

# Chihuahuan Desert Ecoregion Program

## World Wildlife Fund-Mexico.

### I.- History of Livestock Industry in the Chihuahuan Desert.

First any conquest of America, the native people of México and United States, lived in harmony with nature, they were hunters, but their principal interest were not the product, but the process of nature, they used what they needed, and the recovery of land was in its way.

#### A.- Spain 1550-1821

Previous of the arrival of spaniards, exists in México animals like bison, wild boar and hares, rabbits, etc. Only turkey, goose and hairless dog was domesticated for a small group of families (Saucedo, 1984). The bison and phronghorn and other wildlife had no frontiers, they came through México and United Sates without barriers, this is the reason because there wasn't degradation of land until the number of bison were very large.

In 1521 began the constant flow of cattle and other products from the islands and the first cattle monopoly establish in 1523. In 1526 the Crown limited the trail of people form islands, but not of the cattle, so proliferation of cattle began in New Spain (Esparza, 1988).

The excelent quality of land and climate favor the spread of cattle in mexican territory. Once distributed, in the haciendas began the breeding of horses, mules and sawhorses for hard work. The principal uses of this kind of cattle was transporting perople, mining and cattle management (Saucedo, 1984). Near 1555 it is said that were about 60 estancias with more than 150,000 beef cattle and mares (Esparza, 1988).

The exploitation of animals had no a specific objective, all the settler wanted was to increase the number of animals, not to improve the breed. In this manner, the degradation of native range began and with this the lack of grasses (Saucedo, 1984). The conqurers more important fact was the product (first the gold, latter the land and after the land, more and more cattle, more and more enslaved, etc.), not the process of nature, they wanted wealth in expenses of the land.

By 1542 or 1545 the pressure of animals in central México was very hard for this, began the movement to the North of México and the areas inhabited. In 1574 the command was that the cattle could graze only in uncultivated lands and stubble ground, this command was not observed and indians protest (Esparza,1988).

Fray J. A. Morfi (1980) narrate in his book of the trip of indians and journal of Nuevo México, the conditions of México in 1777. Missions were the outpost of spaniards, they had the cammandership of pacify and evangelize indians, with this the subdue of indians to make toil labor were easy and they can own land for missions. Related mining activity in Zacatecas, the use of horses and mules. In the trail of Fresnillo and Sombrerete he could observe good grasses, and in the Haciendas of Los Muleros and El Ojo had breeding of cattle, horses and about 60,000 sheeps. In 1736 only in one distrit of the Curato of Sagrario grazed 80,000 beef cattle, 2,000 herds of mares, that anually brought 2,000 mules and horses, and 5,000 bulls and cows and 150,000 sheeps. In the time Morfi arrived, he just could see trace of that land.

Beef cattle decrease by the XVII century and the sheep develop extraordinarily (Esparza, 1988). In the 18<sup>th</sup> and 19<sup>th</sup> century cattle and horses were essentially feral animals looking after themselves on vast expenses of semiarid rangelands (Young et al., 1979).

Different tribes of natives lived in the now Chihuahuan desert like tobosos, cocoyomes, tlaxcaltecas, chchimecas, huachichiles, tinapihuayas, pihuigues, pauzanes y julimeños, etc.(an extense list and charts of ditribution of natives present in Annex 1).

## 2.- Large Haciendas

Los mayorazgos, las prerrogativas en favor de los españoles, el abandono de las poblaciones indígenas y la desigualdad en la distribución de la tierra, fueron los vicios de la organización agraria en México durante la colonia (Saucedo, 1984, Menes, 1993).

Para Herbert (1988), la hacienda se considera la institución económica más importante durante el virreynato. Se pueden determinar tres etapas en su desarrollo histórico:

La primera corresponde a la de su formación a abarca de 1530 a 1630.

La segunda es la de su consolidación y se efectúa entre 1630 y 1730 en la cual fue posible aunar a las propiedades legítimas, los terrenos que la hacienda había adquirido sin justos títulos o de manera dudosa mediante el pago de composiciones.

Finalmente encontramos la etapa clásica, de 1730 a 1821.

El primer mayorazgo aparece en 1550, pero adquiere relevancia en el siglo XVII (Menes, 1993).

By the XVI century the livestock in México was esplendorous, the haciendas with extense land and thousands of beef cattle and mules, mares and horses were in their apogee. From 1570 to 86 Don Diego de Ibarra the landowner of El Trujillo hacienda in Zacatecas, branded about 37,000 bull calves annually and in Las Poanas of Don Diego del Río, about 42,000. They could have about 50 or 60 thousands of breeding cows (Esparza, 1988).

Just in Saltillo, plenty of streams and fertile lands, were 49 haciendas and ranches and 665 springs of water small and large. There were only two landowners of the family of Sánchez Navarro and Santos Rojo y (Morfi, 1980).

About 1803 in Zacatecas exists 66 rustic haciendas with extensions between 5 to 100 sites of beef cattle and minor, but there were from 120 to 160 sites with only beef cattle with precious grasses and cultivated land, with plenty of water (streams) but, these sites needed care the landowner couldn't bring, so the brake up supposed had the solution (Esparza, 1988).

En la segunda mitad del siglo XVIII se presenta la etapa clásica de la hacienda, sus caracteres son bien definidos según Menes, (1993):

Establecimiento de infraestructura necesaria para la explotación de la tierra.

Aseguramiento de la mano de obra

Comercialización de sus productos en los centros urbanos y poblaciones dedicadas a actividades económicas diversas, como la minería.

Para 1810 estaban registradas 3,749 haciendas y 6,689 ranchos, o sea un total de 10,438 unidades de producción. En 1854; 6,092 haciendas y 15,085 ranchos, con un total de 21,177 centros de explotación. En 1876; 5,700 haciendas y 13,800 ranchos, lo que da un total de 19,000. En 1893; 8,872 haciendas y 26,607 ranchos que registraban un total de 35,479 unidades de producción. Para 1908 en número de fincas rústicas era de 42,237. El aumento en el número de ranchos y fincas parece significar el fraccionamiento de las haciendas (Saucedo, 1984).

En el Estado de Coahuila existían propiedades como: Los Jardines, con 49,861 has; Santa Teresa, con 60,899; San Gregorio, con 69,326 has; Santa Margarita, con 81,185 has, y San Blas, con 395,767 has. En Sonora la Hacienda la Cocóspera tenía 51,528 has., en Chihuahua, la Santísima tenía 118,888 has.; La Lagunita del

Dosal, con 158,123 has., San José Babicora con 63,201, La Nariz y Santa María con 196,628 has. y Bachimba con 50,000 has. En Zacatecas, El Malpaso con 63,786 has; San José del Mangué, con 69,086 has. Don Luis Terrazas en Chihuahua poseía 60,000 km<sup>2</sup>, existía la anécdota de si le preguntaban si era de Chihuahua, él contestaba, “no, Chihuahua es mío”, solamente en 17 propiedades tenía una superficie de 7.6 millones de has (tomado de Roa, en Saucedo, 1984).

Aunque muchas órdenes religiosas fueron propietarias de tierra para cultivo, los jesuitas fueron quienes contaban con las mayores extensiones y quienes llevaron las misiones a el sur de la Unión Americana.

Maybe there was a pronounced social difference, a small amount of land owners and a large amount of indians whose worked for them. But the large extensions of land permit move the cattle through Northern to Southern plains and grasslands and the degradation, until present, was not so serious as later when the land atomized. La cría de borrego se dio fuerte en Chihuahua y Zacatecas, en donde existieron haciendas con varias docenas de miles de cabezas de ganado lanar. Según Kaeger (1976) había cuatro tipos de trabajadores en las haciendas: Peones, Trabajadores eventuales, Arrendatarios y Medieros o aparceros.

### **3.- Land Grants.**

La transferencia de la tierra sucede dentro de la misma hacienda, se arrendan parcelas y de esta manera el hacendado sigue recibiendo frutos y no perdía la tierra. En esta época, no se habían desintegrado realmente las haciendas y latifundios, se iniciaron las parcelas dentro, pero no fue sino hasta el siglo XVIII y XIX y todavía en el XX cuando la disolución se presentó verdaderamente.

Inicialmente la Hacienda contaba con toda su superficie, con el Mayorazgo se incrementaron las superficies de las haciendas en favor de los hijos del hacendado, posteriormente se inició la fracción de ellas en Ranchos, mismos que contaban con grandes extensiones (como se podrá observar en puntos posteriores). Posterior a la Independencia se realiza el reparto agrario.

## **B.- México 1821-1914**

### **1.- Haciendas**

Previous information was presented in A.2

Al finalizar el periodo colonial se fundaron los consulados o juntas de gobierno, cuyo objetivo era fomentar la agricultura, industria y comercio, pero no tuvieron éxito (Saucedo, 1984).

La monarquía española ejerció una presión que iba en aumento y produjo una fuerte reacción de todas las clases sociales que habitaban el país, esto se tradujo en el movimiento de independencia que derrocó al régimen colonial (Saucedo, 1984).

La poca información con que se cuenta está basada en los archivos de las haciendas (Katz, 1976).

Durante este periodo la atención que recibió la ganadería fue casi nula. Solo la administración de Santa Anna y durante el imperio se prestó atención al desarrollo de la zootecnia. Fue en la época de Don Porfirio Díaz cuando se formalizó el pensamiento ganadero y se llevaron a cabo realmente acciones. En 1898 el embajador de México en Washington informó :

“ México será, antes de mucho tiempo, un gran productor de ganado vacuno, ha enviado en dos años, cerca de 400,000 reses pequeñas y mal desarrolladas a los Estados Unidos.... los criadores de México no han adelantado mucho en la formación de razas selectas, no aprecian su valor y no pagan la mitad de lo que valen los animales de línea pura”. El Gobernador de Chihuahua, para 1909 dio la declaración de que la ganadería

sería una de las industria más lucrativas del país. En Chihuahua se contaba con grandes y hermosas planicies y llanuras para ello (Saucedo, 1984).

Para 1910, al finalizar el régimen de Porfirio Díaz, aproximadamente el 95 % de los jefes de familia campesina no tenían tierras, en cambio, en Chihuahua se entregaron más de 13 millones de has. de terrenos nacionales a solo 7 concesionarios, en Durango se otorgaron a 2 personas tierras por cerca de 1 millón de has. a cada uno, no para campesinos, sino para favoritos y políticos. El latifundio de los Terrazas, tenía más de 2.5 millones de has. con 300,000 bovinos, 125,000 lanares, 25,000 bestias caballares, 15,000 asnales, o sea, 12 reses por kilómetro cuadrado (Saucedo, 1984).

