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SIMULATION MODEL: PROFITABILITY IN RANCHES OF TAMAULIPAN SHRUB OF COAHUILA BY EFFECT OF THE RATIO BOVINE:DEER IN THE STOCKING RATE

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ABSTRACT

The administration of the scarce budget intended for the investigation and the traditional investigation methods, scarcely appropriate for complex systems; generate the great need of making an effective use of the available amount for the knowledge obtainment with a better solution of problems and a just channeling of the federal budgets and deprived toward the investigation. The ranches of the State of Coahuila, Mexico, with calves production and deer's utilization, located in the region of the Tamaulipan Shrub of Coahuila (TSC), they are an example of complex systems. In this regard, the researchers, technical and ranchers of the region, require of tools to know the better relationship bovine:deer, concerning the profitability that by this relationship is originated. The systems analysis through the present simulation model, it is a strategy to achieve the efficient use of resources in the investigation and the complex systems study, as the ranches of the TSC.

KEY WORDS
Simulation Model, Profitability, Ranches, Tamaulipan Shrub, Coahuila, Bovine, Deer, Stocking Rate, Density

ANTECEDENT

SIMULATION MODEL

Simulation Model is conceived as the abstraction of the reality, imitating through a computer the behavior of a system.

Exist few examples with success in the simulation of decision problems at farm level, furthermore, they are of hypothetical cases (Dent and Anderson 1974, Grant *et al*. 1997). On the other hand, it is not the simulation concept what is new, are the computers employment, in this regard the development of the computers is an indispensable prerequisite for the development of the simulation. In this sense have not been taken advantage the possibilities that offers the simulation, for example for the climate (Dent and Anderson 1974). Exist two forms of building models: Analytical (with pencil, paper and complex mathematics) and the Simulation (with computer and simple mathematics). The analytical approximation is not especially useful in the models construction of ecosystems. In the simulation a model is built to simulate the future behavior of the system, however yet they are little viable the guides for the ecological models construction (Jeffers 1978). In base to the foregoing, the systems analysis is a philosophy as well as a set of quantitative techniques, including to the simulation, that it has been developed explicitly to face problems related to the complex systems operation (Grant *et al*. 1997).

PROFITABILITY

The profitability is the reason of be of the company. Indicate the return that the owners perceive in exchange for the investment, risk and developed effort (Guerra and Aguilar 1995). Is defined as the update rate to the one which the updated value of the costs is equal to the updated value of the benefits (Carvallo 1993).

In the rangelands of the Mexican dessert, it exists lack of the administration as discipline, mainly in the ranches of the social sector, being furthermore common, that the educational institution ranches, present a distressing productivity, causing lag, frustration and incompetence in their students (Romo and Chavez 1999). on the other hand for to produce, it is necessary to invest capital, where the net usefulness is the economic result of the production, that is obtained through the capital investment. To find the profitability are considered so much the interest of the own capital, as those of foreign capital (Trillas 1982). In the case of private companies, the principal goal are the usefulness; in the case of public organizations and not profitable, it is to survive and to attract sufficient funds to perform well its functions. Now then, the key is not to achieve usefulness as such, but to achieve them as consequence of have accomplished a good work (Kotler 1993). Upon accomplishing investigation where are approached economic aspects, it should be to consider that the information provided by the Producer defers of the real investment made by the same, that in occasions is insufficient (Guerra 1992).

RANCHES

For practical proposes of the present study, the word "ranches" will represent to the production unit whose principal source of matter outweighs is the rangeland and is located in the Tamaulipan Shrub of Coahuila (TSC). In this context, it is necessary to define the ranches legislation with bovine and deer, warning the opportunities and threats of that type of companies

Legislation

The sports hunt, it is a increasingly promissory activity by its link to the established markets, as well as by the important economic assessment that generates. Said activity is carried out in the extensive UMAS (Units for the Conservation, Managing and Sustainable Utilization of Wild Life), those which are properties or companies hold to record, habitat managing, population monitoring, sustainable utilization processes, managing and certification plans of the production (Rodríguez *et al*. 1998). The diversified cattle production was born in the Northeast of Mexico in 1987, grouping today to more than 800 producing (Villarreal 1999).

Opportunities and threats

As opportunities, the option of go into the cattle production diversified in the integral utilization of the resources of an rancher company (wildlife, bovine cattle producing of meat and the landscape in itself), is increased day with day. (Rodríguez *et al*. 1998). Data of a recent study in Texas suggest that the recreation activities more popular in the open air between the Texans include the fishing, camps, treks and rides, assistance parks, swimming, hunt, rides in boat and rides in bicycle (Scott 1999). The production of the deer and its utilization, always will give as a result, a value added to the cattle ranch, that practically would not be possible to obtain through traditional production system (Villarreal 1999).

