

## **Evaluation of a Total Ranch Management Workshop as an Educational Tool to Transfer Technology in Mexico**

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### **ABSTRACT**

To improve management and achieve goals, ranchers must make critical decisions. The total ranch management (TRM) planning process is an approach to help ranchers maintain better control of the ranch and its future, and is based on the idea of management achievements rather than specific practices. The objectives of this study were to 1) evaluate the effect of a TRM workshop as a method of technology transfer, 2) determine impressions of participants, 3) determine extent of learning, and 4) determine comprehension and utilization of information. Mexican ranchers (n=20) interested in technology transfer attended a 6-d workshop taught by 1 Mexican and 5 U.S. instructors in 2 sessions. The information was divided into 8 themes and adapted from Texas Cooperative Extension's Total Ranch Management program. Participants were asked to complete a confidential 45-question survey to identify demographics and background knowledge of TRM issues and elements, a 9-question evaluation of each session and instructor, and a 13 question evaluation of the entire workshop. Eleven mo. after the workshop, ranchers were revisited to apply a 26-question, post evaluation survey. Workshop evaluations were analyzed using descriptive statistics and t-Tests. Major enterprises of workshop participants included: cow/calf (63%), stockers (13%), registered cattle (57%), and wildlife (40%). Participants affirmed (61%) they learned the ability to analyze their ranch situation and make better ranch management. Level of understanding of all topics was greater ( $P<0.01$ ) after as compared to before the workshop. Total mean

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change in understanding concepts of strategic planning, economics, livestock production, wildlife management, and grazing management were, 48, 39, 54, and 54%, respectively. The TRM program has been proven to be a platform to convey and continue education and improve decision making processes in ranch management. Mexican ranchers are welcoming through TRM technology transfer mechanism that was not in place.

**Key words:** Technology transfer, total ranch management, Mexico.

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## INTRODUCTION

Technology transfer is often considered to be the adoption of proven techniques and practices for specific enterprises rather than meeting the needs for ranch sustainability and success. Total Ranch Management (TRM) workshops have been conducted to teach ranchers and extension personnel how to better understand, manage and use ranch decisions, and organize the total ranch to better evaluate and select management decisions (Troxel & White, 1990). White (1988) recognized a need for education in ranch management and began development of a TRM course that teaches planning strategies and concepts of ranching ecosystems. The value of this approach to a TRM program is that it is not necessary to teach all of the specific principles of ranch management. Rather, what is taught is a *new* thought process from which ranchers can approach all decision-making.

Teaching programs are needed to educate, inform, and train ranchers and extension employees on the importance and value of ranch resources. In addition, teaching programs should be focused on better understanding, management and utilization of resources to optimize production, organization of the ranch enterprise for effective management, and improving evaluation of management decisions through use of a strategic management approach (Troxel & White, 1990; White, 1999).

Technology transfer in Mexico is an area that can be developed in a systematic approach to improve rangelands for livestock and wildlife production. Few landowners in Mexico are using integral management programs to improve animal production and natural resource conservation (Hanselka *et al.*, 2005). Mexican cattle ranchers are especially interested in raising their level of technology. The Mexico TRM workshop is an all-encompassing, holistic approach to ranch management using the viewpoint of the ranch as an enterprise and includes economic information, and cattle and wildlife management (Hinojosa, 2005). Moreover, this educational program was developed to increase or confirm the knowledge base of resources managed and implement a more organized ranch planning methodology.

A TRM workshop, as a strategy of technology transfer, should have more impact if it is conducted in the natural environment of the participants. These TRM efforts need to be evaluated to determine how this information impacts the participants. Timely evaluation provides useful input to refine program design and improve performance (Alex & Byerlee, 2000).

The objectives of this study were (1) to evaluate the effect of the TRM workshop on participants as a strategy of technology transfer, (2) to determine the impressions of the participants concerning the workshop, (3) to determine the extent of learning by the participants, and (4) to determine to what extent the presented information was

comprehended and thus utilized, applied, and incorporated into their ranch management program. We hypothesized that the TRM workshop can be used as a tool to accomplish change in the decision making process for ranch management activities in Mexico.

