

## Prickly Cactus 2010: A Prospective View

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### INTRODUCTION

The purpose of this study is to present prospective planning for the future of prickly cactus. The methodology for the work consists of four phases:

- The normative phase, in which we present **the future we wish** by predicting the happenings in the year 2010, that is, creating and dreaming the future environment we want to live in. This phase also includes the logic future, viewing how our future can be.
- The second phase reviews what the present is, its relevant properties, and interaction among them. We describe it as the **Model of Reality**.
- The third phase is one of confrontation, which includes the difference between the possible future and reality. We named it **Alternatives to change the future**.
- The fourth phase is the determination of strategies to make feasible the future we desire: **Possible Scenarios for Prickly Cactus in the Future**. How the future can be constructed and the routes to get to our goal. It is in this phase that we present four possible scenarios. Each scenario is a different combination of variables and produces scenery that goes from the very positive position to the most negative one.

### A PROSPECTIVE VIEW

#### The Future We Wish

In the year 2010 cactus covers 70% of the desert land in the northern states of Mexico and the southern states of the USA. They used to have a large area of arid lands, which now are covered with cactus plants of great diversity. Prickly cactus is the most commonly found among them.

The virtues of these plants have been spread throughout the world and they are highly appreciated by all the people.

Along all the roads, we can admire different varieties of these plants cultivated by the farmers in small and highly intensive farms.

All of the farmers cultivated cactus plants for various numbers of years to prevent deforestation, erosion, and dryness in the area.

Prickly cactus is used for fences and for decorating farm and home gardens.

People use cactus plants to improve the quality of foods and personal and house cleaning products. They are a highly regarded source of fiber and pectin, helpful elements for diet programs.

Research on curative qualities of cactus was so productive that the market for these farm products is an enviable business.

Cactus plants' by-products are used as fertilizers, insecticides, and for other biotechnological purposes.

All of the farm animals are fed with some prickly cactus during the year and greater quantities during the dry season.

Farmers are highly aware of the practices that improve production and secure the future of the land and animals.

People became sensitive about the preservation of nature and have carefully cultivated cactus plants. During this century we highly value our own cultural and native resources.

### **Model of Reality**

Arid lands in Mexico in 1996 cover 70% of the national territory. Temperatures undergo extreme changes and dryness is a common phenomenon. These two factors will lead to:

- **Forage production becomes highly expensive and difficult.** Growing any kind of animal feed is almost impossible in arid lands because of the long dry season. Hundreds of animals die every year due to the lack of forage for the same reason. It is very expensive to produce forage since water has to be pumped from very deep wells.
- **Soil erosion is widespread.** The lack of rain on arid lands does not allow plants to grow and erosion is not prevented.
- **Lack of awareness about sustainable development is common.** Exploitation of lands and water is a common practice and almost no one thinks about future generations. We all worry about highly productive animals and crops through practices that compromise the future provision of nature.
- **Knowledge about nutrition and management of cactus is scarce.** Research is directed toward those plants and animals that are highly productive and have the best nutritional characteristics. Care is not taken about those plants and animals that better benefit the preservation of nature: plants that can provide us food but, at the same time, help us preserve our resources. Cactus plants are treated analogically as minorities are: Under developed and lower-class individuals that require some backstage treatment.

- The farmer is becoming an endangered species. High interest rates, climatological changes, longer dry seasons every year, neoliberal economics policies, low social status of farmers, and other practical reasons have induced farmers to migrate to cities and change their occupation.

The previous items describe only some of our present conditions. However, population increases at a 2.8% annual rate and every year the demands for food are potentially increasing. Global warming, degradation of natural resources, soil erosion, epidemics, and many other great world problems demand us to take a moment for meditation and to think of creative alternatives to solving our problems without compromising resources for future generations.

### **Alternatives to Change the Future**

There are some alternatives that nature has provided to help us solve this future problem: PRICKLY CACTUS.

#### ***Highly Productive Crop***

- Prickly cactus is a long-lived plant; it lasts many years and maintains its productive potential.
- It is highly resistant to low and high temperatures, which allows it to survive under adverse climatological conditions.
- It is highly adaptable to different kinds of soils. Prickly cactus can grow on very thin and poor soils.
- It is highly resistant to diseases, so the need for careful supervision is very low.
- Prickly cactus is an easy and low-cost crop to establish. It is available to establish for almost any size income.
- It is a low-maintenance-cost crop. Its reticular property preserves humidity and its high resistance to diseases require very little attention. For these reasons there is a colloquial saying that says: "Al nopal nomás lo van a ver cuando tiene tunas."
- There is a high disposability of prickly cactus during the whole year: as a seed, as forage, as vegetable, and as fruit.