La revolución victimó por igual caballos y vacunos. Los ganaderos se convirtieron en la proveeduría de los bandos combatientes; para sufragar gastos se enviaron a Estados Unidos, ganado en pié, cueros, sebos, etc. saliendo aprox. 2.5 millones de cabezas y cerca de 400 millones de libras de productos. Podríamos decir que para 1910, la revolución acabó con el 50 % del inventario ganadero del país, liquidando, prácticamente el de la zona norte. No fue sino hasta los años 20's que volvió a surgir la ganadería (Saucedo, 1984).

## **2.- Land Grants**

Same as A.3.

## **C.- México 1914 to present**

### **1.- Ejidos**

La palabra Ejido deriva de la voz latina *exitus*, que significa salida.

Cuando los españoles iniciaron la conquista en 1519, el territorio estaba sometido a una federación integrada por señoríos. Existía el derecho autóctono, el cual se caracterizaba por ser funcional y relativo. El hombre es funcionario de la colectividad, implica esto, una idea de servicio de cada individuo en beneficio de la comunidad (Rincón, 1980). El ejido era la tierra que rodeaba al pueblo.

En las primeras leyes de indias se ordenó que se fundaran exidos. La Ley XIII dictada en 1523 establece que los exidos sean en tan competente distancia que si creciera la población, quedara espacio para recreación y ganado. Sin embargo los españoles querían grandes extensiones de tierras particulares, por lo que el ejido se convirtió de lugar solaz y divertimento, en el lugar en el que pastan los ganados. Para 1857 pareciera que los ejidos no tenían propietario, por ello el gobierno dispuso que los ejidos se repartieran entre los padres y jefes de familia de cada pueblo. Se procedió a la enajenación de los ejidos y a su reducción a propiedad privada individual (Rincón, 1980).

En el Plan de Ayala Zapata hace constar que se expropiarían, previa indemnización de la tercera parte de esos monopolios a los poderosos propietarios de ellas a fin de que los pueblos y ciudadanos de México obtengan ejidos, colonias, fundos legales para pueblos o campos de sembraduría y labor para la prosperidad de los mexicanos (Rincón, 1980).

Para Stavenhagen y colaboradores (1976) el ejido como unidad económica para la explotación prácticamente no existe. El Ejido ha llegado a ser solo un conjunto de minifundios, la mayor parte de ellos de temporal, que son trabajados aislada e individualmente por los ejidatarios. La pequeñez de las parcelas condena a los ejidatarios a ser subocupados, con la asistencia técnica mínima que reciben, no hay grandes esperanzas de progreso. Así mismo, no se ha desarrollado la idea de cooperación en el trabajo entre los ejidatarios.

By 1991 with the reform of Art. 27, exists in México 27,410 ejidos that occupied more than half of México's arable land and nominally provide employment for 3.1 million of ejidatarios. The reforms of Art. 27 may have a more far reaching and enduring impact than any other economic reforms introduced in México by technocratic governments since 1982 (Cornelius & Myhre, 1998).

The reform of Art. 27 came a part of a package of neoliberal reforms. These include the North American Free trade Agreement (NAFTA), privatization of states enterprises, deregulation of agricultural produce markets, and the privatization of irrigation water management. These changes have had differential impacts on agriculturalist, depending on the crops they cultivate, the power to negotiate access to credit markets, their household resource base. Along with NAFTA, for the ejidatario household, these changes brought a heightened sense of vulnerability, with two consequences. First, households were more inclined to rent out their land while they diversified household income through migration to the United States and nearby Mexican cities. Second, the renting of land to nonejidatarios, created a shadow social structure, interests outside of ejido organizations can take control of land and possibly water resources. For most, the term ejidatario has lost its sense of a special relationship with the state, won over time. In the process, ejidatarios will create new organizations, both formal and informal, as they redefine their own identity and their relationship to the state (Cornelius & Myhre, 1998).

## **2.- Private Ranches**

### **3.- State and Federal grazing laws, regulations and policies.**

A nivel nacional existe solo el Reglamento para la Determinación de Coeficientes de Agostadero que se publicó en el Diario Oficial de la Federación de 1978. Contiene 11 Artículos y da la prerrogativa a la Sría. De Agricultura y Recursos Hidráulicos de aquél entonces para llevar a cabo las investigaciones necesarias. Este reglamento está basado en la Ley de la Reforma Agraria ya derogada, por lo que es inoperante (Cabral y Aguilar, 1995).

En lo que se refiere a cercos y pastos, existen 11 legislaturas estatales (solo Zacatecas del Desierto Chihuahuense), en materia de Conservación y Mejoramiento de Terrenos para Criaderos, Agostaderos y Praderas artificiales, existen 22 legislaturas estatales (Coahuila, Nuevo León, San Luis Potosí y Zacatecas, del Desierto Chihuahuense) (Cabral y Aguilar, 1995).

La Ley del Estado de Zacatecas contempla puntos importantes según Cabral y Aguilar ( 1995), como:

- Realización de estudios continuos de los tipos de vegetación en coordinación con la dependencia de que se trate
- Prohibición de quema de pastizales, agostaderos, bosques o malezas al margen de la carretera.
- Prohibición de desmonte de agostaderos sin previa autorización.
- Se prohíbe introducir mas animales de los que establezca un estudio de coeficiente de agostadero.

Solo en la ley ganadera de Zacatecas se establece la manera de ponderar la capacidad de los potreros, establecida por unidad animal y considerando a un bovino de 450 kg de peso (o una vaca adulta con su cría) o su equivalente en ganado menor (Cabral y Aguilar, 1995).

Como fuentes de información en este rubro existen, (Cabral y Aguilar, 1995):

- Código Administrativo del Estado de Chihuahua (1974)
- Ley de Fomento Ganadero del Estado de Coahuila (1969)
- Ley de fomento Ganadero del Estado de Durango (1969 y proyecto 1989)
- Ley de Ganadería del Estado de Nuevo León (1962 y proyecto de 1992)
- Ley y Reglamento Ganadero del Estado de San Luis Potosí (1974)
- Ley de Ganadería para el Estado de Zacatecas (1983)

En lo que se refiere a programas nacionales, uno de los más detrimentales para México fue el Programa Nacional de Desmontes, a través del cual se desmontaron cerca de 650,000 has. entre 1979 y 1990, este programa surgió como una necesidad para el establecimiento de praderas y otros conceptos, desgraciadamente esto ha acelerado la desertificación, sobre todo en áreas áridas y semiáridas.

Dentro del Programa Nacional de reforestación, se tiene contemplada, no solo la reforestación forestal, sino la pastización, protección y restauración de áreas. De llevarse a cabo de manera eficiente, podríamos contar con áreas de pastizales naturales en recuperación, para el año 2020.

Existe la Ley General del Equilibrio Ecológico y Protección al Ambiente y leyes ecológicas para los estados como en el caso de Coahuila. En ellas se especifican competencias y, existen capítulos que se refieren a flora, fauna y áreas protegidas.

Solamente en este año (1998), los incendios forestales, más de 13,700 en todo el país, acabaron con más de 530,000 has., por lo que es inminente un programa de recuperación inmediato, en el que se contemple conservación de suelo y prácticas de rehabilitación sustentables.

## **D.- US 1846 to present**

### **1.- Open Ranges**

By 1500, before European settlers came to North America, between 60 million and 125 million of grass eating american bison roamed the plain, prairies, and woodlands over most the continent. Single herds covered thousands of square kilometers of land. First american settlers viewed the continent as a hostile wilderness to be conquered, opened up, cleared and used as quickly as possible. This frontier attitude led to enormous resource waste and little regard for future resource needs (Miller, 1992).

By 1840, Ohio settlers had occupied most of the prairie land adjacent to rivers and timber, and some were moving to Indiana, Missouri and the Lake States, the grasslands were practically untouched (Donahue et al., 1956).

During the period of 1850 to 1880, the prairies and plains were effective barriers to westward expansion. For two hundred years agricultural settlement had followed streams, but here a few narrow trails were the only routes into the vast tall-grass prairie and short-grass plains beyond. Indians were a constant threat to the settlement of the west. Population pressure on the east forced settlers to establish new communities on the prairies from Ohio to Mississippi and from Canada to Texas. A few years later the steel plow proved to be an effective implement for reducing manual labor and animal power (Donahue et al., 1956).

In 1849 the gold rush to California temporarily diverted the efforts to conquer the prairies. Eastern farmers who had been accustomed to high rainfall soon found that their crops and methods were not adapted to the Great Plains. The settlement of the Great Plains was the beginning of dry farming in the United States. The natural vegetation was the main factor in the development of the range-cattle industry. Such native grasses as the grama, buffalograss and mesquite grass provided good grazing in the states to which they were adapted. Mixtures of warm-season and cool-season grasses were a dependable source of forage from early spring to late fall, and the dry vegetation which consisted of standing grasses that had not been heavily grazed was good winter pasture (Donahue, et al., 1956).

The conditions prevailing in the grassland interior during the century from 1750 to 1850 were anything but the eighteenth-century ideal "state of nature". By 1854 the steam railroad not only made the grassland a grain-growing area, but also provided the structure for its livestock economy. It made also possible the marketing of the Pacific Coast products and the Northwest populations at the population centers of the East (Malin, 1956).

Jared Smith made a research about the grazing problems in the southwest in 1899 and he found this: In 1883 the Texas Pacific Railroad was built through the heart of the range country. Owners, agents of land and investors were seeking to acquire free range and free grass. The native grasses would support 300 head of stock per square mile. New comers thought that this richness of vegetation was normal. The result was grazed

an exhausting overstocking. The best grasses were eaten down to their very roots. Every green thing was eaten down, they could neither ripen seed and thus preserve its kind.

The grazing capacity has been reduced within a period of twenty years, from one head to 2-5 acres to 1 head to 20-25 acres (in annex 2 show the list of the replies received from stock and range owners in the State of Texas in 1894). Such denuded areas occur in New Mexico and Arizona. The chief cause of overstocking was the free range system. Overstocking caused the rapid extermination of the most valuable of the native and forage plants. On the Southern prairies, the stockmen seen the change with grasses only at intervals and prickly pear near so thick to drive cattle (Smith, 1899).

Because the grassland possessed environmental peculiarities quite unlike the conditions of the forest, European-American culture with its forest background approached it with an unconscious ecological outlook quite foreign to the requirements of life under the strange conditions that had produced a grassland. The grassland was characteristically a "sawed house", not a "sod house", country and still remains so (Malin, 1956).

The American Civil war stopped the movement of range cattle out the Southwest and the Northern Great Plains. After the war there was a steady migration of people from South to these regions. The railroad which extended into the range country carried cattle to the large population centers in the East in a few days (Donahue et al., 1956).