With respect to the threats, the recovery and the conservation of the environment is not consider by most of the persons in the society, as a benefit for the Mexicans and for their following generations (Romo and Alvarado 1998). In reality exists a legal vacuum that it has given born to a peculiar relationship between the state and federal governments, the producers and the users of the resource; result has been a lack of valuation of the resource that is translated in the deterioration of the habitats by change in the use of the soil or wrong practical in the cattle ranching; the proposal of the managing and utilization units of the wild life (UMAS), it must be evaluated carefully; on the other hand the differences between Mexico and Texas they are huge with respect to 35,000 hunting in Mexico and 911,000 in Texas, with an economic assessment of $200,000 dollars in Mexico and $1'475'682,317 dollars in Texas, as well as 17,000 permits in Mexico and 955,505 in Texas, (Carrera and Moreno 1999).

TAMAULIPAN SHRUB OF COAHUILA (TSC)

The TSC is the type of dominant vegetation of the Subprovincia of the flatness of Coahuila and Nuevo Leon, Mexico, corresponding to the province of the great flatness of North America (SPP 1983). The TSC, is located between 99º and 102º of West length, and between 27º and 30º of north latitude (Villarreal and Valdés 1993, USDC 1979, CETENAL 1975). The region of the TSC coincides with the hunt region one of Coahuila (SEMARNAP 1998 and Villarreal and Valdés 1993) and with the zone nine of distribution of the *Odocoileus virginianus texanus*, of deer white tail in Mexico. The region where is located the white tail, encompasses the northeast part of the State of Coahuila (Rodríguez *et al*. 1998).

Climate

It is the set of atmospheric conditions that characterize to a region (RAE 1984). In the study region the type of prevailing climate is the dry or dessert (Bso) and the next to arid or next to dessert (BS1) (Rodríguez *et al*. 1998). In table 1, is presented a concentrated of data on the climate, obtained from different bibliographical references and in which most of the data coincide.

Table 1. Climate in the northeast of Coahuila

AUTHOR	COMPONENT						
	PLACE	TYPE	RAIN (mm)	T ºC	HUMIDITY	FROSTY	DRY
CETENAL (1975)	HIDALGO, COAH.		452.84				
SARH (1979)	HIDALGO, COAH.	$BS_O(H')$	400-500	22 - 24		NOV-FEB.	
Villarreal and Valdés (1993)	COAHUILA		300-635	21			
Rodríguez *et al.*, (1998)	COAHUILA NE	BS_O BS_1	400-700	18 and 22	LOW 14Jl-24Ag	WINTER	2, 3, more years

Exist a guide document in the one which there are all the existing meteorological information in the state of Coahuila, Mexico, same that was arranged by the factors of the climate and in the averages by each month of each station (Table 2). Considering that the corresponding climate to the study region is of dry type (INEGI 1999).

Table 2. Meteorological Information of the northeast of Coahuila (adapted of SFA 1997)

MONTH	JN	FB	MR	AP	MY	JN	JL	AG	SP	OC	NV	DC	σ
Tº MAX	18.54	21.14	25.44	29.08	32.18	34.90	35.37	35.49	32.38	28.75	22.98	18.99	6.4
Tº LESS	4.53	6.19	9.92	14.00	18.07	21.21	21.87	21.83	19.31	14.59	8.78	5.19	6.7
RAIN	17.83	21.35	14.70	40.18	68.40	60.53	46.04	39.34	89.22	39.69	19.64	19.85	23.0

Soil

It is the area in which live or they can live the plants (RAE 1984). Departing of general information, with local soil observations, soil units are Vertisoles Pélicos, Kastanozems Háplicos and Kastanozems Lúvicos, of great to smaller proportion respectively, for the region of the northeast of Coahuila (FAO & UNESCO 1972). In the region of the north and northeast of the State of Coahuila, soils of the TSC are with granite, sandy and deep in the valleys, to stony and shallow in high lands, commonly with good drainage (Villarreal and Valdés 1993). In the northeast of Coahuila, prevailing soils are the xerosoles and regosoles, characterized by be deep, of clayey texture or sandy-loam, whose coloration vary of clear coffee to obscure coffee and of pH slightly alkaline to alkaline (Rodríguez *et al*. 1998).