## **MATERIAL AND METHODS**

Two, 3-d training sessions were conducted spring 2005 in Reynosa, Tamaulipas, MX. They included lectures and two field exercises at a participant's ranches. During the first field exercise instructors demonstrated how to conduct spotlight surveys to determine wildlife inventories. The second field exercise concentrated on training and practical activities for range inventory and evaluation, animal reproduction, and cattle management. The TRM teaching materials were adapted from the Department of Rangeland Ecology and Management, Texas A&M University and Texas Cooperative Extension TRM program, and translated into Spanish.

To better understand the concepts of TRM, the workshop was divided into eight themes: introduction, strategic planning, resource capabilities and limitations on management, using and understanding budgets, livestock enterprises, wildlife management, grazing management, and management implementation. Six instructors were involved with the TRM workshop; three of them were simultaneously translated from English to Spanish, and all instructors used power point presentations in Spanish. The participants (n=20) were invited to the workshop through direct contact and (or) via the newspaper.

During the second 3-d workshop session, participants were asked to answer a 45-question, confidential survey. The objective was to identify participant demographics (name, age, sex, occupation, previous schooling, and interests) in order to serve as background reference of the group. The questionnaire also included other background information and knowledge related to topics, issues, and elements of TRM that would be included in the course.

*Evaluation.* Participants of the TRM workshop were asked to evaluate the teaching sessions of each instructor and provide feedback to improve future workshops. An additional 9-question survey was designed to evaluate participant opinions of each instructor. Evaluated items included: subject presentation, holding interest of participants, organization, response to the participants, visual aids, clear and accurate examples, motivation of participation, presentation duration, and how well the subject was covered (data not shown).

On the last day of the workshop, participants were asked to evaluate the entire TRM workshop experience. This evaluation was 13-question instrument; some questions followed the Likert scale and others were short answer or answered by yes or no. All participants completed each of the three instruments and they were used for data analysis.

Eleven months after the TRM workshop, participants were revisited in Reynosa, Tamaulipas, MX to apply a final evaluation instrument designed to determine the level of understanding of workshop topics. During this post-workshop meeting, 75% (15/20) of the participants were in attendance. The survey instrument was divided into sections representing the subjects taught and each section had four or six questions. The retrospective, post-evaluation instrument had 26 questions that followed the Likert scale, as described previously, and one short answer question. This instrument was used to evaluate participant knowledge before and after the TRM workshop.

## **Statistical Analysis**

All TRM participants were kept anonymous to encourage truthful and to unbiased responses. The instruments were directly and personally applied during and after the TRM workshop. Descriptive statistics were employed to produce tables and figures for the general information, and evaluation of instructors and the TRM workshop. The SAS V8 was used to make the Dependent Samples t-Test in order to determine differences between the level of understanding before and after the TRM workshop (Herrera & Barreras, 2000; Kaps & Lamberson, 2004).

## **RESULTS**

The age of the participants of the TRM workshop was from 29 to 66 yr; the mean age was 47 yr, and the mode was 37 yr. The occupations of the participants were rancher (50%), administrator (30%), extension agent (5%), researcher (5%), consultant (5%), and student (5%). The level of schooling of the participants was: middle school (15%), high school (10%), bachelors degree (45%), and graduate degree (20%). The main enterprises of the participant's ranches were: cow/calf (63%), stockers (13%), cow/calf and stockers (13%), registered breeds (57%), and wildlife (40%). The livestock on their ranches were: cattle, sheep, goats, horses, and poultry.