According Miller (1992) after the Civil War, the federal government turned its attention to expanding the frontier westward. That meant displacing the Native Americans- mostly Apaches, Comanches, Arapahos, Kiowas, and Sioux- who were obstacles to settling the plains this involved the mass killing of these indigenous people and of the American bison, which served as a major source of food and another resource for these dwellers on the land. In 1850, about the 85% of the total land area of the United States was government owned. Most of this land had been taken from indigenous Native Americans, who had lived on it sustainably for thousands of years. By 1876 remaining Native Americans had been pushed onto a few government-managed reservations. As railroad spreads westward, in the late 1860's, railroad companies hired professional bison hunters to supply construction crews with meat. The well known bison hunter "Buffalo Bill" Cody killed an estimated 4,280 bison in only 18 months.

The disappearance of the buffalo was nearly coincident with that of the Indian and there was a period of until ten years after the destruction of the buffalo herds, before the number of cattle and sheep on any portion of the ranges equaled the great herds of game. These years, from 1874 to 1884 may be called the "golden period" of the southwestern stockman. During this decade there were fewer head of stock, abundant rain and the seasons were favorable to the development of the grasses. It is common testimony of the older stockmen that in the early eighties the grass was often as high as a cow's back, not only along the river bottoms, but also in uplands far from creeks and rivers (changes in bison population are shown graphically in annex 2) (Smith, 1899).

Between 1865 and 1880, several railroads were built into the towns east of the Missouri River. From 1870 to 1890 aided by an abundance of nutritious grasses and the railroads, the raising range cattle was the most important industry in the Great Plains. Grasshoppers and severe drought plagued the settlers from 1863 through 1867 (Donahue et al., 1956) According with Stoddart et al. (1975) 1866 marks the beginning of the movement of cattle in considerable proportion. (routes of Texas trail herds are shown in Annex 3). In 1889 just 542 buffalos remain in plains (Rodriguez, 1979).

The settlers aided by the westward extension of the railroads offered an excellent market for livestock. Phenomenal increases in cattle numbers occurred until 1885. An immediate collapse was precipitated by the winter 1885-86. In a 85% the animals dead over wide areas of range (Stoddart, et al., 1975).

By 1900 the days of consolidation, farming, ranching, and pioneer home making just begun. The use of grasslands always has been a major problem in the manager of the public lands, known as the public domain. In 1802 the public domain had grown to 266 million acres. With large transactions, a public domain of almost

1,500,000,000 acres rounded out the present continental U.S.: Texas, the Louisiana Territory, and the lands acquired from México were mainly grasslands (Stoddart et al., 1975).

## **2.- Cattleman's Associations**

The following national industry organizations work as partners to accomplish the vision of beef industry as a dynamic and profitable, and are guided in their efforts by Beef Industry Long Range Plan (1998).

\*National Cattlemen's Beef Association (NCBA), is the marketing organization and trade association for America's one million cattle farmers and ranchers. Offices in Denver, Chicago and Washington, D.C.

\*Cattlemen's Beef Board (CBB). Oversees the collection of \$1.00 per head on all cattle sold in the U.S. and \$1.00 equivalent on imported cattle, beef and beef products.

\*American National Cattle Women (ANCW) founded in 1952, focuses on promotion and consumer education regarding beef as a nutritious food.

\*U.S. Meat Export Federation (USMEF) is a non-profit, international trade organization working to identify and develop foreign markets for U.S. beef and veal.

\*Cattle Fax is a member owned information organization, serving producers in all segments of the cattle business.

## **3.- State Lands**

During 1781 to 1802 seven states turned their owned lands over the government, and this became the first public domain (Stoddart et al., 1075). Later with the Homestead Acts land was given to stockmen. Public lands became managed and protected for government agencies for different purposes.

Later turn in Public Lands.

## **4.- Bureau of Land Management**

The Bureau of Land Management (BLM) of the Department of Interior had a special interest in initiating grazing management systems as an alternative to weed control and seeding for range improvement in 1968 (Young et al. 1979). By 1976 The Federal Land Policy and Management Act gave it real authority to manage public lands (Miller, 1992).

Actually BLM manages nearly 270 million acres of publicly owned land for timber production, recreation, oil and gas development, livestock grazing, hunting, mining, fishing, and many other uses. Public lands provide significant social, ecological and economic benefits. Approximately 19,000 ranchers graze livestock on nearly 170 million acres of public rangelands, nearly 14% of the land base in the lower 48 states. Debate among the many users the public rangelands had occurred for decades; often resulting in litigation and controversy. To improve their management, BLM published new grazing regulations in August of 1995. A new (7/28/96) version of the Public Rangelands Management Act is under discussion in the House of Representatives. The Corporate Agenda of BLM is presented in Annex 4 (BLM Fact Sheet, 1998).

## **5.- Private Lands**



By 1887 most of the highly productive lands of the middle West had passed to private ownerships (Stoddart et al., 1975).

## **6.- State and Federal grazing laws, regulations and policies**

Land policies greatly affected the course of range management in the United States. During 1781 and 1802 seven states turned their unowned lands over to the government, and this land became the first public domain (Stoddart et al., 1975).

In 1862 The first homestead law opened the west to agricultural settlement. Was designed to give settlers a chance to establish permanent homes on land which had been the public domain (Donahue et al., 1956). The first self-regulating windmill was invented in 1854, to 1883 windmills and towers became available (Donahue et al., 1956).

The Timber Stone Act (1878) permit industries acquire large holdings of timberland, much of this land was suitable for grazing (Donahue et al., 1956). In 1891 Congress passed the Forest Reserve Act, it set aside Yellowstone Timberland Reserve as the first federal forest service (Miller, 1992).

The Reclamation Act of 1902 authorized the Secretary of Interior to withdraw public lands for reclamation projects (Donahue et al., 1956). In 1905 Congress created the U. S. Forest Service to manage and protect the forest reserves (Miller, 1992). By 1909 The Enlarged Homestead Act, increased the homestead size to 320 acres in nine western states (Stoddart et al., 1975).

In 1916 The Stock-raising Homestead Act for land not adapted to cultivation, gave stockmen 640 acres (260 has.) to carry 50 head of cattle, this principle had followed for fifty four years (Stoddart et al., 1975; Donahue et al., 1956).

The Taylor Grazing Act of 1934 provided for the organization of about 80 million acres of public lands outside national forests into grazing districts under supervision of the Department of Interior, by 1967 were over 138 districts (Stoddart et al., 1975). This marked the beginning of regulation of grazing of domesticated livestock specially in the west (Miller, 1992).

The Federal Land Policy and Management Act in 1976 kept the grazing service (In 1946 the Bureau of Land Management) poorly founded allowed many ranchers abusing on land (Miller, 1992).

Between 1940 and 1960 there were few development in federal resource conservation policy. Between 1969 and 1980 Congress passed more than 24 pieces of legislation to help protect the air, water, land and wildlife. The Federal Land Policy and Management Act of 1976 gave the Bureau of Land Management its first real authority to manage the public lands, mostly in the west, under its control (Miller, 1992).

The U.S. House of Representatives in October 1997 passed the Forage Improvement Act of 1997, HR 2493 (a copy of the summary is presented in Annex 5).

## **II.- Current Economic and Institutional Forces.**

### **A.- Demand for Beef**

About 73 percent of all public land in the contiguous 11 western states is grazed by domestic livestock (Nielsen and Workman, 1971). The percentage of privately owned land in the 11 western states that is grazed is probably even higher. Why is this land grazed by livestock rather than used in some other way? Range forage is a "flow" resource that with present technology can be converted on a large scale to products useful to man only through livestock grazing. The Midwest can also produce more cattle per acre than can the 11

western states. The Midwest can outproduce other areas in all three crops, it can outproduce them more in terms of net return per acre with corn than with wheat or cattle (Workman, 1981).

It should be recognized that many genuine family ranching operations have spanned several generations. Thus the \$ 2500 per broad cow unit implied here actually represents current market value of land, livestock, etc, rather than the amount actually invested in these assets at the time of purchase. Supply is defined as the quantity of a product willingly offered for sale per unit of time at a specific price (Workman, 1981).

Los precios reales y actuales (con la inflación ajustada) han alcanzado los niveles más bajos desde la Segunda Guerra mundial (Holecheck et al.,1994). Muchos productores en los Estados Unidos de América y México se están preguntando cual será el futuro para los precios de la carne. Los bajos precios de la actualidad reflejan los mayores incrementos en la producción de carne en relación con el crecimiento de la población humana los cuales han ocurrido en los Estados Unidos, Argentina y Australia. Factores indirectos tales como la economía mundial y la producción de granos han afectado también la demanda de carne (Holecheck, 1995).

Otro hecho es el incremento de los abastecimientos mundiales de carne a partir de un aumento de su producción en países de desarrollo particularmente en Argentina y Australia. Estos países están ganando el mercado mundial debido a que sus costos de producción son mucho más bajos que en los Estados Unidos de América. Los costos de producción son casi un 62% más bajos en Argentina y casi un 34% más bajos en Australia comparados con los precios de los EUA, por esta razón los Estados Unidos ahora importan más carne que la exportan (Holecheck, 1995).

“As the economy in Mexico continues to recover, meat consumption is up and interest in the program is very high on the Mexican side. Mexico is the fourth largest export market for U.S. beef, with sales this year expected to top 60,000 metric tons. Sales of U.S. beef to Mexico for the first six months of 1996, including beef variety meats, were up 38%, compared to the same period last year. The USMEF has set an export goal of 167,000 metric tons for U.S. beef sales to Mexico in the year 2000, a goal Cobb believes is within reach as the number of U.S. meat sections grow ( Willis & Oates, 1996).

For Willis & Manuel (1995) the initiatives must be checked off by producers and the U.S.D.A. were:

- 1.- The underlying fundamentals in the Mexican market remain strong.
- 2.- The Mexican market in recent years has demonstrated tremendous growth potential for U.S. beef and pork.
- 3.- The USMEF will continue to focus on programs and activities in Mexico to help the Mexican trade and U.S. suppliers weather this period of uncertainty and high import prices.

In 1993, Mexico purchased 80,314 metric tons of U.S. beef and beef variety meats, making Mexico the third largest export customer for the American beef industry. In 1994, the U.S. Meat Export Federation forecasts export volume of U.S. beef and beef variety meats to Mexico will be 93,938 metric tons, with a value of \$198.9 million (Oates, 1994).

Questions and answers, ¿Did You Know? (Cattle Organization web page)

Cattle farmers and others with cropland have been increasing their soil-conservation practices? USDA's Natural Resources Conservation Service says water erosion of cropland was reduced by 24 percent during the past 10 year. Two-thirds of soil savings was made on highly erodible land. In some areas hilly land has been converted from crop production to grassland for grazing, thus saving soil.