Vegetation

It is the set of the own vegetables of a landscape or existing region in a given area (RAE 1984). The Tamaulipan biotic province is the region occupy by the northeast of Mexico and the south of Texas (Kendeigh 1961). The Tamaulipan Shrub is composed by a great diversity of shrubs of less than 4 m of height, wild weed communities, native grass and some cactus as the cactus cacanapo (*Opuntia lindehimeri*) and the tasajillo (*Opuntia leptocaulis*). This type of vegetation is the most common in the area, being some of its characteristic kinds: chaparro prieto (*Acacia rigidula*), guajillo (*Acacia berlandieri*), cenizo (*Leucophillum frutescens*), uña de gato (*Acacia greggi*), coyotillo (*Karwinskia humboldtiana*) and palo verde (*Cercidium floridum*), between other. In addition to the natural vegetation, are presented the agricultural areas and of grasslands cultivated and induced (Rodríguez *et al*. 1998).

In the TSC, the association more frequent is that of *Acacia rigidula* - *Leucophillum frutescens* - *Prosopis glandulosa*, with elements of *Parthenium incanum* in the regions of the west portion, and *Cordia boissieri* in the regions toward the east. In the grassy stratum are frequent the gramineous in opened communities or protected between the shrubs (Villarreal and Valdés 1993).

Exist recent studies on inventories floristic, but are found in the basin Burgos within State of Nuevo León, Mexico realized by the Agrarian Autonomous University Antonio Narro (UAAAN). In the portion 24E, of the basin Burgos in the northeast of Mexico, specifically for the corresponding vegetation to the Tamaulipan Shrub, were obtained the following data as of a sampling by quadrants: Kind, Densities, Coverage, Diameter, Dominance, Frequencies and other values (UAAAN 1999). Nevertheless that the mentioned study obtained several data until arriving to the index of Shannon, for the present work is considered that the data more useful are those of Kind, Relative Dominance and Relative Density.

BOVINE:DEER

Bovine

Are all ruminant mammal, with the casing of the smooth horns, the nuzzle it broad and nude and the tail releases with a lock in the extreme. They are animal of great height and many of them are reduced to domesticity (RAE 1984).

It is required to deepen more in the knowledge of the systems of meat production in grazing, carrying at regional level the indices of yield or similar productivity to the registered in nearly all the United States, known as SPAs (García *et al*. 1999). On the other hand the world cattle inventories have declined 4 percent (Rosson and Adcock 1999).

Deer

Animal ruminant mammal, of some 130 cm of height, slender, of rough hair, short and brown reddish in summer and gray in winter; clearer by the abdomen than by the loin; long foots and very short tail. It is animal not domestic and is hunt to use its skin, its shafts and its meat (RAE 1984). For object of the present study, it is indispensable to specify the type of deer with the one which is intended to work, as well as the relationship male:female and the managing of this specimen:

* The type of prevailing deer in the Tamaulipan shrub is the white Tailed Texan (*Odocoileus virginianus texanus*). large part of the distribution of the deer white tailed is found in the Tamaulipan shrub (Rodríguez *et al*. 1998).

* Relationships Male:Female. Exist different three relationships male:female:suckling, that provide various efficiencies in the deer's production by hectare (Guerra, 1992) as can be appreciated in table 3. However it is recommended to maintain the relationship in 1:2.5 or 1:2 (Rodríguez *et al.* 1998).

Table 3. Efficiency in the deer's production by hectare

RANCH	RATIO Male:Female:Suckling	TOTAL DEERS	HECTARES/1DEER
1	1 : 6 : 2.58	9.58	2.5
2	1 : 5 : 2.5	8.5	6.6
3	1 : 1.2: 0.24	2.44	5

* Managing. It can be concluded that an excessive managing of the fauna not always brings the waited benefits. Certainly the knowledge of populations and ecosystems it is yet improper (Dasmann 1981).

The relationship Bovine:Deer of a ranches implies to specify the forage preferences by each animal kind, as well as the characteristics of each animal kind, those which are presented in the subsequent lines.

Forage Preferences

Preference is the primacy, advantage or majority that a person or thing has on other, already in value, already in the merit. Forage is green that is given to the cattle, especially in spring; dry grass preserved for nourishment of the cattle (RAE 1984).