#### ***Highly Convenient Animal Food***

Prickly cactus has been used as an emergency food during droughts. However, it has many advantages that deserve to be reviewed to introduce it as a daily complementary food:

- High palatability
- Few thorns
- High digestibility
- Accessible management in the field
- Important feed for livestock and wildlife in the arid and semiarid zones
- Resistance to transportation conditions
- Highly abundant
- High rate of recuperation to harvesting and productivity
- Always green
- High production of biomass

### ***Highly Ecological Plant***

Prickly cactus is highly productive under adverse ecological conditions. That is, there are varieties of *Opuntia* that are resistant to extreme temperatures and can last through longer dry periods than other plants. Other characteristics are:

- Easy establishment, does not need sophisticated machinery or ideal soil conditions.
- Its survival mechanism, thorns, gives it natural protection. It helps maintain ecological balance, is available for prairie animals, and avoids erosion.

### **Possible Scenarios for Prickly Cactus in the Future**

Succeeding paragraphs provide four possible scenarios that combine two variables: education and highly intensive production.

#### ***Education***

Education includes the promotion of research programs for prickly cactus as forage and studies that can improve the knowledge about the benefits of including prickly cactus in the diets of livestock. These research projects should be done closer to the farmers, in joint programs between livestock producers organizations and research centers or universities, in order to make them highly productive and practical journeys.

The goal of research should not end with publication of the results, but should get the benefits of knowledge to the direct users of that information. We recommend closeness with the farmers during the research process so that they and their neighbors will get the knowledge as it is developed.

In addition, good informational programs, such as popular publications, spaces in the daily paper, and radio spots that include messages in a very common language that anybody can understand, are needed.

These extension programs should include educational programs that promote better management practices and awareness of all the benefits of cultivating prickly cactus as forage.

These programs should include messages about values. For example, Mexicans regard the family as one of the most important elements in their lives, so a good awareness program must talk about the danger of the future lives of our children if we do not use our natural resources wisely.

#### ***Highly Intensive Production***

Intensive growing of prickly cactus for various purposes, such as forage, fruit, or vegetable is essential. Prickly cactus can and should be used as an ecological control for erosion and prairie animals' feed.

However, highly intensive production requires excellent marketing strategies so that, the product can be commercialized in a profitable way. This factor should be combined with the extension and education programs to sell the idea of using prickly cactus in the diet and for livestock production.

A highly productive crop requires improved production techniques. This factor should also be combined with joint research between producers and researchers. This type of joint research can

be financed with the profits of the production (if production improves, the benefits can be shared).

**SCENARIO CONSTRUCTION**

<b>SCENARIO I</b>	<b>SCENARIO II</b>
EDUCATION AND HIGHLY INTENSIVE PRODUCTION	EDUCATION LOW PRODUCTION
<b>SCENARIO III</b>	<b>SCENARIO IV</b>
NO EDUCATION HIGHLY INTENSIVE PRODUCTION	NO EDUCATION LOW PRODUCTION

**SCENARIO I: Education and Highly Intensive Production**

If these two factors combine, that is, if we can educate the people to use natural resources wisely and to improve their production of prickly cactus, we will see green fields all over, a lot of prairie animals, and livestock producers with cactus fields in their farms.

**SCENARIO II: Education and Low Production**

If education is provided in the planned manner, we will see a better use of our resources and awareness of the advantages of including prickly cactus in the diets of humans and animals and we will take care of the already-grown cactus. However, if production is not promoted in an intensive way, erosion will not be avoided, animals will not be fed with these plants, prickly cactus producers will have low income benefits and, eventually, they will have to change their crop production or migrate to the cities to take up the blue-collar occupations.

**SCENARIO III: No Education and Highly Intensive Production**

The high intensive production of prickly cactus will provide higher economic benefits to plant and livestock producers. Because of all the advantages that this crop has (its management, high productivity, easy establishment, etc.) it will be a profitable product. However, if education is absent, that is, if awareness about prickly cactus continues as is, the people will not buy this product as food, livestock will be fed with other crops, it will not be used to prevent erosion, etc.

**SCENARIO IV: No Education and Low Production**

If these two variables combine, we will see the warmest, driest, lifeless, foodless region of the world. No one will be interested in eating prickly cactus products, they do not even know of their existence. Livestock production is an extinct occupation, because the producers never knew about the benefits of including this crop in their management practices.

This scenario is the saddest one because it describes the worst possible future of prickly cactus if we do not pay attention to the possible solutions.

## CONCLUSIONS

This exercise provides a view of the possible future we can create. It can be done, and it is recommended to be done by controlling all the possible variables that you can think of. We, the Professional Association for Cactus Development (PACD), need to begin our design of strategies to improve highly intensive production, trading, research and extension, education, etc. The only way to do this is for producers and researchers to work jointly, sharing experience and knowledge.