Cattle consume millions or pounds of by-products of the industry? Approximately 10 percent of all concentrates (feedstuffs like grain and protein feeds, other than forage and roughage) are food by-products.

Exports now account for almost 13 percent of the wholesale value of total U.S. beef production? According to a Beef Board report, that figure compares to four percent just 10 years ago. Demand for U.S. fed beef, with its recognized eating quality and safety, has been increasing in Asia in particular.

## B.- Costs of Supplemental Feed

Supply is defined as the quantity of a product willingly offered for sale per unit of time at a specific price (Workman, 1981).

### Hypothetical Supply Schedule for Beef

Beef price (\$ / lb)	Quantity offered for sale (billion lb beef per year)
0.25	1.56
0.50	9.38
0.75	17.19
1.00	25.00
1.25	32.81
1.50	40.63
1.75	48.44

The concept of supply, based on the positive relationship between price and the quantity offered for sale.

## C.- Feedlots

Cattle coming directly from the range or pastures as weaners or stockers have neither the size, fleshing or finish to adequately supply the market with quality beef demanded by the consumer. Consequently these cattle must be placed in a feedlot to complete the growing-finishing process. Cattle feeding has been a growing industry and has become highly specialized. There are many management decisions which must be made in the complex business of cattle feeding. Each feedlot has its unique position. Cattle feeding is not a new enterprise, and integration is not new to the cattlefeeding business. Early statistics are sketchy at best, but we know that cattle feeding was associated with the production of feed grain (Thompson & O'Mary, 1983).

The USDA publication "Demand and Prices for Meat" (Breimeyer, 1961) gives estimates of the number of cattle on feed and fed-cattle marketings from 1922 (Palme, 1983).

### Cattle on Feed and Fed-Cattle Marketings\*

Year	No. of cattle on feed Jan. 1 (1,000 hd)	Fed cattle marketed (1,000 hd)	Fed cattle as percent of all cattle slaughtered (%)
1925		3,600	24.5
1930	3,113	3,675	30.5
1935	2,215	2,875	19.4
1940	3,633	5,225	34.9
1945	4,411	6,936	32.0
1950	4,390	7,411	39.8
1955	5,795	10,071	37.9
1960	7,574	13,200	50.7
1965	9,979	18,718	56.4
1970	13,190	25,626	72.4
1975	9,619	20,494	51.7

1980	11,713	23,183	68.6
------	--------	--------	------

\* Early data from Breimeyer, H. 1961. Technical Bulletin 1253; later data from Cattle on Feed and Livestock Slaughter Reports published by USDA.

The small farmer-feeder, with a feedlot having a capacity of less than 1,000 head of cattle, owned 98% of all cattle feedlots in 1980, (Palme, 1983) changes through months and years (1996-1988) in cattle on feed, in feedlots 1,000+ capacity are shown in annex 6.

Commercial cattle feedlots are generally defined as feedlots with a capacity of 1,000 or more cattle at one time. However, many large feedlots have a capacity or more than 10,000 head and a few hold more than 100,000 head. In 1980, commercial feedlots accounted for only 2% of all cattle feedlots, but they produced 72% of the fed cattle marketed. In the four western states of Texas, Colorado, Arizona and California, the commercial feedlots accounted for 29% of the total lots and 98% of the total fedcattle marketed in 1980. In Texas and Kansas Oklahoma, 36% and 43% respectively of all fedcattle marketed during the year 1964 were custom fed (Palme, 1983).

Number of Cattle Fed by Large and Small Feedlots in Texas.\*

	1955	1960	1965	1970	1975	1980
				(1,000 hd)		
Small Feeders+	66	52	50	98	50	51
Larger Feeders+	66	196	438	3,040	3,017	4,109
Total:	132	248	488	3,138	3,067	4,160

\* From cattle on Feed Reports, Published by USDA. Through 1965, number is Cattle on Feed January 1. Data for 1970-1980 is total fed cattle marketed during the year.

+ Small Feeders have lot capacity of 1,000 head or less. Large Feeders have capacity over 1,000 head.

Marketings of custom-fed cattle had increased to 71% of all marketings in the Southern Plains. The best recent data available were developed by the USDA in an 1976 survey of feedlots next Table (Palme, 1983).

Custom Cattle Feeding of Commercial Feedlots, by Feedlot Capacity and Region, 1975.

Feedlot Capacity (head) and Region	Custom-Fed Cattle as a Proportion of Total Marketings	Operations That Custom Feed Cattle Feedlots Custom Feeding Cattle	Total Marketings Custom Fed
Feedlot Capacity:		Percent	
1,000-1,999	1	5	28
2,000-3,999	9	18	63
4,000-7,999	33	53	65
8,000-15,999	54	79	74
16,000-31,999	70	100	92
32,000 and over	50	75	83
All Sizes	46	36	73
Region:			
Central Plains	37	38	76
Southern Plains	71	85	80
Southwest	58	62	70

---

Source: 1976 USDA Survey of Feedlots, from U.S. Fed-beef Production Costs, 1976-77, and Industry Structure.

There is marked variation in the size of lots by geographic area. No feedlots in the 8,000-head capacity have been reported in Illinois through 1980. California developed large capacity feedlots early with 37 lots of over 8,000-head capacity reported in 1962. Colorado and Texas each reported 14 lots over 8,000-head capacity in 1962. In Texas 79% of the cattle marketed were from the 68 lots with over 8,000-head capacity in 1980 (Thompson, 1983).

The trend to larger feedlots and the reduction of small feedlots is indicated by trends of the last 15 year. The future of the beef industry and the future of cattle feeding will depend on the extent beef can be produced and marketed in a competitive food market (Thompson, 1983).

### **Feedlots in México**

La Unión Sonorense de Engordadores de ganado estima un capacidad instalada estatal en 180,000 cabezas que a razón de dos vueltas al año, implica una capacidad anual de 360,000 cabezas. Inició hace unos 15 años. Industrias Engordadoras de Ganado, S.A., de Hermosillo con capacidad para 12,500 cabezas, y una existencia actual de 60% como máximo. Fue fundada en 1972 por Manuel Torres Escobosa.

El costo del financiamiento se ha incrementado en un 160%, en perjuicio del valor del novillo o vaquilla que tanto sacrificio y esfuerzo le cuesta al ganadero criador para producirlo.

La industria de la engorda en el Estado de Nuevo León se fundamenta en el consumo regional de carne, sobre todo en las ciudades de Monterrey y en menor grado de Saltillo y Monclova y otros centros urbanos cercanos.

A fines de la década pasada se había fundado la mayor parte de las 14 engordas grandes en el Estado y algunas, como la de los Chapa, tiene ya 15 años de funcionar.

Se ha permitido la creación de una infraestructura de engorda capaz de alojar 70,000 cabezas y debido al buen mercado, actualmente está la ocupación en un 80% a 85%.

El presidente de la Unión de Engordadores del Noroeste. División Pecuaria de Visa tiene a su cargo una de las más grandes empresas engordadoras de la región. Es un corral para 12,000 cabezas.

El ganado se obtiene principalmente en Coahuila. El peso del ganado a la recepción es de 240 kgs. en promedio a la salida es de 380 kgs.

Las raciones son formuladas en la planta de alimentos de la empresa y en Malta, S.A., bagazo cervecero, sorgo, la urea, la melaza, la vitaminas y los minerales. Con estas raciones el ganado se incrementa unos 140 kgs., en 120 días y es sacrificado en rastros TIF de Monterrey. Hace 15 años se inició con un corral para 1,500 cabezas y actualmente se cuenta con un capacidad superior a las 12,000.

El ganado entra con 190 a 200 kgs., en 120 a 150 días sale con 200 kgs., más, lo que equivale a una ganancia de peso de fluctúa entre 1.35 y 1.4 kgs. por día.

La laguna es un lugar indóneo para la engorda de ganado, estando enclavada además en una región de agostaderos como Durango, Coahuila y Chihuahua. Las engordas en la Laguna empezaron a florecer, se cuenta con una capacidad instalada de 70,000 cabezas entre unos 52 socios de la Unión de Engordadores de La Laguna.

Chihuahua es un Estado, productor de ganado de exportación, cuenta con una de las plantas engordadoras más antiguas del país, con una capacidad de alrededor de 80,000 cabezas, distribuidas en zonas como Cuahuhtémoc, Casas Grandes, y Cd. Juárez, además de la ciudad de Chihuahua.

#### D.- Packing Plants

Packers are involved in feeding to varying degrees. As noted in next Table, packers or associated interests owned 8.8% of the feedlots in the 15 states covered in the 1964 survey of the national Commission on Food Marketing (Palme, 1983).

Packer Feeding by Regions: Marketings of Fed Cattle, Volume of Packer and Associated Interests\*

Region	Fed-cattle	Volume fed	% of
	marketings	by packing and associated interests	total
	1,000 hd	1,000 hd	%
Pennsylvania	116	4.2	3.6
Lake states	1,097	22.3	2.0
Corn Belt	6,147	101.5	1.7
Northern plains	4,031	213.7	5.3
Southeastern	559	159.9	28.6
High Plains	1,567	281.0	18.0
Mountain	379	69.5	18.3
Colorado	1,144	268.5	23.5
Pacific northwest	746	168.2	22.5
California-Arizona	2,932	682.8	40.2
Other	218	87.6	40.2
39 States	18,936	2,059.2	10.9

\*From Aspelin, A. and G. Engelman. 1966. Packer feeding of cattle: Its volume and significance USDA Report 776, Washington, D.C.

Packer feeding is not uniform around the country but tends to be heavily centered in areas where farmers have not undertaken the production of fed cattle. The farmer-feeder form of integration had and still has several economic advantages. The feed is available on the farm in the form of grain, silage, and often pasture (Palme, 1983).

The large commercial fedlot has been more alert to opportunities to feed off-grade cattle. Many commercial lots have geared their operations to a rapid turnover of lower grade cattle, finishing them to a high-Good low-Choice grade and marketing them at lighter weights. The producer of the feeder cattle has become closely involved in cattle feeding. The farmer or rancher is a major feeder of cattle in custom feedlots (Palme, 1983).

Historically, it has generally been regarded as more efficient to take cattle to areas of surplus grain for finishing rather than taking the feed to the cattle. The beef industry in the 1980s is undergoing another change with increasing popularity of leaner beef. The grain-fed beef taste is still in demand and is the basis for an expanding beef export trade. However, the consumer demands less fat, which will require changes in cattle feeding programs to assure the grain-fed beef taste with low trim (Thompson, 1983).

## E.- Markets and Products

In 1993, Mexico purchased 80,314 metric tons of U.S. beef and beef variety meats, making Mexico the third largest export customer for the American beef industry. In 1994, the U.S. Meat Export Federation forecasts export volume of U.S. beef and beef variety meats to Mexico will be 93,938 metric tons, with a value of \$198.9 million (Oates, 1994).