Regarding the knowledge of the workshop content, 99% responded that they had a high level of knowledge. The subjects referred are mentioned in order by frequency of reference: Economics (administration, use and understanding of budgets, accounting, financial projects) (16), Ranch management (resources capabilities and limitations) (11), Wildlife Management (8), Livestock Management (8), Range Management (6), Grazing management (2), Strategic planning in ranching (2), Agriculture (1), Cattle vaccination (1), and Functions of cattle digestion system (1). Participant expectations were as follows: Learn new techniques of ranch management (5), understand and improve ranch management (3), improve administration of the ranch (1), and to practice the learning (1).

Concerning the strategic planning concept, 44% affirmed to know this concept, and 50% presently ignored it. Twenty five percent said that they actually apply strategic planning, while the others did not. Ninety percent of the participants indicated they will apply this concept in the future, and all of the participants were interested in this kind of information.

### ***Evaluation of the workshop***

The first question evaluated the cost of the course in terms of money investment. Eleven percent rated it as good, 42% very good and 42% was excellent. Concerning benefits obtained from the workshop, 52% of the participants considered the benefits as excellent and 47% considered them good. All of the participants felt that their expectations were accomplished.

The subjects that the participants suggested to be included in the future TRM workshop were: introduction to new methodologies, commercialization, more emphasis in cattle and grazing, exportation, alternatives to obtain utilities, breeding, medicines, techniques related to wildlife, ranch management, more information about rangeland, management and wildlife studies, and operation cost of pasture maintenance.

Some of the elective topics that participants liked most in the workshop were: wildlife management, rangeland management, carrying capacity, reproduction, cattle and

pasture. In addition other items included practical knowledge, knowledge of the instructors, interaction and group integration /comradeship and positive attitude help to accomplish the activities, the way the information was communicated, discussions on different points of views and experiences.

Areas for improvement of TRM workshop included: more time to evaluate wildlife, more complete themes, divide by themes, economic information presented in more practical examples, change of some instructors, more time for each theme, less themes but more time to accomplish the objectives, precise and short time to apply and practice knowledge, improve the visual material, courses for ranch hands.

When asked about how they can apply the principles learned in their specific situation, they expressed: using of the information step by step trying to do the best under my circumstances, improving enterprise management, sharing and communicating this information to my workers, talking with my clients, interaction with other ranches, practicing to have profitability in my ranch, incorporating most of the information learned in the workshop, doing adjustments to correct what we do wrong or in a less productive way.

A majority of the participants (77%) rated the TRM workshop as very good to excellent; the remainder did not provide an answer. Most participants (61%) affirmed the workshop gave them the tools to analyze their ranch situation, 21% said it did not, and 28% did not answer. Seventy two percent of the participants agreed to participate in an organized group of technology transfer, 28% did not answer.

Finally, some suggestions or comments expressed by participants about the TRM workshop were: "These workshops should continue because there are people interested in improving their ranches", "To keep in touch with the instructors"; "Ask for the botanical inventory of the native species of Northeast of Mexico", "We are going to be organized".

#### ***The "before" and "after" survey***

Effective ranch management requires a tremendous amount of information. The purpose of this Mexican TRM workshop was to consolidate some of the basic information ranch managers need for proper decision making.

The levels of probability for the "before" and "after" understanding survey or retrospective-post evaluation, were statistically different for every subject included in the survey (Table 1). The Dependent Sample t-Test analysis showed significant differences ( $p < .001$  to  $p < .01$ ) in the level of understanding of all topics before compared to after the TRM workshop. The mean level of understanding before and after the TRM workshop for each subject taught is shown in Figures 1 to 5.

The total mean change in the level of understanding in the concept of strategic planning subject was 48% (Figure 1). The greatest increase was observed in the understanding of using strategic planning in ranching (64.9%); lower levels of increased understanding were observed in identifying available ranch resources (47.5%), decision making (44.2%), and setting and accomplishing ranch goals (35.6%).

