting can and probably will become an option for villagers from San Juan Tepeuxila. When their basic needs are covered San Juan Tepeuxila could become another town that exports prickly pears into a market located in Milpa Alta in Mexico City. To do this the first step would be to carry a considerable amount of prickly pears products into a city in Oaxaca, they can either be plants, tunas or even cosmetic products, such as shampoos and body creams. They can be sold in this city or cities and profit would be noticeably good for villagers. This process can be achieved in approximately 3 to 5 years, depending on the production of villagers and the increase of San Juan Tepeuxila's population. In a time of 4 to 8 years products may be exported to Mexico City by this same town and not by a city. By this time, villagers would not only be well nourished, but their income will exceed the minimum wage by far.

The annual ingest of prickly pears per capita is of roughly speaking 6.4 kg, that means that only in the state of Oaxaca, which, according to INEGI's figures in 2012, has around 3,8 million of habitants, the annual demand would be of about 24,320,000kg of prickly pears, not counting other products like tunas. It is not suggested to remove spines from prickly pears because the durability of this plant decreases, but if they are being consumed right away it is recommended to do so. Prickly pears without spines are better paid than the ones with spines.

Prickly pears as an edible product demand have been incrementing in Mexico through the past 5 years. The relation between the demand of prickly pears and the increase of Mexican population is directly proportional. Exporting this plant from San Juan Tepeuxila, and practically any other place, can be a source of income for many decades, not only because it is a highly nutritive plant, but because it can be used in more than 100 ways.

In relation to International demand, United States of America has been developing a series of industrialized products from prickly pears. This country's demand is still way lower than the one in Mexico, but it can also be seen as a factor that would bring another income to Mexico. Some uses of prickly pears in the U.S. are for nourishment and naturalistic medicines. In two decade or a bit more, exporting prickly pears from San Juan Tepeuxila could be a viable option to obtain more profits. This would take a large and probably difficult process, but it is possible for it to happen.

FIDA is an organization that consists on fighting against hunger and poverty in rural places by improving food production and nutrition of people with a low income. It was established in 1977, based on a decision made by the CMA in 1974. This organization provides direct financing by giving loans and/ or donations. It also helps giving resources and supporting projects and programs in order to increase the agricultural production, employment, nutrition and local income distribution.

Prickly Pears are the ideal crop to plant in San Juan Tepeuxila. Its nutrients are enough to provide villagers a continuous alimentation and most important a healthy life. By taking this crop as their basic agricultural source people will be able to solve their basic necessities. Iron deficiencies will no longer be a cause of death in this community. Children will be able to develop naturally and efficiently because of the consumption of this cactus. Because of the increase on prickly pears demand, money barriers will not longer be a matter of concern and food availability will last enough as a lifetime. Prickly pears are one of the most demanded products in all Mexico for what main producers, such as Estado de México, cannot fulfill this demand. Hardly this demand will decrease, not only because some of the principal typical Mexican dishes contain prickly pears on its recipe, but also because it is so nutritive that everybody wants it in their tables. By keeping this lifestyle were people cultivate this plant, they will, at some point, be able to achieve others goals such as exporting this vegetables, whether it is nationally or even internationally. San Juan Tepeuxila will no longer be a place defined as extremely poor, it will become a habitable and resourceful place. The process of

exportation can be accelerated if FIDA creates a project to help this community grow in an agricultural way. This can be achieved by financing the construction of macro tunnels. Macro tunnels facilitate and decrease the time in which crops are edible. By accelerating the production of Prickly Pears, San Juan Tepeuxila could become one of the major producers of this plant. Corn and beans can also be cultivated in these macro tunnels, not only giving this town the possibility of exporting one but three products. This will eventually happen if villagers' work is constant. People will now live in decent conditions and the need to search for food will be left behind.

The objective of this proposal is to optimize agriculture in San Juan Tepeuxila, by creating a project where villagers will be able to self-manage their production by being advised about the possible use of innovating techniques in this area. This advice will be given by "Universidad Autónoma de Chapingo", a University recognized for its scientific and technological investigation on agricultural field, the state government will also provide and participate in the improvement on these advisements. A viable option for the future of San Juan Tepeuxila would be implementing the cultivation of improved seeds. Its origin comes from the mixture of two seeds that are capable of reproducing. These cannot be called transgenic because they are not modified genetically. Seed with this capacity can be fortified, which can enrich its content of protein and iron. This technique can and will develop San Juan Tepeuxila's villagers nutrition and economy, not only because its fortification will provide them a better health, but because corn is one of the seeds that can be put into this process, which has been their main cultivated crop. It would be desirable to complement this idea with machinery, such as tractors, or agricultural techniques, like fertilizer or plagiaries, but given the economic situation in this town it is not possible. To balance this condition the creation of compost would be a reasonable initiative. By using animals' wastes on plants, the speed on which these grow will increment, letting villagers to produce more rapidly and with more quality products than before.

At the time animals such as cows, horses, etc. are not available on this town, but contiguous villages do have them. Buying some of this animals would not only produce more sources of protein and food in general, these can be also used in agriculture. Attaching a wood wagon to the back of, for instance, a horse, would be the perfect supplement of a tractor. By making this horse pass through the land, where crops are intended to be cultivated, furrows will be made and planting will be facilitated. Prickly pears cultivation, enriched seeds, and animals are the solution to improve the circumstances in which people in this town are currently going through. At this point people in this town will be able to use their land in an adequate, ample, satisfactory, useful and more profiting way. This will be the first step followed by many others to end with food insecurity and extreme poverty in San Juan Tepeuxila.

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