Over the Dec. 20, 1994-Jan. 31, 1995 period, U.S. beef sales to Mexico declined 70-80 percent. Concurrently, domestic beef carcass prices in Mexico have increased dramatically, up 46% for the week of Feb. 6.

Productos exportados por México, 1996-1997\*

Producto	Valor	1996	Valor	1997	Variación
		Participación (%)		Participación (%)	
Ganadería, agricultura, caza y pesca (D)	91.6	0.5	98.1	0.4	7.2
Ganadería y apicultura	188.1	0.2	247.2	0.2	34.4
Ganado vacuno	127.5	0.2	198.3	0.2	55.5

(Comercio Exterior, 1998).

U.S. agricultural exports\*\*:

Commodity	October - June			
	Thousand units		Thousand dollars	
	1993/94	1994/95	1993/94	1994/95
	Animals & animal prods (NA )	--	--	6,358,555
Animals live - ex poultry (NA)	--	--	365,495	317,289
Meats & meat prods (MT )	947	1,192	2,545,719	3,148,269
Beef & veal (MT)	356	414	1,561,326	1,860,179

U.S. Agricultural imports\*\*:

Commodity	October - June			
	Thousand units		Thousand dollars	
	1993/94	1994/95	1993/94	1994/95
	Animals & prods (NA)	--	--	4,421,279
Animals - live, ex poultry (NO):	2,488	3,284	1,042,629	1,292,243
Cattle and calves (NO):	1,832	2,259	921,282	1,111,949
Meats & prods, ex poultry (MT):	882	795	2,095,854	1,776,574

U.S. agricultural exports\*\*:

Commodity group	October - August	
	1993/94	1994/95
	--- 1,000 tons ---	
Animal products	3,841	5,022
Meats and meat products	1,185	1,479

U.S. agricultural exports\*\*:

Commodity group	October - September	
	1993/94	1994/95
	-- 1,000 tons ---	
Animal products	4,246	5,481
Meats and meat products	1,316	1,633

\*\* Foreign Agric. Trade of the U.S., 1995.

More and precise information is presented in annex 7

#### **F.- Government subsidies and assistance**

Agriculture is an especially risky business. Whether a farmer has a good or a bad year is determined by factors over which the farmer has little control - weather, crop prices, crop pests and disease, interest rates, and the global market. Because of that and the need to have a reliable supply of food to prevent political unrest, most governments provide various forms of assistance to farmers. Governments can influence crop and livestock prices, and thus the supply of food, in several ways (Miller, 1992):

- They can keep food prices artificially low: This makes consumers happy but can decrease food production by reducing profits for farmers.
- They can give farmers subsidies to keep them in business and encourage them to increase food production.
- They can eliminate price controls and subsidies, allowing market competition to determine food prices and thus the amount of food produced.

Government price supports and other subsidies for agriculture farmers total more than \$ 300 billion a year. This makes farmers and agribusiness executives happy. They are also popular with most consumers because they make food prices seem low. A Department of Agriculture study estimated that U.S. shoppers would pay \$ 30 to \$ 35 more each year if federal farm subsidies were eliminated. Those subsidies cost each U.S. taxpayer an average of \$ 200 in 1990 (Miller, 1992).



1.- Tendencias del financiamiento rural en México (Santoyo et al., 1997).

Hasta 1990 el Banco Nacional de Crédito Rural (Banrural) tenía a su cargo canalizar créditos a los productores pequeños y medianos, fundamentalmente ejidatarios, de las áreas riego y temporal, en tanto que

los Fideicomisos Instituidos Relación con la Agricultura (FIRA) y la banca comercial atendían a los medianos y grandes productores de las áreas de riego de buen temporal.

En ese marco el crédito representaba un mecanismo transmisor de subsidios al campo mediante:

- 1.- Tasas de interés fijas y con frecuencia negativas en términos reales.
- 2.- Subsidios a la operación del Banrural y de los FIRA, los cuales canalizan la gran mayoría de los recursos por medio de banca comercial, a la que también otorgan reembolsos parciales por sus costos de transacción y asistencia técnica.
- 3.- El Banrural obtenía un subsidio considerable con la “recuperación” de créditos vía la transferencia del seguro agrícola.
- 4.- Subsidios del Banrural en la forma de condonaciones y reestructuración de adeudos por motivos políticos.

La incapacidad de muchos productores para constituirse en sujetos de crédito, la ineficiencia del sistema financiero, la deficiente asignación de los recursos de inversión y la dependencia permanente respecto de los subsidios, dieron lugar a una profunda transformación del sistema financiero rural mexicano, cuyos principales ejes fueron: a) La eliminación en 1988 del “encaje legal”. B) La desaparición de la Anagsa y la creación de Agroasemex. C) La instauración de tasas de interés variables. D) El establecimiento de criterios de rentabilidad en la operación del Banrural y la libertad para financiar cualquier actividad. D) Imposición de garantías adicionales a créditos del Banrural y la eliminación de las reestructuraciones generalizadas. f) Se fragmentaron las funciones de las instituciones que conforman el sistema financiero rural.

## 2.- Cambios en el Entorno y Opciones de Financiamiento

La banca de desarrollo: Banrural ha aumentado su participación en sectores no agropecuarios. La banca comercial: los bancos comerciales han sido aún más selectivos en el otorgamiento de créditos al campo. Las uniones de crédito: de 1990 a 1994 se alentó ampliamente la creación de uniones de crédito para distribuir recursos a los productores pequeños y medianos. El programa de Apoyo al Campo (Procampo): se creó en 1993 para ofrecer estímulos por hectárea con la finalidad de compensar a los productores de maíz, frijol, soya, trigo, sorgo, arroz y algodón por la alineación de los precios internos con los de importación. Proveedores, prestadores de servicios y clientes: por la contracción del financiamiento, los agricultores redujeron considerablemente la demanda de insumos y servicios. Agentes para financieros: este mecanismo ha sido estimulado por la banca para canalizar crédito a pequeños productores, pues con ello reduce considerablemente sus costos y riesgos, además de que recibe estímulos fiscales. Fuentes no formales: aquí destacan las remesas del exterior que envían los mexicanos a sus lugares de origen. De un total de 4,500 millones de dólares que anualmente ingresan por ese medio, se calcula, de manera conservadora, que cerca de 2,000 millones se destinan al financiamiento rural. El sistema financiero rural no cumple a cabalidad con sus tres funciones básicas; movilización del ahorro rural, financiamiento del sector y asignación eficiente de los recursos (Santoyo et al., 1997).

## G.- Tradition

## H.- Costs associated with land permits

For grazing private livestock on federal lands are currently set under a formula in the Public Rangelands Improvement Act of 1978. PRIA, s minimum fee of \$ 1.35 per Animal Unit Month (AUM) - - the amount of forage needed to sustain one animal unit (one cow and calf, one horse, or five sheep or goats) for one month. 1996 grazing fees were the minimum \$1.35 per AUM. The 1995 fee was \$ 1.61 per AUM, and the 1994 fee was \$ 1.98 per AUM. The declining fee reflects both falling beef prices and rising production costs (Cody and Baldwin, 1998) .

The \$ 1.35 grazing fee also applies to BLM lands and National Forests in Arizona, California, Colorado, ...New Mexico, etc. The grazing fee for national grasslands administered by the Forest Service in Colorado, Kansas, New Mexico, North Dakota, Oklahoma, South Dakota, Texas and Wyoming is \$1.42 per AUM (Polk, 1996).

#### **I.- Taxes**

#### **J.- Cooperatives**

#### **K.- Impact of NAFTA**

El tratado de libre Comercio traerá cambios profundos en todos los sistemas de producción primaria del país, aquellos basados en el manejo de pastizales no será la excepción. A estas alturas aún no podemos ver con claridad suficiente el panorama general, se nos ha dicho que los productos más importantes del pastizal como son los becerros al destete, seguirán siendo competitivos dentro del libre comercio, si ese fuera el caso esto traerá capital, proposiciones para la asociación, introducción de tecnología. Insumos y muchas otras cosas que desde luego se esperan sean medios eficientes para desarrollar la actividad productiva (Claverán, 1993).

When NAFTA took effect Jan. 1, 1994 tariffs on U.S. beef imports dropped from 20-25% to zero, pushing U.S. beef trade with Mexico to record highs in 1994, up an estimated 69% over 1993. Similarly, U.S. pork exports to Mexico were up an estimated 43% in 1994 over the prior year. With NAFTA in place, the U.S. and Canada continue to enjoy a substantial trade advantage in Mexico over Australia, Europe, and other competing countries. It is difficult to predict export levels to Mexico for 1995 without knowing when and where the exchange rate will settle and without having a clear estimate of inflation, income and employment rates in Mexico. However, the Mexican government has set a target of 4.5 pesos to the U.S. dollar for the end of 1994, which amounts to a cost increase for U.S. meat imports of 21%. (Willis and Manuel, 1995).

On January 1, 1994, the North American Free Trade Agreement (NAFTA) eliminated import tariffs of 15 and 20 percent on U.S. beef sales to Mexico. The latest USDA report shows U.S. beef exports up 28 percent in volume and 43 percent in value since NAFTA went into effect (Oates, 1994).

En México está previsto en el TLC que la Comisión de Libre Comercio atienda al sector agropecuario a través del Comité de Comercio Agropecuario, auxiliado por el Comité Asesor en Materia de Controversias Comerciales Privadas sobre Productos Agropecuarios, el Comité de Medidas Sanitarias y Fitosanitarias, así como el Grupo de Trabajo sobre Subsidios Agropecuarios. Indirectamente, el sector tendrá presencia en diversos grupos de trabajo, como el de Reglas de Origen o los de Asuntos Bilaterales (\*).

#### **ESTRUCTURAS AGRARIAS COMPARADAS ENTRE EE.UU., CANADÁ Y MÉXICO 1992**

PAÍSES	Estados Unidos	Canadá	México
Superficie Ganadera (miles ha.)	239,172	28,000	74,499
Subsidios (% del PIB) (*)	0.38	0.79	0.58
Tamaño promedio Predios (Ha.)	125	153	7.1
Ha. Agric./PEA Agropecuario	69.5	114.8	2.8
Ingreso per cápita (dólares/año)	21,000	25,000	2,700

Ingreso Agropecuario per Cápita	420	750	216
---------------------------------	-----	-----	-----

Fuentes (23)

(\*).- SARH, PROCAMPO. Vamos al Grano Para Progresar, México, s.f., p. 61

En el TLC se permiten apoyos internos al ingreso del productor a través de pagos directos para elevar la productividad, cuestión que ha sido aprovechada por México para crear el PROCAMPO. PROCAMPO constituye una nueva forma de apoyo a la agricultura (un “subsidio verde”), que consiste en entrega directa de dinero a los productores por cada hectárea que se haya trabajado con los nueve cultivos seleccionados.