Table 1. Level of probability for the “before” and “after” understanding survey of TRM workshop

SUBJECT	CALCULATED VALUE	t p
Strategic planning		
Understanding of using strategic planning in ranching	6.8	<.0001
Understanding of decision making	4.7	0.0003
Setting and accomplishing goals	3.8	0.0021
Identifying available resources	4.7	0.0003
Budget		
Planning with budget	5.5	<.0001
Reviewing budget	3.4	0.0044
Modifying budget	3.6	0.0028
Information of costs	3.8	0.0021
Livestock enterprises		
Inventory of resources	4.8	0.0003
General production plan	5.5	<.0001
Yearly calendar	5.3	0.0001
Ranching as a business	4.0	0.0012
Wildlife management		
Setting wildlife goals	4.8	0.0003
Inventory of wildlife resources	4.2	0.0009
Identifying wildlife habitats	5.0	0.0002
Managing wildlife enterprises for profit	4.5	0.0005
Grazing management		
Range goals in a total ranch context	4.8	0.0004
Grazing control	7.8	<.0001
Planned grazing	7.8	<.0001
Range inventory	5.5	0.0001
Balancing animal numbers with forage supply	5.0	0.0002
Matching animal nutrient demand and supply cycles	8.0	<.0001

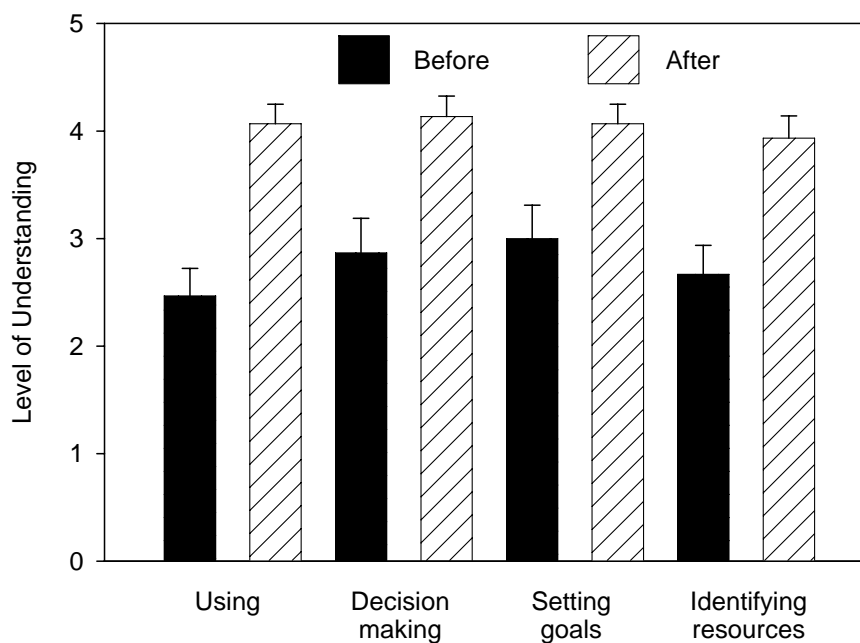


Figure 1. Mean ( $\pm$  SEM) level of understanding before and after the TRM workshop for topics within the strategic planning subject.

The total mean change in the level of understanding for the economics subject was 38.8% (Figure 2). The greatest change was observed in the understanding of economic planning (47.5%); lower levels of change occurred in the understanding of costs records (38.1%), modifying planning with budget (37.5%), and reviewing the budget (32.5%).

