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ABSTRACT

A study was conducted to identify and compare livestock production and range management practices currently in use in the Texas/Mexico border corridor, and to determine the acceptance of selected innovative practices among cattle ranchers in the State of Sonora, Mexico. Information was collected from private livestock producers who were members of organizations in three different geographical zones in Sonora and from those who were not members of such organizations. The research described a variety of ranch management and livestock handling techniques in use throughout the region, and identified a number of attributes needed to facilitate the transfer of technology among ranchers in the state. The study concluded that agencies involved in cross-cultural education in the state should be aware of cultural values and language barriers in attempting to diffuse technology. A number of recommendations for action and further research were made. (Contains 55 references.) (KC)

FACTORS IN SUSTAINABLE DEVELOPMENT:
CURRENT AND INNOVATIVE LIVESTOCK
AND RANGE MANAGEMENT PRACTICES
AS PERCEIVED BY
CATTLE-PRODUCING EJIDATARIOS AND
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OF SONORA, MEXICO

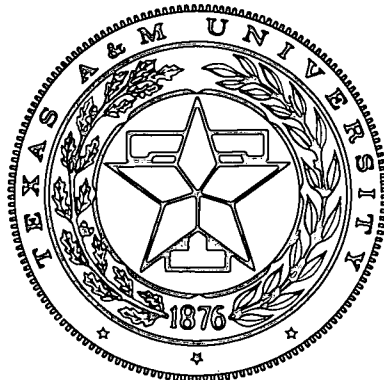
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A Summary Report of Research

by

Peggy J. Hamlett
Principal Investigator
for

Texas A&M University and PATROCIPES in
Kellogg Foundation-sponsored Project:
“Managing Agroecosystems Through Technological Adaptation and Transfer in
the Multi-cultural Environment of the United States/Mexico Border Corridor”

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FOREWORD

Program planners, program evaluators, program administrators, change agents, and observers of the process of agricultural development have long been concerned with the perceptions held, abilities possessed, and willingness of farmers and ranchers to accept, adopt, and continue to use innovative or improved production and management practices. This is especially true if those producers perceive that they are affected directly by governmental policies or organizations and agencies that "have a say" in how producers operate their productive enterprises. Traditionally, this has been a concern of cattle producers, as in many settings they pride themselves on their independence.

Much research has been conducted on the adoption of technology by agriculturalists. However, not much attention has been directed toward comparing the innovativeness of people in the same culture, society, and social systems who are relatively free of influence by governmental agencies with those who possibly either are constrained or are helped by policies of such agencies. An example is that of the independent private cattle ranchers on the one hand and the members of ranching ejidos in México. These same producers were or were not active members of regional livestock associations that were part of a state-wide livestock union. Then too, we do not know as much as we should about managing agroecosystems through adaptation of technology in multicultural environments.

Specifically, not much was known about the status of, perceptions of, or the willingness of cattle producers in the northern tier of states in México with respect to adopting improved livestock and range management practices. Thus the timely research summarized herein by Dr. Peggy J. Hamlett on current and innovative livestock and range management practices as perceived by cattle-producing ejidatarios and private cattle ranchers in three different areas of the state of Sonora, México is one further step toward understanding such conditions as it revealed answers to some of these questions. Also, her research sheds light on some factors affecting sustainable development in agriculture in settings where different levels of resources are available. Furthermore, implications exist for the livestock industry in both Mexico and the United States because of closer relationships emerging as an outgrowth of the influence of NAFTA.

Her findings, conclusions, implications, and recommendations provide food for thought and have implications for application by agents of change, program planners, policy makers, and others concerned with the process of agricultural development, especially those working in settings where governmental agencies influence heavily what producers at all levels of economic status can and cannot do. Dr. Hamlett is to be commended for conducting the research and the personnel of the Patronato del Centro de Investigaciones Pecuarias del Estado de Sonora, A.C. (PATROCIPES) are to be commended for supporting this research among the cattle producers that they serve.

For more information about the research, Dr. Hamlett may be contacted directly by writing, telephoning, or e-mailing her as follows:

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A complete report of the research is on file in the library of Texas A&M University. A summary report in Spanish is also available.

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October 15, 1999

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With respect to the Mexican counterpart organization, PATROCIPES, I would like to express my warmest gratitude to Lic. Hector Acedo Valenzuela for his, above and beyond even the well-known Mexican hospitality, that he extended to me and my research data collection. This project would not have succeeded without his tremendous efforts in seeing to the details of living expenses, interpreters, professional contacts, and probably things behind-the-scenes that I was completely unaware he was doing.

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- All of the PATROCIPES' staff and especially, Sr. Roberto Laborin and his family for good working relations and friendship and Roberto's assistance as an

interpreter, the PATROCIPES' cowboys for allowing me to work the cattle roundup with them, laughing with me (not at me) when roping calves frustrated me, and their families for including me in their Christmas party, and all of the INIFAP researchers in the PATROCIPES-Carbo Experiment Station for giving me a portion of their valuable time to provide input into this study. They have my utmost respect for their expertises. A special appreciation to the secretaries of PATROCIPES, both in Hermosillo and Carbo, for the typing they did and for collecting my mail and seeing that it safely arrived to me in the field.

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**Factors in Sustainable Development:
Current and Innovative Livestock and Range Management Practices as Perceived by Cattle-
Producing Ejidatarios and Private Cattle Ranchers of Sonora, Mexico**

(A Collaborative Project between PATROCIPES/Texas A&M University/Kellogg Foundation)

A Summary Report of Research

Dr. Peggy J. Hamlett, Principal Investigator

The overall purpose of this study was to identify and compare livestock production and range management practices currently in use and determine the acceptance of selected innovative practices among private and ejido cattle ranchers in the State of Sonora, Mexico.

Because of the overall purpose of the collaborative project, “Managing Agroecosystems Through Technological Adaptation and Transfer in the Multi-cultural Environment of the United States/Mexico Border Corridor,” of which this research was a part, secondary purposes were:

1. to determine perceptions of these producers as to how governmental policies relating to the use of the land and the production and marketing livestock, affected them as they implemented various production techniques and considered progressively innovative ones;
2. to determine if they perceived that they have control in their destiny as livestock producers;
3. to determine attitudes of the producers towards the cattlemen’s associations, the cattlemen’s union of the State of Sonora, the livestock research centers, and other governmental and private-sector organizations that were considered to be communication links for production information among the producers; and
4. to determine the perceptions and attitudes of the producers and the employees of these organizations toward USA collaborators.