Para el sector agropecuario nacional el TLC representa una serie de oportunidades:

- 1) Se abre la posibilidad de importar maquinaria e insumos sin aranceles, los que consecuentemente llegarán a precios menores a los productores.
- 2) La desgravación de importaciones por Estados Unidos y Canadá ofrece oportunidades para los productores mexicanos de café, tomate, ganado bovino en pie, que podrán ampliar de inmediato su participación en el mercado externo.
- 3) En relación con Canadá, México debe establecer nuevas formas de acercamiento económico y comercial que permitan desarrollar el amplio potencial de complementariedad.

El Tratado también implica retos para el sector agropecuario:

- 1) La importación de productos que competirán abiertamente con la producción nacional, como es el caso del sorgo, que tiene una desgravación inmediata.
- 2) El diferencial de precios en muchos productos deriva de una productividad más alta.

Los apoyos de PROCAMPO tienen un efecto real, inmediato y directo en el ingreso del productor. Para 1994 con sólo demostrar que se ha cultivado la tierra con cualquiera de los productos agrícolas elegibles, en cualquiera de los dos ciclos agrícola anteriores a agosto de 1993 y registrarse en la SARH, se obtienen N\$ 350 por hectárea.

Este esquema operativo es el que hace atractivo el subsidio: no fuerza ni induce la decisión del beneficiado, pero en cambio eleva el ingreso y la rentabilidad de la parcela y en forma la competitividad de la producción.

(\*) Se desconocen datos bibliográficos.

### **III Current Debate**

By all measures, private grazing on federal lands has been a costly venture. The environmental condition of public ranges deteriorated in the early 1900s because of overgrazing, and improvement since then has been slow and expensive. Taxpayers have paid for federally supervised and subsidized grazing. Ranchers, the intended beneficiaries, have gained little except debt, insecurity, and mountains of regulations (Hess and Holecheck, 1995).

#### **A. BLM-US Forest Service Rangeland Reform (Hess and Holecheck, 1995)**

Range reform is the centerpiece of Interior Secretary Bruce Babbitt's environmental agenda, yet his Rangeland Reform '94 is a bitter disappointment. It ignores the institutional impediments that have made overgrazing and land abuse official programs of the federal government, and it leaves unchanged the federal policies that discourage rancher stewardship and pay stockmen to overgraze and reward them for poor management practices. It is time to rethink our use of public lands. New institutions and policies—predicated on deregulation and the end of command and control—are needed. First, ranchers, not taxpayers, should shoulder the fiscal burden of private grazing on public lands. Second, grazing permits should be made marketable to persons other than ranchers and for uses other than livestock. Third, control over federal lands should be decentralized in selected areas on a trial basis. Fourth, range reform should be taken to its limits, extending local control and opening debate on partial or full divestiture of public lands.

The BLM and the Forest Service now spend 10 to 20 percent more on their public-land grazing programs each year than public-land ranchers make in net profits. Moreover, six years of the combined rangeland budgets of the two agencies now equal or exceed the current market value of all federal grazing permits: roughly \$1.2 billion.

Range reform on BLM and Forest Service lands is needed to correct a century of economic inefficiency and environmental abuse. First, the deficit-ridden federal grazing program must be made fiscally sound to relieve taxpayers of an unnecessary burden. That means streamlining the operations of the BLM and the Forest Service. Second, economically and ecologically failed multiple-use policies must be replaced with market policies. That means shifting power over federal resources from bureaucrats and special-interest groups to the tens of millions of Americans who use the public lands each year. Third, control over federal rangelands must be decentralized and diversified. That means changing the laws and regulations that rule the federal estate and transferring powers once reserved to bureaucracies to new, locally elected governing councils. Fourth, more fundamental and sweeping reforms must be examined to prepare public grazing lands for the 21<sup>st</sup> century. That means far-reaching yet sustainable changes in the nature of stewardship, control, accountability, responsibility, and ultimately, ownership on the nation's vast federal grazing estate.

Range reform that substantively decentralizes management of and decisionmaking about federal lands has the potential of yielding an array of fiscal, civic, and environmental benefits. Devolution of federal authority to local, self-governing resource councils will reduce federal expenditures on resource management, expand opportunities for more effective public participation in land-use decisionmaking, and promote diverse and innovative approaches to land stewardship.

## **B. Best Management Practices**

Transformation ecology, which is founded on basic ecology, agronomy and physical sciences, should be a specialized branch of **range sciencia**. New approaches are necessary and renewed interests in the roll of organic matter and soil surface management provide the potential for a significant advancement in transformation ecology in finding new ways to solve the riddle. (Reynaga, 1994). Before we can rehabilitate rangeland ecosystems, we must understand their structure and function and its dynamics. If physicians are trained to treat sick human bodies, ecologists must be trained to treat sick land (Burgess 1992). The capacity of rangelands to produce commodities and to satisfy values on a sustained basis depends on internal, self-sustaining ecological processes such as soil development, nutrient cycling, energy flow, and the structure and dynamics of the plant communities. (Reynaga, 1994)

Para poder rehabilitar adecuadamente los pastizales desérticos, necesitamos primeramente determinar las causas que ha producido dichos cambios de vegetación; existen diferentes causas que han sido propuestas para explicar este fenómeno, tales como: 1) los cambios del clima, 2) el sobrepastoreo por el ganado doméstico, 3) el impacto por roedores y pequeños mamíferos, y 4) el control de los incendios naturales. (Sosebee, 1994)

Cuando nuestros problemas con los arbustos y las malas hierbas se vuelven muy grandes, de tal forma que necesitamos controlarlos o cuando nuestros pastizales se deterioran tanto que debemos revegetarlos, ningún nivel de manejo del pastoreo mejorará la condición de nuestros pastizales. En este caso debemos dirigirnos

hacia alguna forma de controlar los arbustos y malas hierbas o implementar un programa de resiembras. Podemos encontrar muchas exclusiones en pastizales áridos y semiáridos en todo el suroeste de los Estados Unidos, algunos de los cuales alcanzan entre 50 y 60 años, la vegetación deseable en esas exclusiones no produce más biomasa ni es de mejor calidad que la vegetación fuera de esas exclusiones y que ha sido sometida al pastoreo. Si queremos rehabilitar estos pastizales y regresarlos a un mayor estado de producción, necesitamos reconocer su potencial y hacer un gran esfuerzo para poder rehabilitarlos adecuadamente. Es imperativo que aprendamos más a cerca de la ecología del área que será rehabilitada, nuestras decisiones acerca de cómo, cuándo, y qué rehabilitaremos nuestros pastizales deberán estar basados en principios ecológicos y no en emocionalismos. Si tomamos nuestras decisiones basada en principios ecológicos podremos conservar nuestra rica herencia de recursos naturales para que puedan ser utilizados por muchas generaciones que están por venir (Sosebee, 1994).

Most ranchers in the Chihuahuan desert have limited amounts of excellent and good condition range but large amounts of range in fair condition. Our study supports integrating Chihuahuan desert ranges in different ecological condition classes into the seasonal suitability grazing scheme discussed by Holechek and Herbel (1982). This involves using poor and fair condition ranges with a high forb and threeawn component in spring and early summer, using good condition ranges dominated by dropseeds in mid-summer through early fall, and saving excellent condition ranges dominated by black grama for winter use. Plant requirements and cattle nutritional welfare are optimized using this strategy. (Smith et al., 1994)

The addition of shrubs and broadleaf herbs to native grasslands has greatly improved forage resources for livestock and game animals. In one earlier mentioned project, important increases in forage production were achieved through alternate row planting of shrubs and forbs with grasses in northern Utah. Adding fourwing saltbush to grass mixtures markedly increased the yield of herbage for cattle and big game on arid lands in Utah and Idaho. This shrub along with a shorter growing shrub, prostrate kochia, has provided important forage during the fall and winter grazing periods. Only one pound of fourwing saltbush seed per acre (0.18 Kg/ha) interplanted with Fairway wheatgrass on a cheatgrass burn in southern Idaho produced about 300 pounds of air-dry forage per acre (55 Kg/ha). Between 70 and 80 percent of the annual twig growth has been browsed each year by cattle. However, the plants have persisted and increased in stature over a 10-year period. (Monsen & Plummer, 1978)

The importance of woody species for production of browse, protection of animals and soil, snow accumulation, stream-channel stability, and habitat suggested the research "to develop guidelines for the establishment or reestablishment of woody species adaptable to draws and upland sites". Other research at the Rapid City Research Unit pertains to rehabilitation of coal and bentonite mine spoils, and management of mine water impoundments. Rehabilitation research focuses on the reestablishment of shrubs, trees, and forbs, while the water research concentrates on water quality for waterfowl, aquatic, plants, and aquatic invertebrate animals. (Bjugstad, 1978)

Reclamation of Mine Spoils: Research shows that dryland techniques for reestablishment of shrub and tree species-such as green ash, Russian olive, poderosa pine, Rocky Mountain juniper, silver buffaloberry, American plum, and Siberian peashrub-on bentonite and low-salt coal spoils in northeastern Wyoming have been moderately successful (Orr 1975). Green ash has the highest survival rate, 44 percent at the start of the third growing season. Rocky Mountain juniper and Russian olive are next with 24 percent; buffaloberry, Siberian peashrub pine, and American plum show survival rate of 7 percent or less. (Bjugstad, 1978)

Dentro de las prácticas de fehabilitación se pueden utilizar resiebras, como en el caso del zacate Buffel común (*Cenchrus ciliaris*) es una gramínea perenne, amacollada de estación cálida. Fue introducido con éxito a la parte sur de Texas en 1947 y a México en 1954. Es de fácil establecimiento, altamente productivo, muy apetecible y digestible por el ganado, tolera el pastoreo intensivo y es relativamente resistente a las sequías. (Hanselka & Johnson, 1991)

### **C. Agricultural Extension, technology transfer**

En México, la COTECOCA (Comisión Técnico Consultivo para la Determinación de coeficientes de Agostadero) en 27 años de trabajo continuo cumplió con el objetivo para el cual fue creada; estudió casi 200 millones de hectáreas donde están contenidos los principales grupos de vegetación y mediante la información obtenida se determinaron los coeficientes de agostaderos a nivel regional, en todos los Estados del país y los resúmenes han sido publicados oficialmente; determinó también coeficientes de agostadero en 47% de la propiedad ganadera privada para la expedición de certificados de inafectabilidad; además de su función principal, COTECOCA ha incursionado en otros terrenos afines según Claverán (1993):

- 1) Proporcionar asistencia técnica en manejo de pastizales
- 2) Formar comités estatales de apoyo a los programas de determinación de los coeficientes de agostadero.
- 3) La formación de un herbario especializado.
- 4) Apoyó al Dr. Beetle para la publicación de los tres volúmenes de “Las Gramíneas de México”, que fue citado anteriormente. Además la publicación de las obras “Las Gramíneas de Sonora” y “Zona Tropicales de México”.
- 5) Con la UNAM publicó seis mapas de ganadería que será parte del “Atlas Nacional de México”, es de particular relevancia el mapa de Coeficientes de Agostadero a que nos referimos en la primera parte de esta presentación.
- 6) Ha intervenido eficientemente en la regularización de los terrenos de Centros de Investigación.