The smaller competition is presented between the deer and the bovine in all the treatments and all the stations (McMahan 1977). On the other hand the reductions in density of deer and animal load of cattle are necessary to protect to the rangeland and to the deers herd (Teer 1965). The bovine presents selectivity by the gramineous while the deer by the weeds and the shrubs, except in the spring (Heady 1975). However the deer production white tail combined with cattle under all the pressures of grazing can be poor, when the deer should compete constantly with the cattle (McMahan 1977). In this sense, it is important to possess diversity of vegetation in native rangelands to assure the adequate levels of nutrients for the deer during all the stations of the year (Varner 1977). On the other hand, conclusions originating from studies led for deer white tailed, domestic cattle and the greater exotic kinds found in Texas, suggest that the deer white tailed uses a plants range more narrow, that each one of the domestic or exotic cattle; furthermore that the bovine cattle in adequate animal load is the less competitive with the deer white tailed; the problem arrives when is overcharge to the rangeland with domestic cattle as well as with deer, the deer that it is not so competitive as the cattle domesticate, suffers a wrong nourishment (Armstrong 1981). The cattle:deer proportion will depend on the desires and objective of the proprietary on the land. Will have to be better deer if the control of the number of deers, puts attention to the total animal load (Blankenship 1981). However, the exotic and native populations, as well as the grazing of the cattle should be controlled to maintain a high position level nutritional in the economically important, deer white tail of central Texas (Warren 1983). Is important to know that the cattle is able to do to vary the habitat of the wild life upon opening dense vegetation sites and to change the composition of its plants through the grazing selective. Some practical of administration of rangelands can be used to improve the habitat of the wild life, as well as to increase the forage for the cattle (Holechek *et al.* 1989). nevertheless, the habitat does not influence the preferences by the deer and the bovine cattle (Zamarron 1997). The nutritional potential of the shrubs is done not know by most of the holders of the land, above all in the northeast of Mexico (Ramírez 1998), but if is avoided the excess on the rangeland, it does not exist competition by food between bovine and deer (Rodríguez *et al*. 1998). In addition, it must be put emphasis on the competition by the grazing occurred between cattle and animal of greater hunt, in most of the situations (Miller and Krueger 1976; Stuth and Winward 1977; Yeo *et al.* 1993; Sheehy and Vavra 1996; cited by Holechek *et al.* 1998). In the period critical during the winter, the large hunt animals such as deer and moose, are concentrated in the areas more decreases, same that receive a heavy utilization from the cattle. Those are the areas where the distribution of the forage is critical (Holechek *et al.* 1998).

CARRYING CAPACITY

Carrying is the action and effect with loading or increasing the weight of some thing, Capacity is the aptitude or sufficiency for some thing (RAE 1984). The Carrying Capacity has been considered as the maximum number of animals that it can be grazed each year in a given area of rangeland, by a specific number by day, without inducing a pressure attempt in the forage production, the quality of the forage or soil (Stoddart and Smith 1955). Carrying Capacity is the maximum possible animal carrying without causing damage to the vegetation or related resources (Aguirre and Huss 1974). The important three process in those which " carrying capacity " it has been defined are: (1) the number of animals of a kind since currently it is sustained by a habitat, is measured by a period of years; (2) the limit superior of the growth of the population in a habitat, greater to which no increase can be supported; and (3) the number of animals that a habitat can maintain in a healthy and vigorous condition (Dasmann 1981). Carrying Capacity is the greater number of some kind since a habitat can sustain continuously (Postel 1994). With the previous argument and for object of the present study, as concept, the Carrying Capacity is considered as the size of the population of some given specimen, that it can sustain certain area with its resources, without injuring to the specimens of its environment. It is understandable that the same as for the case of the bovines, the possible maximum density of population of deer in a ranch has a limit, determined by the "carrying capacity" in its habitat (Rodríguez *et al*., 1998). About the considerations and the importance of a correct animal load, the carrying capacity are usually used terms when is discussed the stocking rate (Holechek *et al.* 1998). As can deal, with the term Carrying Capacity, are included two terms that is required to define to use them in the development of the work, as are: Animal Unit and Stocking Rate, that immediately are defined.

Animal Unit

Animal: some organic that it lives, it sit and is moved by its own impulse. Unit: singularity in number or quality (RAE 1984). An animal unit is equivalent to a cow of 450 kg. with its suckling (Aguirre and Huss 1974). Or its equivalent in horses, lambs, goats or deer (Dasmann 1981; USDI 1992).

Stocking Rate

Stocking Rate is the expressed current number either in animal units or animal units month, in a specific area, to a specific time (Aguirre and Huss, 1974). Is the quantity of land distributed for each animal unit during the period total of grazing of the year (Holechek *et al*. 1989). The improper charges have sponsored in the long run negative impacts on the cattle, the resource rangeland, the finances and the associated goods, such as deer white tailed and other specimens (Hanselka and Landres 1993). The animal load will have to be modified to increase the profit when the costs associated with the land are high in relationship to the costs/animal. Some authors contradict the slope of the curve in animal charges, proposing a curve sigmoid and gradual with growing slope (Church 1980). Nevertheless, the ranch used with animal charges that go of moderated to light, have much more high forage levels in foot, to be harvested during the year (Holechek *et al.* 1998).