To accomplish those purposes, the following specific objectives were identified:

1. collect information from selected private livestock producers and livestock producers who are members of ejidos in three different geographical zones in the State of Sonora, México about livestock production and range management practices currently (i.e., 1998) in use;
2. determine the perceptions and willingness of these same producers to accept selected innovative or improved livestock production and/or range management practices;
3. determine the relationship between cattle producers who were members and those who were not members of a livestock association;
4. determine the producers' perceptions of the governmental policies and the level of impact the governmental influence and policies had on their lives and ability to produce livestock;
5. secure insights as to producers' perceptions of current and potential relationships between producers and agricultural workers (governmental and private) and Mexican and USA citizens; and
6. examine the settings that exist for educational strategies that can be introduced to secure the adoption of practices considered appropriate by the selected livestock producers.

Objective One

Collect information from selected private livestock producers and livestock producers who are member of ejidos in three different geographical zones in the State of Sonora, México about livestock production and range management practices currently (i.e., 1998) in use.

Household demographics

The average age of cattle producers was 54 years and 96% of them were married. Of the producers interviewed, only 9% were female, all of whom were ejidatarias who had inherited ejido holdings (e.g., parcel and communal range access) from a father or deceased husband. The average ejidatario household had five children, which was only one more than the average private producer household. Only 13% of either ejido or private cattle producers had children who assisted on the ranch. Less than a quarter (21%) of the private producers and slightly more than a quarter (26%) of the ejidatarios reported that they had family members who were employed elsewhere. Elsewhere included other ranches in and out of the local area and in cities throughout México and/or in the United States.

Educational impact

There was an interdependency within a Mexican family that served to enhance the capabilities that a producer, lacking formal education, might otherwise be deprived of, if that same producer were trying to function in, for example, the USA cattle industry.

Labor resources

All of the large-holdings private producers were businessmen in towns or cities, where they chose to live as well. They had ranch managers, living on the ranches, to whom they gave information and instructions for implementation of practices. Private-producer labor resources consisted of family, temporary (e.g., extra cowboys hired for roundup), and/or long-term hired labor (e.g., ranch managers). Ejidatarios' labor resources consisted of family, plus they had the benefits of the communal effort from fellow members of their ejido. Typically, adult males were responsible for ranching activities and women were responsible for household activities among private producers and ejidatarios.

Approximately two-thirds (64%) of the private producers and almost three-fourths (72%) of the ejidatarios depended on their cattle as their main source of income. Other sources of income included: 1) professions (among large and medium-holdings private producers) such as retailing, law, medicine and veterinary medicine, 2) cowboying on other ranches at roundup, 3) making and selling homemade cheeses and liquor, and 4) relatives working in other areas of México and the USA and sending money home.

Cattle producers' ranching experiences

Approximately one-third of the private producers and half of the ejidatarios were reared on a ranch and were involved in some capacity of ranching in the family, and still produced cattle (as of 1998) on the ranch on which they were reared.

Land use and control

Ninety-three percent of the ranches in this study were privately owned. Fifty-five percent of the ejidatarios either had the title or a certification to receive title to their designated parcel on the ejido in which they were members.

The renting of range was minuscule. Ejidatarios used the most fertile soils of the ejidos for crops (both for human and animal consumption). Parcels of ejido land next to rivers were irrigated. Ejido rangeland was for communal cattle production (i.e., individually owned cattle, as well as some ejido-owned cattle such as a bull on commonly owned range).

All private producers used private ranges for cattle. Some of them also used ejido ranges. Typically, private producers who used ejido ranges had kinship (or, were also ejidatarios by inheritance) within the ejido where they had cattle.

The dominant production scheme, for all producers, was commercial (crossbred) cow/calf operations. The dominant market for these operations was that of stockers destined for USA feedlots. Because of the producers' desire to benefit from this market, there were efforts being made to reduce the *Bos indicus* influence and increase *Bos taurus* germplasm.

With the overwhelming desire to produce stockers for the USA market, it was surprising to find little accurate knowledge of the NAFTA among the producers. Wildlife (e.g., Bighorn sheep and Mule deer), was a source of income for 190 ranchers throughout Sonora. Only two large-holdings private producers in this study, reported participating in a wildlife management/hunting program.

Changes in ranching practices over the years

For many years, the recommended procedures in planting improved grasses involved the complete clearing of the targeted site, whereas, in 1998, there was an amendment to the laws governing land cultivation that enforced a biodiversity component – a certain percent of natural grasses, brushes/shrubs, and trees must remain on the site.

The same governmentally enforced regulations with respect to the range applied to both private producers and ejidatarios. However, there were some rules and regulations imposed upon ejidatarios by ejidatarios within a given ejido. For example, a recent change involved restrictions of only 25 animals (regardless of the species) per ejidatario on the ejido. Another example, was reduction of equine species on the range needed by cattle.

Innovative use of the biodiversity of flora (e.g., native and improved) and fauna (e.g., promotion of wildlife management), was beginning to be seen on the rangelands of Sonora, México, and will progress toward a more ecologically-sound environment.

Among the current cattle production and range management practices were: 1) as expected, immediate solutions to alleviate acute effects of drought such as better water distribution methods and promotions to decrease overstocking; and 2) the not so expected, producers pursuing greater knowledge of ways to improve cattle and range management practices.

There was no difference in the cattle and range management practices recommended, by various organizations, from one geographical location to the next. Throughout the study, many of the producers, regardless of their location, were well versed in the livestock organizations' recommendations. Keeping in mind that Carbo is a desert climate and the other two locations are

mountainous, one would expect at least differences between Carbo and the other two sites. In fact, of the practices considered, the greatest difference was in the control of runoff.

All producers in the desert and mountains who responded with a desire to implement improved grasses mentioned the same one, i.e., buffelgrass. Cattle that were born and reared in the float, hot desert climate, were recommended (and brought) to the steep, extremely hot to cold climates in the Sierra Madre. It was reported that bulls brought to Sahuaripa, from Carbo/Hermosillo, required a year more than did local bulls for acclimation to the climate, topography, and vegetation differences.