La Ley de la Reforma Agraria deberá utilizar sistemáticamente los coeficientes de agostaderos determinados por COTECOCA, para definir la extensión de la pequeña propiedad ganadera así como recomendar a los ejidos los coeficientes de agostadero que les conviene aplicar. Por otra parte la Ley General del Equilibrio Ecológico y la Protección al Ambiente (Diario Oficial de la Federación, 28 de enero de 1988) legisla sobre todos los recursos naturales del país sin mencionar específicamente a los pastizales, la única mención que ha de ellos se encuentra en el punto seis del Artículo 99, que dice textualmente: “La determinación o modificación de los límites establecidos en los coeficientes de agostadero”, eso es todo. Es pertinente aclarar, que ni la Ley Federal ni las estatales excluyen a los pastizales de las generalidades de protección de los recursos naturales.

### **D. Privatization of public lands**

### **E. Land tenure changes and trends in U.S. and México**

La tenencia de la tierra por el gobierno de grandes extensiones de pastizales se ha probado que es un gran error en los Estados Unidos de América y otros países, la socialización de los pastizales en los Estados Unidos, México o África ha llevado invariablemente a su explotación debido a la inseguridad de los derechos de pastoreo y a la tendencia de los gobiernos a ceder a presiones políticas y promover fondo para proyectos de rehabilitación de pastizales. La historia de los Estados Unidos indica que a largo plazo los programas no han generado mejoramiento de condición de la tierra ni de los productores marginados (Holecheck y Hess,

1994). Dichos programas han sido muy costosos puesto que los productores incrementan su dependencia del gobierno y contribuyen a la sobreproducción de carne.

Fact: Exchanges between the two federal governments and range managers is distinct.

Rangeland management in the United States developed in a specific, task-oriented setting (the protection and management of the public domain). The rangeland users in Mexico, who control most of the rangelands have not created a strong demand for rangeland management, and many of the smaller users, who need the rangeland manager's knowledge, are not even aware of the existence of this scientific endeavor.

Develop cooperative training ventures. The fact that the specific rangeland situations of northern Mexico and the southwestern United States differ should not be discouraging. The socioeconomic differences are large enough that we may expect that a great deal of the specific training we carry on, on either side of the border, needs more "fine tuning" to the situation on the other side.

Permit Tenure. The period of tenure for public-land permits should be lengthened to a minimum of 25 years. That will give the degree of security and stability needed to encourage long-term stewardship and to diversify management of federal grazing lands.

## **F. Rancher Response to drought**

## **G. Patterns of industry growth.**

## **H.- Range condition, private vs. Public.**

McIntyre in his paper The road to rangeland reform (no date) mention that evaluations of range carrying capacity are severely outdated, weakening the case that managers can make for reducing stock densities. The GAO (1988) asked range managers from both agencies how recently they had assessed the carrying capacity of grazing allotments, and particularly those which they knew to be overstocked. In both cases the overstocked allotments were less likely to have been evaluated recently than average. The same managers also estimated that range conditions were declining on overstocked land more frequently than on properly stocked land.

Fact: A great deal of practical knowledge concerning rangeland conditions resides in the collective minds of ranchers (Downing and Folliott, 1981).

All rangeland managers know that it would be foolish to suggest that their discipline, or even all the academic disciplines, have exclusive information on rangeland management. Much of what is known about specific rangeland conditions and rangeland management practices resides in the collective heads of hundreds of bright rangeland users (cowboys, ranch owners, operators, herders, etc.). Unfortunately, very little of this "folk" or "practical" knowledge is systematically collected and organized. Nonetheless, much of this information on local range conditions, animal behavior, and microenvironmental conditions can be recovered. Some of it will prove of minimal use to hard scientific investigations, while other information will assist in the development and testing of hypotheses. To deny the importance of this local level knowledge is to deny the value of experience itself, a denial which few of us who are nearing our middle age would dare support (Downing and Folliott, 1981).

La mayor parte de los suelos de México, están afectados en mayor o menor grado por erosión. Los estudios correspondientes estiman que este daño varía en todo el territorio de 71 a 86%, (dependiendo de los autores), pero aún el porcentaje estimado, representa un problema de importancia cardinal para el futuro del país. Desde luego que el sobrepastoreo no es el único culpable de esos porcentajes preocupantes, la agricultura y la deforestación han contribuido también generosamente. (Claverán, 1993)

A study made by Smith et al., (1994) indicate that Chihuahuan desert ranges are in high ecological condition produce more forage than those in an earlier successional stage. Paulsen and Ares (1962) and Tembo (1990) in New Mexico, and Frost and Smith (1991) in Arizona also found forage production increased as ecological condition increased on desert ranges. Cattle grazing capacity might be 30 to 40% higher on excellent compared to good condition range.

## **I. Cattle breeds adapted to deserts**

In his publication (Ward, 1998) reference to west ranchers and remarks the opportunity to adapt to changing conditions. This means better use of scientific information, and new approaches to human, biological, physical and financial resource management.

The Bar W Beef Cattle Program for small independent ranchers by Nol Ward has been established in Texas to assist ranchers want improve ranch management. The objectives are four-fold:

- 1.- Development of rugged, practical cattle that have the ability to breed readily beginning as short yearlings. (12-14 months of age), calve unassisted around their second birthday, and produce highly acceptable offspring every year thereafter, for ten or more years.
- 2.- Development of highly productive, environmentally adapted cattle that are “predictable breeders” from a functional viewpoint.
- 3.- Development of cattle that can do it all on their own with a minimum amount of costly feed input and care.
- 4.- Development of cattle that have the ability to meet the first three parts of the objective in large, uniform numbers.

## **J. Livestock caused shrub encroachment**

Encroachment of woody plants into previously brushless areas is closely correlated with intensification of the activities of modern man. “People pressure” has complemented fluctuations in climate and local weather to allow increases in the severity of the brush problem. Cyclic wet and dry periods and periodic wildfires shaped the ecological structure of the grasslands. However, before the white man’s influence, the mobility of grazing during dry periods. Large numbers of herbivores grazed given areas for only short periods of time and then moved as the supply of forage decreased. Today, fences restrict the movement of grazing animals, making grazing deferment a part of man’s management responsibility. Overgrazing accentuated by periodic droughts resulted in a cover of sod grasses such as buffalograss, the shorter grama, and species of Hilaria. Brush management efforts must be approached with consideration of all potential uses for rangeland. Taking the land out of use does not necessarily promote conservation, nor can this luxury be afforded from a practical standpoint. (Scifres, 1980)

## **K. Managing rangelands to increase pasture productivity**

Since overuse and mismanagement have caused the deterioration of a large portion of our rangelands, some people propose complete protection of those lands from further use to restore them to their condition. Good grazing management techniques can control the establishment of undesirable woody plants but will not remove established plants unless those techniques, such as the inclusion of goats for brush control, are



designed specifically for that purpose. Brush management, then, is a management problem that must be approached on an ecological basis and within a closely defined economic framework. (Sciffres, 1980).

Savory (1988) contend that the present management techniques are doing long term damage to range. Holistic Resource Management (HRM) is grounded upon three principles: 1.- Grazing is good for grasslands, most distinguish between grazing and overgrazing. 2.- Over-grazing can be avoided by herbivore herding (reducing the pasture available to a herd or increasing the cattle density in a larger area). Using grass conditions as an indicator of when move the herd between pastures. HRM has been adopted on several large ranches and appears to be forward (McIntyre, n/d).

Samuel & Hart (1994) found that rangeland 10 - 20 years after disturbance may be superior to undisturbed range for cattle grazing. Disturbed range produced more forage in most years and had a much higher percentage of western wheatgrass, which is the most important grass in cattle diets on the Wyoming High Plains. Biological diversity also appears to be higher on disturbed range, which is not dominated by blue grama as is undisturbed range, but has a much higher percentage of forbs and other grasses.

Secondary succession proceeded through usual stages: annual forbs, perennial forbs and annual grasses, short-lived perennial grasses, and long-lived grasses. Western wheatgrass [*Pascopyrum smithii* (Rydb.) A. Love] was an exception because it appeared much earlier and in much greater abundance than other long-lived perennial grasses. Blue grama [*Bouteloua gracilis* (H.B.K.) Lag. ex. Steud.] may be another exception; total recovery of this grass may require centuries. Time of appearance in succession seemed to be related to availability of propagules and ease of establishment; (Samuel & Hart, 1994).

## **L. Rangeland treatments (for restoration)**

In III B, C, H, C, J, K, we have been talking about improvement of rangelands, here only add important aspects.

Sosebee (1994a) nos da una serie de información sobre rehabilitación en forma práctica: Si se toma la decisión de rehabilitar el pastizal a través del uso de herbicidas, el dueño del terreno o el rancharo deberá planear el control de acuerdo al tiempo atmosférico más apropiado para obtener la mayor efectividad. También hemos tomado la decisión de aplicar el herbicida en función de las condiciones del tiempo atmosférico. Sin embargo, es de gran importancia planear el control de arbustos y malas hierbas de acuerdo con la especie que se pretende controlar y del tiempo exacto en el cual esta especie es más susceptible su control con herbicidas.

Por lo regular, con los métodos mecánicos para el control de arbustos y malas hierbas se evita la introducción de productos químicos en el ambiente, pero al mismo tiempo nos encontramos con otros problemas que se asocian con la destrucción de la vegetación existente (alguna de la cual puede ser deseable) y se disturba la superficie del suelo. El uso de algunos tratamientos mecánicos tales como el arado desenraizador y el cadeno con discos debieran ser considerados solamente bajo los siguientes criterios: 1) cuando el pastizal se ha deteriorado hasta un punto en que ninguna otra cosa puede hacerse 2) cuando la precipitación anual es mayor de 600 mm/año.

Una vez que hemos disturbado nuestros pastizales por algún método mecánico, estamos obligados a resembrar para establecer una cubierta de plantas de la vegetación deseada. En relación a esto debemos hacer dos cosas para poder establecer la comunidad de vegetación deseada: 1) reducir la temperatura del suelo con un acolchonado superficial de materia orgánica, y 2) esperar que las lluvias se presenten con cierto grado de frecuencia y regularidad después de la resiembra.