When the stocking rate is increased to certain degree, the food by animal is limited and the production by animal starts to decline (Figure 1. A). Transported to the extreme, the production by animal will decline to the degree of the fact that the production by surface unit also will decline. However before this happen, other complications occur, this is, the costs of other resources as the work, veterinary supplements and nutritional supplements, begin to increase the level of its fixed position that reduces the cost of the land, eliminate the increase from the earnings. In this way, to achieve the goal of maximizing the annual earnings, the rancher must select the stocking rate that it is less than the correspondent to the maximum production by surface unit, but greater than the stocking rate more high associated with the maximum production by animal (Conner *et al*. 1993) appreciated in the Figure 1. B.

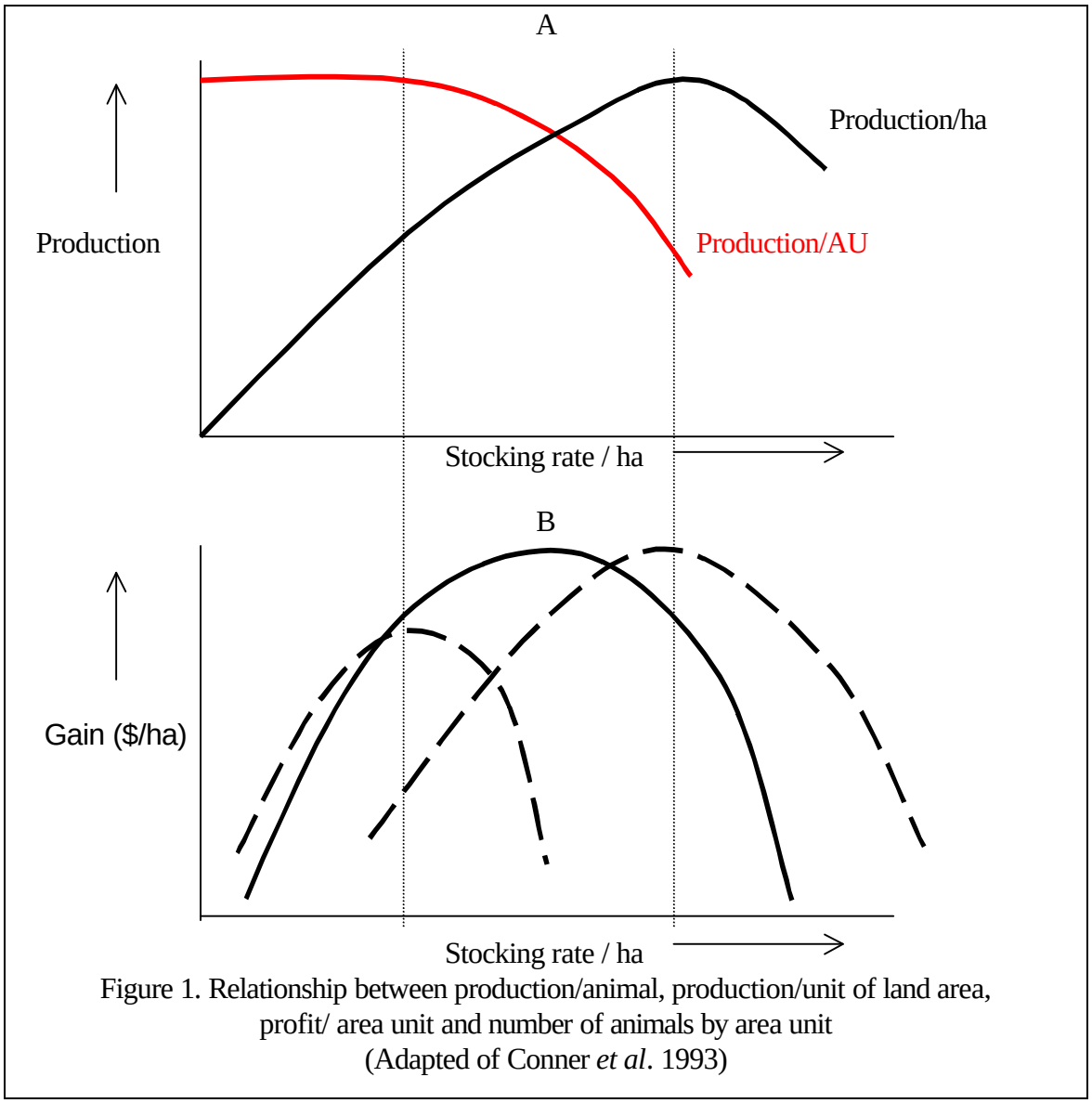

Figure 1. Relationship between production/animal, production/unit of land area, profit/ area unit and number of animals by area unit
(Adapted of Conner *et al*. 1993)