It was recognized that there were negative connotations to certain things, such as burros in the Carbo area and ejidos in the Sahuaripa area. In Carbo, burros were observed only at one household and it was not a cattle-producing household. The term, burro, was commonly used in a critical name-calling context. This was not the case in Sahuaripa or Arizpe. Burros were common in the towns and on the ranches for these two areas. They were spoken of in terms of work animals, as were other equine species. In Sahuaripa, terms that were an issue did not include burros, but ejidatario and ejido. Ejidos and colectivos, according to the Union Ganadera president and some of the producers in Sahuaripa, were two separate groups based on the manner in which they were formed. Ejidos were formed when the government expropriated land from landowners and handed it to a group of individuals. Colectivos were formed by a group of individuals who combined their finances and purchased land together. Because the land, in both situations, was utilized communally, the Union categorized them into one group called ejidos. This categorization was offensive to some people in Sahuaripa who paid for the land from which they made a living. However, some people within the same group called themselves ejidatarios while others did not want to be called that. It was not clear, based on the interviewees, about who was a part of which of these groups. With respect to the groupings, this study used the Union and local cattlemen's association's categorization, as it did in the other two locations. This issue was not observed in Carbo or Arizpe.

Calving

Calving seasons in all locations were quite diverse. The most common breeding practice was leaving the bulls with the cowherds all year.

Advice with respect to cattle management and health practices

There were people in the three rural communities with the specific job of helping the cattle producers complete the application process in governmental assistance for ranching improvements. There was an implication that the process was too complicated. On the other

hand, it indicated that the process was recognized as being too complicated; thus, the extra assistance was provided in the process. However, it raised the question as to why put so much effort in training and hiring an added entity instead of simplifying the application process. Because all producers in this study sought advice about health practices from the same sources, on-going public relations that build trust should be a key component for organizations responsible for the promotion of technological transfer.

Also, of the producers who used veterinary product suppliers', the Union's, and PATROCIPES' publications, the private producers significantly outnumbered the ejidatarios in all three locations. Such results may imply a higher literacy rate among private producers than ejidatarios. On the other hand, it may imply that more private producers go to Hermosillo, as all of them have their own vehicles, (compared to 10% ejidatarios owning long distance-worthy vehicles) and visit these organizations more often than do the ejidatarios.

The ranching infrastructure in the Sahuaripa and Arizpe areas was a hindrance to marketing livestock and implementing technological development on the range.

Commercial cowherds were predominantly zebu crosses. Charolais was another dominant influence. Where there was Brangus influence, producers discussed the desire to increase the Angus germplasm to utilize the USA market. Producers in Arizpe had capitalized on the Hereford germplasm.

Bull sources differed ($P < .01$) between private producers and ejidatarios. In all locations, the large-holdings private producers were more likely to purchase purebred bulls from the USA, than any of the other producers. All other producers purchased bulls from the large-holdings private producers, or the local cattlemen's associations. The local cattlemen's association purchased bulls from the Union Ganadera, which purchased bulls from the large-holdings private producers and/or the USA.

Cattle production practices

More than 75% of all of the producers used seasonal rotation where movement of cattle was based on rainfall/water availability. Only one ejido that was in the Municipio de Arizpe was aggressively pursuing improvements in their cattle production. It was the only ejido that separated the bulls from the cows. The leadership of this particular ejido displayed the characteristic behavior of innovators. For example, with a calving rate of 90%, they were discussing a plan to breed their cattle in corrals in an effort to increase this percent.

Water was the greatest determinant for economic success with cattle production in all locations. It was evidenced in the mountainous locations and the tone of conversations that the

water rights issue was an important leveraging tool for the livestock holders that could divide peaceful men and prompt range wars.

Hauling water and PVC-piped water were common to the Carbo area. Canals and PVC-piped water were common to parcels near the towns of Sahuaripa and Arizpe. However, in the mountain ranges, cattle were dependent upon springs, rivers, and manmade runoff and overflow reservoirs, all of which were few and far between (84% of all producers said cattle walked more than 2 km to water).

Range management practices

With drought as the most influential factor in cattle production and range management practices in the three locations studied, the producers utilized feeding and watering resources as strategies for addressing intensified seasonal feed and water shortages. These strategies included burning spines off cholla and nopal, promoting the removal of non-cattle livestock from the range, and peer-pressure enforcement of limiting the number of head of livestock per ejidatario on the ejido. Also, there was the time-consuming process of applying for governmental assistance to get 1) the permission to clear land, 2) the equipment to come to do the clearing, and 3) the seeds – all of which was reported to be, often, too little too late.

Producers' views of ways to improve cattle production

Approximately one third of the ejidatarios and one fifth of the private producers reported that the reduction of cattle numbers as a tactic toward reversing land degradation was a bad idea. Another quarter of the ejidatarios and another fifth of the private producers said fewer cattle on the range was a good idea, but they would not be able to be the ones to reduce their herd size. One way this was being dealt with was by enforcing limits on the number of head per ejidatario allowable on the ejido rangeland. So, more than half of the ejidatarios and more than a third of the private producers were not willing to reduce their numbers of livestock on the range to help reverse land degradation.

Surprisingly, there was no correlation between willingness to reduce numbers of livestock on the range and having other sources of income, which correlated with those with the greatest number of livestock on the range. The only category with a significant correlation (Kendall's tau = .89%, $P < .05$) was the medium-holdings private producers of Carbo. The medium-holdings private producers in the Carbo area spoke with the most authentic command of knowledge about their operations and the range they used; it was not surprising that they would be the most likely to consider a reduction in numbers of head on the range.

Producers' views on ways to improve the range

Over 75% of all producers agreed that more adapted cattle and land improvements were the best ways to improve cattle production. The most common ways to improve the land as reported by producers were: 1) rotate cattle and use improved grasses, 2) use improved cattle breeds, and 3) build more water-holding tanks. The best explanation of improved cattle breeds for land improvements was that the cattle would be hardy enough to withstand drought and utilize the browse as well as grasses and protect the calves from predators. Only 4% of the ejidatarios believed that dividing the whole ejido into individual parcels would improve the range and cattle production. However, they shared this view with the president of the Union Ganadera. This group reported that individual parcels could receive more care and production would increase.

All other ejidatarios believed that collective ranching was best for them. One particular fraction of the Ejido de Carbo was working the collective way, but in smaller cell-groups within that fraction of that ejido. They believed this way of ranching, as ejidatarios, was more feasible because: 1) if there are more than 10 people in a group, there is too much disagreement; whereas, a group in agreement pools resources, e.g., purchasing bulls and financing well pump repairs; 2) a group of ejidatarios has a better chance for getting credit than an individual ejidatario; 3) the designated 48 hectares of range per parcel per ejidatario cannot support enough cattle for a living; however, a small group of 11 ejidatarios was able to combine six hectares each of their parcels into one good field of 66 hectares for alfalfa and sorghum; and 4) a small group of ejidatarios can more easily rent a range from a private producer, to let their range grow back, than can an individual ejidatario.