Un método viable de control biológico es; sin embargo, el uso de cabras para controlar (o manejar) especies selectas de arbustos y el uso de borregos para controlar especies selectas de plantas maderables. Si un gran

número de cabras y borregos son utilizados inicialmente para tener bajo control los arbustos y malas hierbas, el número de animales debe ser reducido cuando el nivel de control deseado se alcance. La tasa de pastoreo por ovinos y caprinos puede ser determinada a un nivel correspondiente al forraje o los renuevos disponibles, o a un nivel que mantenga el grado deseado de control de los arbustos y las malas hierbas. Este método ha sido utilizado en forma exitosa en la región de las Planicies Onduladas y en el Altiplano Edwards (Edwards Plateau) de Texas y también en el norte de México. En aquellos lugares en donde se pueda utilizar este método debe aplicarse sin ningún titubeo.

El fuego es una herramienta ecológica usada para rehabilitar los pastizales en algunas regiones de los Estados Unidos y México. Pero no es muy útil en muchas regiones áridas debido a la falta de suficiente material combustible fino y debido a la lluvia errática. Sin embargo, en sitios de pastizal donde existe suficiente material combustible, el fuego controlado es una excelente herramienta para ser usada. La clave para una rehabilitación de pastizales exitosa usando el fuego es la precisión con la cual se quema el pastizal. Las quemaduras prescritas debe ser llevadas a cabo cuando una gran cantidad de daño pueda ser producido en los arbustos y hierbas nocivas y en donde se produzca un daño mínimo a la vegetación deseable. Obviamente se debe tener precaución para evitar quemar áreas que no se desean quemar.

El concepto de desarrollo sustentable en terrenos pastoriles tradicionales es posible, siempre y cuando se encuadre dentro de los siguientes seis principios vitales (Johnson, 1993). Aprovechamiento con base en capacidad de sostenimiento del ambiente.

1. Visualizar los problemas de las áreas pastoriles tradicionales en las zonas secas desde un punto de vista integral.
2. Considerar las instituciones pastoriles tradicionales.
3. Proteger las zonas críticas para el éxito del sistema pastoril local.
4. Mantener la movilidad pastoril
5. Mantener, hasta donde sea posible, la flexibilidad del sistema pastoril.
6. Mantener los sistemas de propiedad comunal productivos.

Holecheck (1991) acota que la sustentabilidad en los agostaderos del desierto Chihuahuense pueden alcanzarse bajo apacentamiento moderado. (García y Romero, 1994)

Amos & Gehlbach in 1988 present an for example, it should be noted that while the rotation pasture did shift back to an increased importance of shortgrasses between 1968 and 1982, the amount of standing biomass present at any given time in this pasture was more similar to the enclosure than to the continuous pasture. For example, standing crop and litter (Kg/ha) for the three pastures in 1979 were (McGinty et al., 1979):

	<u>Continuous</u>	<u>Rotation</u>	<u>Exclosure</u>
Standing Crop	1270	2257	1907
Litter	1188	2758	3031

Clearly the rotation grazing did permit accumulation of greater aboveground biomass than the continuously heavily grazed pasture, although it was primarily dominated by shortgrasses at that time. (Amos & Gehlbach, 1988)

Sosebee (1994) has been working in the addition of biosolids to rangelands to increase organic matter in the rehabilitation practice. A reduction in rainfall significantly affects productivity of the rangeland vegetation and its ability to respond to biosolids. But, the hot, dry environment of the Desert Grasslands offers unique opportunities for the use of municipal biosolids (e.g., increased infiltration, decreased erosion) that are not available in other ecosystems. (Sosebee, 1994)

Biological control has been used in agriculture, De Loach et al., (1985) try to adequate to rangelands. Several of the more serious weeds of rangeland of the southwestern United States and northern Mexico have good potential for biological control. The introduction of insects and possibly plant pathogens from other areas of the world, principally from semiarid regions of southern South America, where other species of the weed

genus are native, offer the most potential for success. Promising natural enemies have been identified on some of these weeds and a few insects are being tested at the USDA's Biological Control of Weeds Laboratory near Buenos Aires, Argentina, by one of us (Cordo). At the moment, the weed that would seem acceptable to both the U.S. and Mexico for biological control are Gutierrezia, Baccharis, Flourensia, and several of the poisonous species. Perhaps more species can be added when the harmful, beneficial, and ecological aspects are more carefully analyzed.

Since the necessary management procedures must be carefully organized into a viable system (interated), we now expose the concept of Integrated Brush Management Systems (IBMS). Although research can provide technologies for use in management systems, ultimate success can be achieved only through their proper application by land managers. Brush and grazing management treatments implemented as a part of IBMS can affect labor and management requirements on the ranch. Such influences range from possible reductions in labor because of the greater ease in working cattle as brush is reduced, or more efficient use of labor in oneherd: multiple-pasture grazing systems- to an increase in managerial requirements as systems become more sophisticated. Since labor and management costs are affected by IBMS, they should be monitored the same as any other posttreatment change (Scifres, 1985).

Until one of the more used practices is the brush control, Monsen and Plummer (1978) try the addition of shrubs and broadleaf herbs to native grasslands has greatly improved forage resources for livestock and game animals. In one earlier mentioned project, important increases in forage production were achieved through alternate row planting of shrubs and forbs with grasses in northern Utah. Adding fourwing saltbush to grass mixtures markedly increased the yield of herbage for cattle and big game on arid lands in Utah and Idaho. This shrub along with a shorter growing shrub, prostrate kochia, has provided important forage during the fall and winter grazing periods. Only one pound of fourwing saltbush seed per acre (0.18 Kg/ha) interplanted with Fairway wheatgrass on a cheatgrass burn in southern Idaho produced about 300 pounds of air-dry forage per acre (55 Kg/ha). Between 70 and 80 percent of the annual twig growth has been browsed each year by cattle. However, the plants have persisted and increased in stature over a 10-year period.

The southwestern United States shows a predominance of cattle; northern Mexico has not only cattle, but also a high proportion of sheep and goats. Rangeland management, in many cases, is animal specific, since the grazing patterns, browse preference, herd behavior, are distinct for each species. Implications: therefore, a sophisticated rangeland management solution will have to show sensitivity to the difference in user preference for different animals (Downing and Folliot, 1981).

## **M. Emerging market incentives for changes in range management.**

## **LISTADO DE TRIBUS NATIVAS DE COAHUILA Y TEXAS Y ALGUNAS COSTUMBRES (PORTILLO 1984)**

Las tribus mencionadas no eran las únicas que poblaban los dilatados desiertos de Coahuila y Texas, pues había varias como consta del siguiente resumen que hace el Sr. Orozco y Berra.

“Cuachichiles, Obayas, Boboles, Tobosos, Cotzales, Manos-prietas, Milijaes, Tilijayas, Contótores, Bauzarijames, Acafes, Cantafes, Cabezas, Tocas Colorados, Apaches, Chantapaches, Mazapnes, Cenizos, Gijames, Tinapihuayas, Pihuiques, Pausantes, Julimes, Mahuames, Pachales. Mescales, Jrames, Obaguames, Chahuames, Pampopas, Cachopostales, Pajaleques, pacos, Panaguas, Pagnaches; Irrilitas, Miscapoas, Meviras Hoeras, Maiconeras, Paogas, Caviseras, Vasapalles, Ahomamas, Yanobopos, Laguneros, Daparabopos, Cocoyomes, Mamazorras, Neguales, Salineros, Baxaneros, payos, Babeles, Gueiquesales, Pinanacas, Cacastes, Comaques, Babiamares. Apes, Pachaques, Baguames, Chacahuales, Hijames, Gabilanes, Terocodames, Pacpoles, Coauites, Zibolos, Canos, Pachoches, Siexacames, Siyanguayas, Sandajuanes, Liguaces, Pacuazin, Pajalatames, Carrizos, Negritos, Bocalos, Xanambres, Borrados, Guanipas, Pelones, Guisoles, Hualahuises, Alasapas, Guazamoros, Yurgimes, Mazames, Metazures, Quepanos, Coyotes, iguanas, Tilojayas Pachalocos, Tusanes Paschales Ocanes, Canuas, Catujanes, Pamulumas, Pacuaches, Pastalocos, Pastancoyas, Pamasus, Pacuas-Papanacas, Tuancas, Pitas, Pasalves, Patacales, Isipopolames, Pies de venado, Chancafes, Payaguas, Gico, coges, Goricas, Bocoras, Escavas, Cocobiptas, Codames Trasmamare, Filifaes, Jumees, Toamares, Bapancorapinanacas, Babosarigames, Panceos, Xarames, Zopilotes Blancos, Amitaguas, quimis, Ayas, Comocabras, Mesquites, Orejones, Tacames, Chayopines, Venados, Pamaques, Sanipaos, Manos de perro, Rayados, y Cholomos.”

En cuanto a los dialectos que se hablaron, sabemos que la tribu de los guachichiles, tenía su lengua propia, lo mismo los tobosos, que como se ha dicho más antes habitaban el Bolsón de Mapimí.

La lengua *coahuilteca* era común a las tribus de los pajalatesm orejones, pacoas, alasapas, pausantes pacuaches, mescales, pampopas, pihuiques, borrados, sanipaos, y manos de perro, cuyas tribus se encontraban al Este de Parras y Norte del Saltillo, hasta tocar el río Grande, quien compuso una gramática de dicho idioma.

Las únicas armas conocidas de los indios en Coahuila y Texas, eran el arco y los chuzos. Se alimentaban de la caza, frutas silvestres y raíces, consistiendo su principal ejercicio en la caza; vivían reducidos a humildes aduares; pues casi seguían una vida

nómada, aunque cada parcialidad o tribu defendía con celos su respectivo territorio sin más insignificante que surgía entre ellos, apelaban inmediatamente a las armas.

## **MAJOR U.S. RESOURCE CONSERVATION AND ENVIRONMENTAL LEGISLATION (MILLER, 1992)**

### **General**

National Environmental Policy Act of 1969 (NEPA)  
International Environmental Protection Act of 1983

### **Land Use and Conservation**

Taylor Grazing Act of 1934  
Wilderness Act of 1964  
Multiple Use Sustained Yield Act of 1968  
National Trails System Act of 1968  
Forest Reserves Management Act of 1974, 1978  
Forest and Rangeland Renewable Resources Act of 1974, 1978  
Federal Land Policy and Management Act of 1976  
National Forest Management Act of 1976  
Soil and Water Conservation Act of 1977  
Surface Mining Control and Reclamation Act of 1977  
Endangered American Wilderness Act of 1978  
Food Security Act of 1985