JUSTIFICATION

Today, the urgencies with respect to use of the ecosystems, turn in connection with the search of the profitability of the production units, without altering the conservation of the natural resources. Unfortunately, the profitability and the natural resources conservation in the ranches, with traditional production systems are so discouraging, that is required to change to systems more promissory; one of them is the bovine and deer production, in whose the ranches of the Tamaulipan Shrub form an important part of the total of Mexican diversified ranches; for the better conservation of the ecosystem that this type of managing implies, as well as by the greater monetary income that its products generate. In the managing of rangelands (specifically in the stocking rate) and in the economy (specifically in the profitability), exists the urgent need of predicting the results that the different relationships bovine:deer could cause in the profitability of the ranch, so that with such forecasts are taken the decisions more adequate, in the use of the rangeland and in the administration of the ranch.

In this context, the present study is considered as a better alternative, to use the model obtained as a other tool, within the decision making in the administration from the ranches located within TSC, on the part of each responsible or ranch manager as well as by the technical personnel and investigating of the region. The foregoing can bring a great number of producers and investigating benefited and consequently, to activate the economy and the discovery of the science in the TSC.

OBJECTIVE AND GOALS

It is outlined the objective of simulating the profitability upon varying the relationship bovine:deer, to establish managing strategies of the rangeland.

It is intended to reach the following goals:

1. To define a manageable interest system with a simulation model
2. To build conceptually a simulation model with respect to topic
3. To develop a quantitative model

MATERIAL AND METHODS

GENERAL AREA

It is the area that occupies an important portion of the total surface of Mexico and of United States, the characteristics of the region concerning climate, soil, vegetation and fauna, they are similar between both countries (Kendeigh 1961, Guy 1997). The Tamaulipan Shrub is the type of prevailing vegetation in the border part of the northeast of Mexico (INEGI, 1999) to see Figure 2.

STUDY AREA

The Tamaulipan Shrub in Mexico, is presented in the region occupy between 97º and 103º of west length, as well as between 24º and 30º of north latitude (SPP 1980). The study area is limited to the region that occupies the TSC that is located in the northeast of the state of Coahuila (figure 2), between 99º and 102º of West length, and between 27º and 30º of north latitude (INEGI 1999, Villarreal and Valdés 1993, USDC 1979, CETENAL 1975).