The best methods, according to the producers, to bring about range improvements included: 1) more government assistance and follow PATROCIPES' range management advice, 2) distribute the water better, and 3) build contours in Sahuaripa and Arizpe and more fence divisions on the land.

The best way, according to the producers, to sustain long-term range improvements as viewed by producers were: 1) do not overstock, rotate, maintain fences, provide supplements such as vitamins, minerals, concentrates, and/or hay, 2) re-seed and control erosion and weeds, and 3) build and maintain better water sources. Considering the ways to improve and sustain the range that the producers, themselves, suggested, the question arises as to how can these things be made available to all producers?

Livestock management

Ejidatarios, generally, were in agreement about livestock production goals. They tended to have strong differences of opinions on how to reach those goals. One ejido of the Municipio

de Arizpe displayed the most harmonious perspective on how to reach goals. They were also the most innovative in cattle production techniques in proportion to their economic status.

Performance recording was a component not included in the survey that hindsight indicates should have been included. The PATROCIPES cattle operation was a well-organized example of keeping performance records.

Extension

Extension efforts were in the form of publications provided by organizations such as PATROCIPES. The initiative in information exchange was on the part of the producer. The perception of extension in the United States tends to be that it is better for the extensionist to go to the ranch for the visit with the producer. It was suggested, in Carbo, that an invitation into the PATROCIPES office may be considered a privilege and would make the producer feel important. An obvious problem with that view was that small-holdings private producers and ejidatarios tended to use public transportation to travel to Hermosillo. PATROCIPES, as well as the Union Ganadera and the cattle breeds associations, were on the far southern edge of the city, making them difficult to reach. According to Dr. Fernando Ibarra, there had been one fairly recent national extension program developed in 1995 that was stringent with technical proposal writing. In 1996, forty people came to receive training. Fifteen people passed the training that year. Only ten passed the year before. Training and renewal of certifications were designed to be once a year. This approach appeared to be too intimidating for the average producer in this study. Furthermore, the extension agent did extension service in his extra time as a free-lance agent. It could not be a full-time job. Pay was only considered acceptable as extra income, so the agent had to have other employment.

Cattlemen's association

There was confusion among the producers, particularly the ejidatarios, about what made a person a member of the local cattlemen's association. The president of the Union Ganadera was more confident about membership requirements, but admitted that changes of requirements were underway at the time of the study. With regard to the producers' understanding of membership of their local association, the only significant difference ($P=.001$) was between numbers of private producers and ejidatarios in Arizpe. For all locations, 64% or more producers were confident that they were members of the local association, whereas, only 14% of the ejidatarios in the Municipio de Arizpe said that they were members.

Objective Two

Determine the perceptions and willingness of selected private livestock producers and livestock producers that are members of ejidos in three different geographical zones in the State of Sonora, México to accept selected innovative or improved livestock production and/or range management practices

Perceived situation

The more contentment the private producers were experiencing at the time of this study, the more willing they were to consider sustainable practices with cattle and the range. The producers in the Carbo area had the best understanding of technological transfer and the most positive outlook for using cattle as their main source of livelihood. It is possible that this relates to the fact that Carbo is the closest of the three locations studied to Hermosillo. This proximity to Hermosillo allowed the Carbo producers the easiest access to the agencies and organizations that were their cattle industry information sources, e.g., headquarters for PATROCIPES, the UNION Ganadera, the various cattle breeder's associations, and the veterinary products suppliers. Also, the Carbo area producers were best situated to observe and/or participate in cattle production and range management trials conducted by the INIFAP research scientists based at PATROCIPES-Carbo.

Biodiversity

Eighty-four of the 92 producers believed that the wildlife had no effect on forage availability. This belief was probably due to the severity of drought at the time of the study causing the producers to have concerns that had a more immediately visible impact (e.g., water shortage) on cattle production than the wildlife component.

Generally, the cattle producers in this study had somewhat of an environmentalist's perspective in that they were not compelled to destroy every naturally adverse entity to cattle production. They recognized some wildlife on the range as competitors for the forage and others as predation threats to their cattle, but instead of viewing them as pests and problems, they were viewed as part of the natural cycle on the range.

Past change

Changes made 10 to 20 years ago toward improved cattle breeds and increased numbers of head of cattle were associated ($\chi^2 = 10.53$, $P < .01$) with other changes recalled from five to 10 years ago on the range, such as land degradation.

The ejidatarios, in Sahuaripa, recalled changes in cattle breeds from mostly Corriente influence to more European breed-types. The reasons recalled for these changes were to get bigger and more calves.

Among the private producers, in Carbo and Sahuaripa, there was an association between land degradation and overstocking. Furthermore, the need to provide a food source for the livestock was the reason for reseeding improved grasses.

It is noteworthy to point out that there was no association between the changes the producers observed over the years (e.g., better cattle breeds, but greater land degradation) and ways to increase carrying capacity on the range.

Networking

There was an association ($\chi^2 = 29.02$, $P < .05$) for both types of producers between local communication and seeing cattle and range practice changes followed by the implementation of the changes. For private producers in Carbo and Sahuaripa and the ejidatarios, in Sahuaripa, there was an equal association for local communication about technological development and its implementation, without having seen the innovative or improved technology. For all of the producers, there was a strong association ($P < .001$) between implemented changes and benefits from them. In other words, everyone who said they made changes in their cattle production and range management practices also said that they experienced improvements in their operations. The extent of the improvements was not explored and it was not determined if they were long or short-term improvements. For example, an improvement that was short-lived was the total clearing of the land for planting improved grasses 10 to 20 years ago, as recommended by experts in the cattle industry. This turned out to be beneficial only until it was realized that if that one species allowed on the field failed, there was nothing else to offer the livestock. On the other hand, when the recommendations tended to have more of a biodiversified approach with integrated range management (e.g., balancing natural and improved vegetation in a field), there was evidence of the improvements having long-term benefits.

It was found, only among the ejidatarios in Carbo, that there was an association ($\chi^2 = 4.95$, $P < .05$) between 'collaboration among producers with respect to labor or financing' and local talk. Observed and implemented changes and change results were not associated with collaboration. This finding was expected among private producers, because there was not the communal factor, but less expected to be so among ejidatarios. However, within some of the ejidos, there was a determined attitude of independence among individual ejidatarios even though, at times, collaboration was a required component as an ejido member. In fact, most ejidatarios in these ejidos spoke in terms of themselves as individual family units, unless there

was direct questioning with respect to ejido collaboration. These ejidos tended to be the ones with the most ‘talked-about’ internal problems.

Objective Three

Determine the relationship between cattle producers who are members and those who are not members of a livestock association

1. There was no distinct difference between the two types of producers with respect to livestock organizational membership and no need to try to separate and analyze responses where there was so much overlapping. Furthermore, it was not clear exactly as to what constituted membership in the Union Ganadera and/or the local cattlemen’s associations.
2. Even though the results of this study indicated little association between the private and ejido ranching sectors due to the fact that private cattlemen produced on their private lands and the ejidatarios maximized their efforts on the ejido lands, there was not strong socioeconomic tension between the two groups. In communal social functions, without knowing the individuals, it was not evident who was a private rancher and who was an ejidatario. A private producer was as likely to be seen visiting with an ejidatario as another private producer, and visa versa. However, generally, just as in other societies (e.g., Bryan, Texas, USA; Timahdite, Morocco, North Africa; Kiboko, Kenya, East Africa), these communication crosslinks tended to be between the various socioeconomic, representative, communal leadership of the groups.
3. Almost three-fourths (72%) of the private producers did not collaborate with fellow producers for the implementation of practices. Almost all of the ejidatarios (87%) reported that they did not collaborate with fellow producers when implementing practices. However, there were, in fact, some laws that govern an ejido and some evidence resulting from participatory observation that made a certain amount of collaboration essential. Examples include: 1) the number of head of livestock allowed per person was determine in ejido group meetings and established as a law for that ejido; 2) when there was a need for fence repairs on the ejido range, a certain amount of time, effort, and financial input was expected from the members (this was not well regulated), and 3) during roundup and/or dipping times, there was the obvious need for the ejidatarios, but they do not belong to it, as was evidenced in the responses with respect to the cattle, range, and family decision-making process, i.e., a strong sense of independence

existed even without the financial stability that generally comes with such attitude and behavior.

4. There was a significant difference ($P < .05$) between private producers and ejidatarios with respect to totally independent decisions for cattle and range practices. Private producers reportedly made more individual decisions about cattle (36%, 14 of 39) and range (26%, 10 of 39) practices than did the ejidatarios (cattle and range 15%, 8 of 53).

Objective Four

Determine the producers' perceptions of the governmental policies and the level of impact the policies have on their lives and ability to produce livestock

1. Some people, who were ejidatarios, never intended to join an ejido; however, during the Cardenas regime, the attitude was 'agricultural reform' and they were caught in the mainstream of it. For example, according to some ejidatarios, during 1938 in the Arizpe area, a group of people wanted to establish an ejido and some of the small-holdings ranchers were told to incorporate their land into the ejido. Their choices were join the ejido or leave and get nothing for their land. Because of such a 'strong arm' approach in the past, it is not difficult to understand the position of dependency on the government that the producers (excluding the large-holdings private producers) have taken with respect to any improvements their operations need. This perspective is strengthened by the facts that the application for aid is stringent enough to require specially trained employees to assist in the process, there are strongly enforced laws with respect to land clearing, and vague rules and regulations for membership of the cattlemen's union. Furthermore, considering the expropriation tactics the government has used in the past, it is also not too difficult to understand the position of independence (e.g., enough power and wealth to cushion governmental invasion) that large-holdings private producers might take. For some large-holdings private producers, this phenomenon of expropriation was not a thing of the past, at the time of the study. According to the Union Ganadera president, there were no more new appeals for land from ejidatarios, but there were some old ones that were still pending processing.
2. There appeared to be a stronger relationship among and between private producers and ejidatarios than with livestock industry workers and either type of producers, which can contribute to the diffusion of technology. Through observation and interviews, it appeared that the most common communication efforts between producers and cattle

industry organizations were with the large-holdings private producers and the organizations (e.g., PATROCIPES, the Union Ganadera, the producers' cooperative supply store, and a veterinary supply store...all in Hermosillo). Livestock extension-type efforts were not significant components for the industry, at the time of this study. Thus, the diffusion of technology is likely to be stronger from producer to producer than from livestock industry worker to producer. This finding is supported by the 29% apparent laggards, 43% late majority, and 16% early majority adopters that were willing to try various degrees of changes in their production and management practices after observing, to some extent, the changes on other producers' ranches. It is also supported by the findings that the ejidatarios, in all locations, chose personal (e.g., friends and family) sources over non-personal (e.g., veterinary product suppliers) sources for information about animal products. The same was true for the private producers, except in Sahuaripa. This finding could have been due to the fact that there was an intricate networking of Sahuaripa family and friends that were closely linked to cattle industry organizations in Hermosillo. For example, both presidents of PATROCIPES and the Union Ganadera were from Sahuaripa, with immediate and extended family members in Sahuaripa. Another example, one of PATROCIPES' accountants was from Sahuaripa.

Objective Five

Secure insights as to producers' perceptions of current and potential relationship between producers and agricultural workers (governmental and private) and Mexican and U.S. citizens

It was reported that the producers were at a disadvantage with respect to the rest of the world, particularly with those of the USA. The Mexican producers must become more efficient in their production efforts to compete in the international markets. It was also reported that they should choose a more lucrative method, e.g., putting more weight on steers or selling meat, to meet the global requirements.

Objective Six

Examine the settings that exist for educational strategies that can be introduced to secure the adoption of practices considered appropriate by the selected livestock producers

Possible educational strategies that could be introduced to secure the adoption of practices considered appropriate by the selected livestock producers are reported in the sections, Recommendations and Suggestions for Future Research.

CONCLUSIONS AND IMPLICATIONS

The findings of this research identified some major issues perceived by selected private and ejido cattle producers within three locations of Sonora México. The findings also revealed relationships among private producers and ejidatarios. Based on these findings in this research, the following conclusions and implications are presented in association with the respective objective of the study.

While the private producers were grouped together in the statistical analysis, there were findings in the participatory observations and interviewing process that could not be quantified, yet, could attribute to the missing link in the necessary progression of successful technological transfer in the three locations of Sonora, México in which this study was conducted.