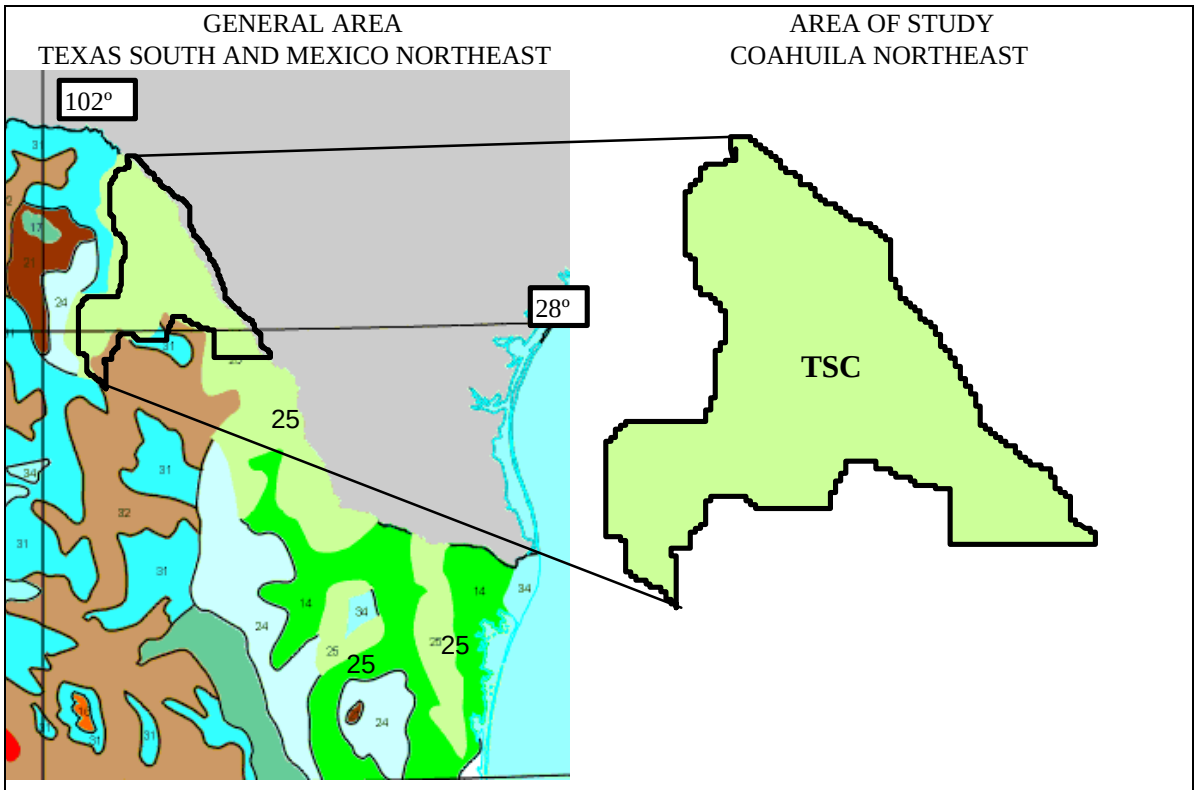

Figure 2. General area and area of study: TSC.

In this detail level the TSC is considered uniform in all its characteristic, fits to mention that accordant is deepened more in the study region, will be found differences of climate, vegetable as well as animal, ranches, economies and even cultures.

MATERIALS

The materials to use will be basically of literature, information (data) originating from private and official sources, ranches of the TSC, programs and calculation equipment, telecommunications, papers, material of compute, etc.

The calculation program to use is the STELLA® (of HPS: Hig Performance Systems Inc. 1998) being supported of the programs that operate parallel to this, as well as the statistic analysis programs that are lent to the study of the data for the simulations.

It will be required to make visits to official instances, to national and foreign universities and to ranches of the region, to acquire information and to corroborate the simulations. The presence of projections equipment will be indispensable to present the weekly advances to the advising committee, seeking the continuous improvement of the work. The use of calculation and equipment programs of projection implies material as the same computer programs, a salon equipped for the presentations, printer, scanner, disks, papers, etc. The visits imply the telephone service, the availability of a vehicle, the necessary documentation to justify the visit, etc. Fits to mention that within material of papers will be required the photocopied of articles and chapters, above all in the case of alone available information in foreign universities.

METHODS

The study will be accomplished through the Systems Analysis by Simulation Models, specifically with the program STELLA, taking the hard data of official sources and of some ranches located within the region in study, basing a criterion when exist variation in the different approaches of the consulted researchers.

It will be created a model to simulate the interest system, continuing the order that handle Grant *et al*. (1997), who after applying the systems and simulation analysis, to a variety of problems related to ecology and natural resources managing, they have identified four fundamental stages in the process of the development and use of the model, below:

I. Development of the Conceptual Model

II. Development of the Quantitative Model

III. Evaluation of the Model

IV. Use of the Model

Each one of the previous stages implies processes, determination and applications, for its fulfillment, consider that the interconnection between the four stages implies the possibility of going through each one of they more of once. With the present study will be been at the point the second previously mentioned stage, letting the bases for the validation of the quantitative model, in subsequent studies to this. What will imply to follow the following steps by each phase:

I. Development of the Conceptual Model

1. To define the objectives of the model
2. To define the limits of the interest system
3. To classify the components of the system
4. To identify the relationships between components
5. To present the conceptual model

For the foregoing, mainly upon arriving to the step 4, it is necessary to define a causative graph as complement of the order to follow, describe the elements of the model and the relationships between them, as initial advance of this project has that of the Figure 3, that indeed will be able be gone modifying in the measure that is advanced with the study and is identified the need of making to its adjustments that thereinafter permit to obtain a conceptual model appropriate possible the best to the interest system.