Objective One

1. Just as in the USA at the time of this study, the cattle business did not appear to be a lucrative employment opportunity for the Sonoran cattleman.
2. The drought situation across northern México has forced the cattle producers to pursue alternative methods for feeding livestock. Some cattle producers were trying to get governmental permission to clear yet more land in an effort to meet cattle feeding requirements. Even if they get permission, they were on a long list for using the equipment and, as in the past, could miss the window for the planting season. There is implication, here, for an integrated range management system, one that expands the resource base with broader integration of native and improved grasses, cactus, trees, brushes, and shrubs in a more profoundly sustainable utilization program for the range. Furthermore, livestock (cattle, precisely) are the way of life in the three locations of this study. Livestock require water. Water resource experts should be involved in providing answers for watering livestock and, considering the importance of livestock in the region, it should be top priority.
3. The ranching ejido population is stabilizing over time. The ejidatarios trying to ranch, in this generation, expressed feelings of responsibility for the land degradation (that actually

occurred over time of past generations) and were intensely interested in finding ways to reverse the process.

4. As wildlife (e.g., deer) increasingly becomes another source of income, educational programs dealing with biodiversified issues could benefit any sustainable rangeland efforts.
5. Because of the diversity in calving season in all locations, and the fact that leaving bulls with the cowherds all year was a common practice, there is implication for improvements in breeding programs. On the other hand, any breeding program would likely require modifications to be appropriate in the almost inaccessible ranges of the Sierra Madre Occidental (mountains).
6. Comments from various managers indicated that they did not necessarily know the full benefits of the practices, but that the boss said to do it, which could explain part of the problem with the implementation of certain technologies. It could be that it is in the details of everyday range management that technological transfer can lose its strength if inadequately addressed.
7. Considering the family interdependency with respect to educational level, it was concluded that educational level was a factor in the ranchers being informed about new improved technology, but it was not a factor that could stonewall the transfer of technology where there is an interest by the producer.
8. Because there were people in the three rural communities of this study with the specific job of helping the cattle producers complete the application process in governmental assistance for ranching improvements, there is an implication that the process was too complicated. On the other hand, it indicates that the process was recognized as being too complicated; thus, the extra assistance provided in the process. However, it raised the question, "Why put so much effort in training and hiring an added entity instead of simplifying the application process?" Because all producers in this study sought advice about cattle management from people they knew and trusted and most sought advice about health practices from the same sources, on-going public relations that build trust should be a key component for organizations in the promotion of technological transfer.
9. Because the Union Ganadera linked with the local associations has the closest contact with the producers of any of the organizations observed in this study, with the bulls program (and supplements and health products programs), it suggests that the Union and local associations would be the most logical organizational entity for collaboration of technological transfer where the cattle producers of Sonora are target recipients.

10. Because Sonora, México, is an important cattle-producing state for México, cattle production and range management extension education and communication should be a high priority. Education opportunities would likely serve the cattle producers best if they were administered through the Union Ganadera and the local associations, with trained extension experts. The extension experts should be specific in their function, as are researchers. The extension experts should be developmental links that bridge the gap between technological research and the practical implementation of the technology through the producers. They should be trained, in a precise and methodical manner, to take scientific results and put them into layman terms, then, deliver them in a practically applicable way conducive to the understanding of all producers (at all educational levels, but not insulting to their intellect as experienced adults).
11. While many producers believed that they have no control over what is happening to the land and that they must do what they must to make a living, there was also the feeling expressed by many producers that they had no conscious desire to destroy the ecological environment, in the name of productivity or survival. Consequently, a paradox existed. Because of the paradox, an implication arises: there is a need for intensified education efforts with respect to sustainable livestock production and range management practices to broaden an understanding of how immediate behavior has drastic impact on future availability of resources. This will be helpful in counteracting the somewhat of a “get-all-you-can-while-you-can” mentality with little sense of responsibility to their future years, let alone generations to come.
12. Because of medium-holding private producers, in the Carbo area, spoke with the most authentic understanding about their operations and the range they used, it was not surprising that they would be the most likely to consider a reduction in numbers of head on the range. This gives rise to the implication that they have a broader knowledge of the requirements for sustainable livestock production. Consequently, a further implication exists that educational efforts to bring about a broader knowledge of sustainable livestock production could be begun in those areas where producers do not have the level of knowledge.
13. Because holders of both sides of opinions about whether the ejido should remain collective or not agree, basically, that smaller numbers of ownership (i.e., responsible persons) brings about more effective cattle production and range management, there is implication that a compromise might be an appropriate management method for ejidatarios using the range for cattle production. An ejido governing smaller cell-groups, which would comprise fewer opinions requiring harmonious perspectives, possibly could

be more manageable and still reap the benefits of a collective unit (e.g., credit and labor resources).

14. Considering the obvious value of keeping livestock performance records, which was exemplified by PATROCIPES, and the high opinion that the producers have of PATROCIPES, it would appear that the producers could learn from the techniques PATROCIPES uses. Also, considering the strong relationships between: 1) PATROCIPES and other research organizations (e.g., INIFAP); 2) PATROCIPES and the Union Ganadera; 3) the Union Ganadera and the local cattlemen's associations; and 4) the local cattlemen's associations and their members (e.g., cattle producers), the task of transferring this technology, and perhaps others, to the producers would likely be appropriate and feasible. The associations between these organizations further support the idea that extension efforts could best be administered through the Union Ganadera and local associations.

The results of the findings in this study support the comments made by Dr. Martha Martin that researchers in PATROCIPES and INIFAP were trained to do research, not extension. Because research is a full-time position, it is not fair – to researchers or the producers – that the researchers be asked to extend themselves into a field for which they are not trained, e.g., extension. Furthermore, by researchers (trained to do research, not trained in extension expertise, and possibly lacking enthusiasm for the task of extension) interjecting untrained efforts into the positions of extension experts, one could surmise futuristic problems for livestock extension programs that would require additional sub-programs to promote extensionists for the experts they are trained to be.

15. Initially, one might think recording performance would only be possible for the literate producers, but because the rural Mexican culture in northern Sonora tends to function as a family unit instead of individually, record keeping is likely to be feasible for illiterate producers as well.

Objective Two

1. Because the Carbo producers had easiest access to livestock industry organizations, in Hermosillo, and the research station in Carbo, and they had the best understanding of technological transfer and perceived their situation with the most positive outlook for using cattle as their main source of livelihood, there is an implication that making

- improved educational efforts about sustainable livestock production and range management a priority would contribute to a healthier ecological environment and turn raising cattle back into a prosperous enterprise.
2. Because the cattle producers were not compelled to destroy every naturally adverse entity to cattle production, e.g., they recognized some wildlife on the range as competitors and predators, but not as pests and problems, they had some what of an environmentalist's perspective by viewing the wildlife as part of the natural cycle on the range. These results indicate that improvement of the range through biodiversity techniques (e.g., integration of flora and fauna) is a feasible possibility.
 3. It was interesting to note that the reason for change over the past years was related to production only, not erosion control, when first asked this question. However, when asked about soil conservation and erosion control, these private producers responded in a way that implied that these components were the underlying source of improved production. This is more evidence that implies that many of the cattle ranchers have knowledge of natural conservation that would render them receptive to innovative and/or improved sustainable technologies.

Objective Three

1. Because of the overlapping of member versus non-member status in the livestock associations and the types of producers and their relationships explained in Objective One, the conclusion is drawn that there is a complex, intermingling relationship for information and technological transfer. This was partially because both sectors of producers had significant representation in the cattlemen's organizations. It may also be because in small rural communities it is better to be amenable with all of the inhabitants, a factor that considers the unmistakable, innate friendly (e.g., live and let live) attitude among the rural populations of these three locations within the Mexican culture.
2. Because of highly significant ($P < .01$) segregated land use, the expectation was that there was not transfer of information and/or technology between the two producer types. To the contrary, there was no difference between the types of producers concerned with which type of producers they locally communicated. Three quarters of all producers stated that they discussed cattle production and range management practices with both types of local producers on a regular basis.
3. Because of attitudes and behaviors the ejidatarios had of an ejido belonging to them, and not of them belonging to an ejido, there is implications for educational efforts to contain

components of accountability with respect to sustainable livestock production and range management. They were, perhaps more so than in the past, more conscious of the need for balance in the give and take of making a living off the land.

Objective Four

1. Because the medium and small-holdings private producers and the ejidatarios have a tendency to be government dependent, there is implication of being afraid to try to do anything without approval from the government for fear of being disqualified for assistance. Thus, a certain level of governmental distrust exists. On the same hand, but in a different vein, the large-holdings private producers appeared to have a tendency to be too independent (or, for some, too friendly with the officials), which implies governmental distrust as well, in their attempts to secure their holdings. Perhaps, these findings support raising a question about the need to pursue further research of a current global issue: the decrease of centralized government.

Objective Five

1. Because the cattle producers' recognized a need for them to learn ways to better compete on a global beef market, there is implication for private and governmental agricultural workers to advance their capabilities for providing appropriate knowledge and technologies to the producers. By doing so, the producers can become more competitive on an international level.

Objective Six

1. The settings that exist for educational strategies that can be introduced to secure the adoption of practices considered appropriate by the selected livestock producers were examined and strategies are under the sections, Recommendations and Suggestions for Future Research.

RECOMMENDATIONS

1. The Ejido de Bacanuchi, in the Arizpe area, was working well as a group. Data should be collected to determine the social factors that made this a successful ejido.
2. Direct technological transfer from the USA to Sonora, México, is likely to be unsuccessful due to the narrow margin for error (i.e., smaller window for success) with cattle production in México than in the USA. The reason has to do with the harsh environment in Sonora and the devaluation of the peso in México.
3. The peso devaluation and the difficulty with starting governmentally controlled/sponsored extension programs supports the recommendation for extension/technology transfer communications efforts to be grafted into an already existing organization with established rapport among the cattle producers. The associations among PATROCIPES, INIFAP, the Union Ganadera, and the local membership of the cattlemen's associations support the idea that extension efforts could best be administered by the Union Ganadera through local associations to the producers.
4. Ejidatarios go to PATROCIPES' field days, but they do not have the finances necessary to apply the advice. It would be advantageous to organize field days that take into account the financial capabilities of the key community adopters within target groups. The medium-holdings private producers, particularly those in the Carbo area, should be targeted to initiate diffusion of improved technology based on: 1) the fact that they spoke with much confidence in their knowledge about their operations and the range they used and that they would be the most likely to consider a reduction in numbers of head on the range (this gives rise to the implication that they have a broader knowledge of the requirements for sustainable livestock production); and 2) they are individually independent, but not so far economically from other producers (e.g., small-holdings private producers and ejidatarios), unlike the large-holdings private producers, that no one would consider the improvements they implement. They are likely key community members for educational efforts to begin the diffusion process to bring about a broader knowledge of sustainable livestock production where producers do not have an effective level of sustainable livestock production and range management knowledge.
5. Researchers should be allowed to do what they do best – research. Then, once an extension program is implemented, request some of the researchers to contribute only in the training sessions, for the extensionists, with technologies that are ready to be passed on to producers.

6. Because the Union Ganadera and local associations are intact and functional (in two of the three locations), they might be a linking component that could be enhanced by better communication technologies and serve as efficient vessels for appropriate technology transfer. An extension service (e.g., perhaps developed at the expense of the Union Ganadera and local cattlemen's association as opposed to a centralized governmental entity and control) that would link technology to extension experts to community and, in the reverse order, could provide evaluation of the program and allow adjustments to the program. For example, an adaptation of the training and visit extension system advocated by the World Bank and based on the Israeli model described by Benor, 1984, might be appropriate for the Sonoran cattle industry. This system could utilize local young men and women who an interest in being employed, want to stay in their home area, are willing to work hard, and have a good reputation within their communities. The training would be such that the sessions would correspond with the seasonal activities of the cattle industry, e.g., prior to breeding season, the extensionists could receive two-day sessions on improved techniques appropriate for their communities, etc. In the original system, the training sessions were every two weeks for two days. Two days in training and two weeks in the field with the immediately, meaningful knowledge from the short-term training on the mind of the extensionist would mean that (s)he would have greater success at delivering accurate information to the producers. Furthermore, questions and concerns that the extensionist could not answer could be discussed at the training session, within two weeks, and taken back to the producer. The idea of the short bursts of training and delivery to the ranches is that the extensionists can be anyone. There are not the intimidation factors of needing to be highly educated or in any particular age group. Key experts on the cattle production and range management issues should be included in planning, training, field days, etc. A multitude of cattle-related organizations, within a community and state that are interested in collaborative efforts should be involved. Promotional efforts should be employed and a network of people, donors, contributors, participants, politicians, recipients, etc. should be built. Finally, impact assessment should be included as an ongoing evaluation component.
7. There was some discussion about the difficulty of the process of applying for government programs that provided funds for ranching improvements. The investigator met two people (one in Sahuaripa and one in Arizpe) whose jobs were to explain and help complete the government forms designed to assist producers in the application process for ranching improvements. Simplify the applications.