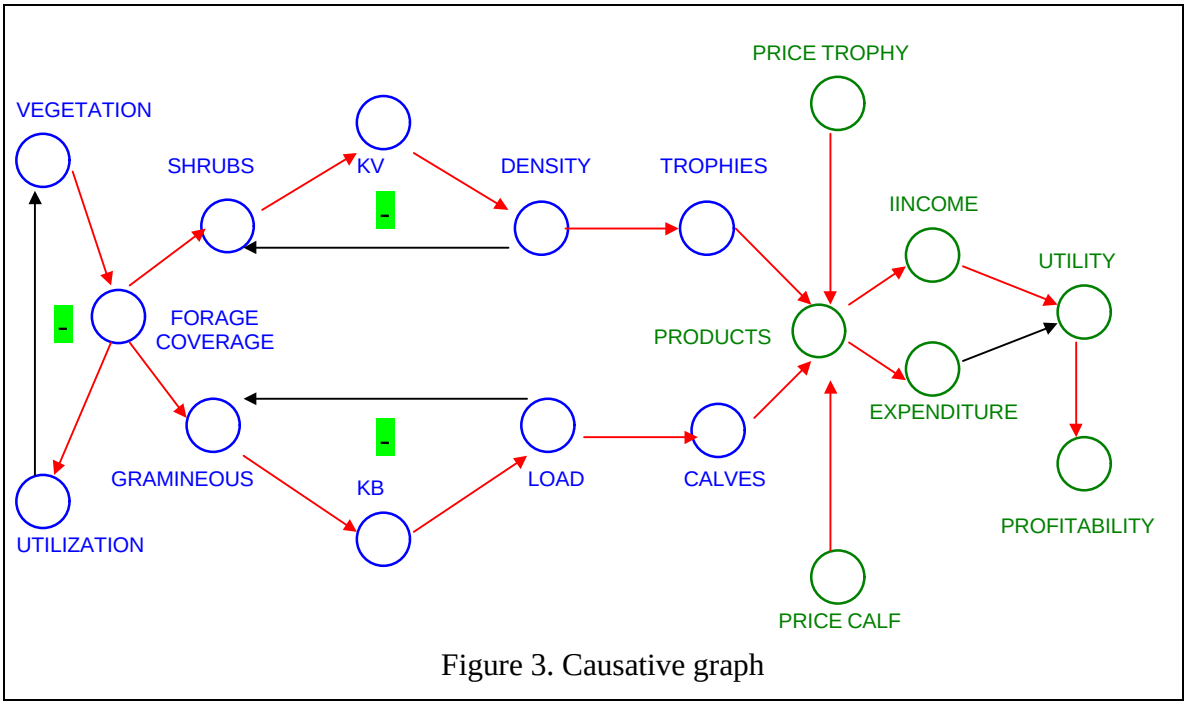

Figure 3. Causative graph

In the previous figure, the circles represent to the elements of the interest system (blue in biological aspects and green in economic aspects), the arrows represent the effect between the elements (red color in positive effect and black color in negative) and green table within cycle, manifesto the presence of a negative cycle, that is to say, a tending subsystem to the balance.

II. Development of the quantitative model

1. To select the form math for the model
2. To choose the time interval for simulations
3. To identify the form of the relationships between variable
4. To estimate the parameters of the equations of the model
5. To codify the equations of the model in computer
6. To execute the reference simulations

While they exist conceptual mistakes with difficulty will be able to do to run the model in the calculation or software program, in addition, once is make to run, it will be indispensable to analyze that the simulated forecasts will be correct. Once is specified the operation of the model, will be accomplished the relevant simulations to happen to the

subsequent stages in studies future, complementing thus the information provided by the quantitative model.

Time-Space Scale

It is the measure of the surface and of the time in the one which is considered a resource to be studied. Most of the resources must be located in the scale of meters to kilometers and minutes to years (Rodríguez 1998). The minimal period to obtain benefits in the ranches from diversified development is of a year approximately, if is that the efficiency conditions of the cattle and population of deers are adapted them from the moment of their establishment (Guerra 1992) as well as to the time in the one which normally is accomplished the obtainment of the profitability in the companies. In the present study will be used a ranch - simulation unit, formed of the characteristics that represent the cases of the ranches of the region of the TSC that are intended to simulate.

Data Managing

Of initial way, are handled the available data to build the equations and the logic phrases of the model; same that on the fly they should be of adjusting to data more reliable, as well as to equations more adequate and corresponding, to build the model of type deterministic as starting point to make it stochastic, considering that is worked with a dynamical system.

Foundation of Information

It will be indispensable to base it more possible the implicit information on the model to build, this will be achieved using the following sources:

* SCIENTIFIC. All the different authors that count on knowledge on respect to the topic in study, through verbal and written communication.
* COTECOCA. It will be justified by that to date, it is the only one official source with respect to the carrying capacity in the TSC.
* SPP. Will provide information concerning climate.
* USDA. Collaterally to the information of SPP will provide comparable information, in light of the fact in Texas exists part of the Tamaulipan Shrub.
* FIRA. It is the official dependency with greater information with respect to the economy of the ranches of the region, nevertheless that will be complemented with the internal information of the ranches in the branch.
* SEMARNAT. Will provide the information more recent concerning the UMAS and the legislation aspects with respect to environment .
* RANCHES. They will be considered in the understood of the fact that possess the information with the one which in reality the owners finally take the decisions.
* OTHER. They will be found other sources with relevant information.

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