8. As demonstrated by range scientists at PATROCIPES, in Carbo, cattle producers should consider that not controlling brush at all could result in lower carrying capacity, poorer animal performance, and higher variable costs over the planning period. Conversely, as brush management increases carrying capacity, it may also increase conception rates and weaning weights as a result of improved forage quality.
9. Considering that the producers expressed attitudes and behaviors somewhat resembling those of natural conservationists with respect to how they perceived wildlife on the rangelands, and the current generation of ejidatarios evidently were in a mind-set more conducive to biodiversified efforts on the ejidos than past generations, now is the time to intensify the promotion of further studies and implementation of sustainable, biodiversified, and integrated range management practices such as brush/wildlife/grazing management programs.
10. The producers need assistance in determining exactly what their desired goals are and what they should be. Also, a program such as IBMS with the EXSEL software program, would greatly enhance an agricultural worker's capabilities for assisting a producer to predict the outcome of alternative practices.

SUGGESTIONS FOR FUTURE RESEARCH

1. Future research could be undertaken to identify the factors successfully at work in the Ejido de Bacanuchi that apparently have resulted in (1) amenable cooperation and (2) increased cattle production, so that they could be applied by other ejidos as appropriate.
2. To further the understanding of technological transfer pathways in these areas studied in Sonora, México, research could be undertaken to identify the factors at work in the northern México ranch manager's role in day-to-day contact, decisions, and implementation of cattle and range practices.
3. For the purpose of integrated range management, one possible approach might be considering the layout of ecologically-friendly production in the mountainous areas. For example, along the river where the irrigated parcels are used for wheat, barley, ryegrass, etc., use that land as it is being used now. For the area just above that zone away from the river, seed to improved and native grasses. Then, in the steeper zone in the area above the grass zone, but still below the tree line, et another management effort could be considered with totally naturally occurring vegetation, such as cholla and nopal (prickly

- pear), that requires seasonal labor primarily, e.g., burning spines. Above that zone, use as unmanaged open range.
4. Furthermore, along the line of future research for range management among the cattle producers of Sonora, México could be the evaluation of a program such as the Integrated Brush Management Systems (IBMS) and its decision-aid software, the Expert System for Brush and Weed Control Technology Selection (EXSEL), (Hamilton et al., 1993). As a side note, after the interviews with the producers that were interested in further conversation, the IBMS with EXSEL program was described and the producers were very interested in trying such technology. An IBMS is a strategic plan for long-range, integrated brush and weed management. It begins with the setting of management objectives based on an inventory of range resources, the identification of problems, and the economic analysis of alternative solutions. Those management objectives must consider all enterprises affected by brush management objectives must consider all enterprises affected by brush management, such as wildlife and livestock management. EXSEL is a user-friendly technology, or treatment selection process, that provides the user with suggested alternatives for treating a brush or weed problem. This type of program is most effective when ranch personnel who are most familiar with the situation can make the decisions. The predicted results of brush management need to be translated from biological into economic terms to give managers a basis for decision making when cost-benefit ratios are important. This can be determined by EXSEL measuring the influence of the integrated brush/wildlife/grazing management program on changes in carrying capacity of the range over the planning period. These production changes are then transformed into monetary values to analyze the economic performance of each alternative. With that stated, it would likely be necessary only to mention these intricate details in the training of extension-type personnel. Then, all they would need to share with the producer would be the inputs and outputs of the program. Extension experts have been proven highly effective for delivering the IBMS and EXSEL system in the USA. This approach might need to be tested and/or modified appropriately for the situation in Sonora, México.
 5. One means to disseminate information more effectively in the rural settings of Carbo, Sahuaripa, and Arizpe could be cattle producers' coffee houses designed to be clearinghouses for information relating technologies, social impacts, policy understandings, etc. to the cattle producers. NGOs might fund pilot projects for the implementation of the clearinghouse coffeeshops. For instance, the Kellogg Foundation Programs, in México, is aimed at educational changes for the private sector.

6. Organizations, such as the International Institute for Cooperation in Agriculture (IICA) have concluded that the educational process is not being well addressed in some countries, including México. Thus, such organizations may be interested in offering people internships for the advancement of education programs in rural Sonora, México, e.g., to train local people in a Training and Visit System extension program.
7. With respect to their desire to reverse the land degradation trend, particularly among the ejidatarios, it would be interesting to study if this paradigm is the result of changed perspectives – due to improved perception of sustainable land issues, or more a result of the ‘next generation’ having come into controlling decision-making positions... suggesting that they want to take a stand and say, “...we did not destroy the land, our forefathers did, but we are ready to face the situation and do what we can to reverse the degradation.” Through participatory observation technique and simply getting to know these people one-on-one, an educated guess leans toward the latter. Thus, the next of the ‘next generation’ is believed to be ripe for intellectual harvest – change makers.
8. The severe degradation of the range and the fact that cattle production was not considered to be a lucrative enterprise for the producers, are some of the reasons to investigate the possibilities of goat production as an alternative ranching practice. Further research into the cattle producers’ motives for staying in the cattle ranching enterprise should be pursued.

CONCLUDING STATEMENT

This study that was undertaken as a sub-project of the collaborative project, “Managing Agroecosystems through Technological Adaptation and Transfer in the Multi-cultural Environment of the United States/México Border Corridor.” As a study that used both quantitative and qualitative data-gathering techniques, it has provided insight into factors influencing cattle production and range management practices by cattle producers in three areas in the State of Sonora, México. What was learned has implications for determining if similar factors are at work in other areas of the México/USA borderlands. Why? While some of what was documented in this study was common knowledge among people familiar with the Mexican cattle industry, reasons underlying other factors, e.g., attitudinal and behavioral, were uncovered that gave rise to serious implications for improving the transfer of technology to these livestock

producers. Consequently, the question should be asked as to whether or not these factors should be examined in other parts of northern México.

Finally, communicating across languages and cultures can be a challenge. However, it was observed that communication within a given language/culture could also be a challenge. Then, if the people communicating are in the same field of study, communication might be better than if they are not, even with different cultures and languages. For example, when the survey was designed by the joint efforts of USA and Mexican researchers, all were in agreement about the meaning of “reducing the herd size.” When a question about this issue was presented to a particular focus group of producers, it was interpreted as a reduction in the “framesize” of cattle within a herd. They discussed the need to downsize the frame of their animals by using smaller bulls. Thus, it is of utmost importance to recognize that there are/will be perspective variations in diverse cultures, but for us who are committed to a binational partnership between México and USA the problems become acceptable challenges to graciously meet head-on, shoulder-to-shoulder.

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