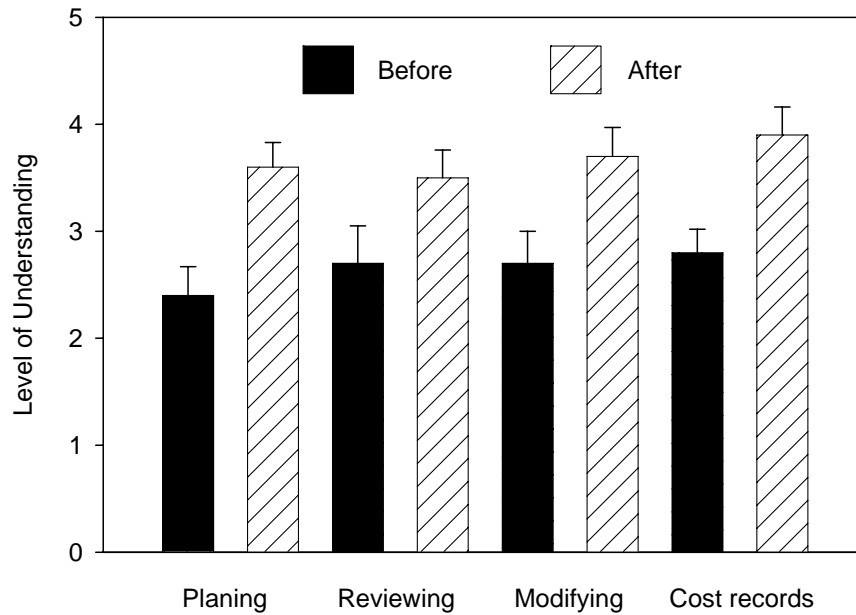


Figure 2. Mean ( $\pm$  SEM) level of understanding before and after the TRM workshop for topics within the economics subject.

The total mean change in the level of understanding for the livestock enterprises subject was 54.1% (Figure 3). The greatest change was observed in the understanding of developing a production plan (65.8%); lower levels of change in understanding were observed in developing a yearly calendar (59.0%), resource inventory (53.5%), and understanding ranching as a business (35.6%).

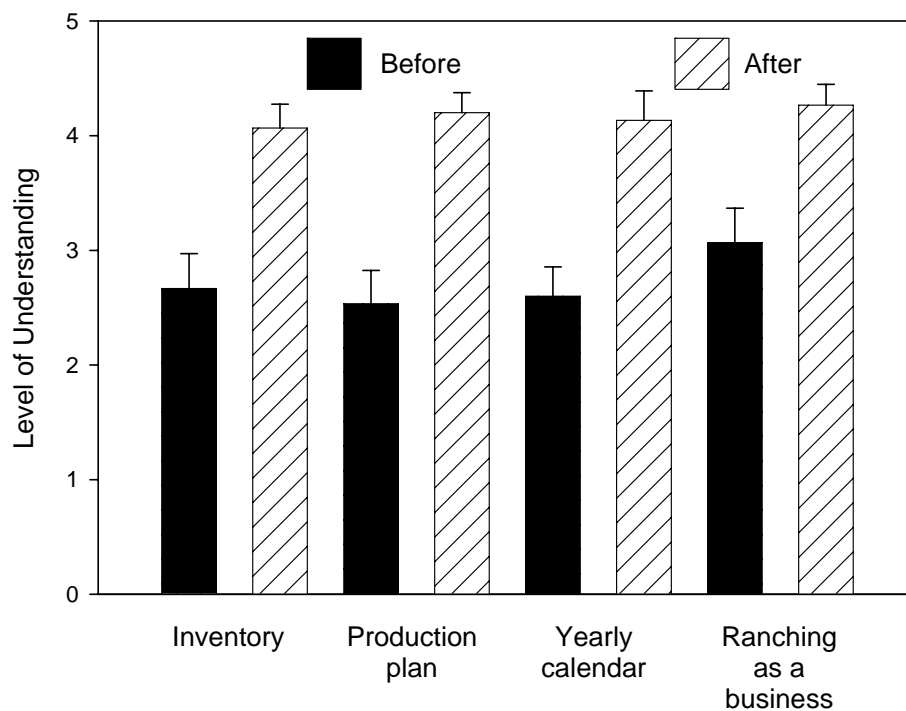


Figure 3. Mean ( $\pm$  SEM) level of understanding before and after the TRM workshop for topics within the livestock enterprises subject.

The overall mean change in the level of understanding for the wildlife management subject was 63.0% (Figure 4). The greatest change was observed in the understanding of setting wildlife goals (69.7%); lower levels of change in understanding were observed in identifying wildlife habitats (68.6%), managing wildlife enterprises for profit (59.4%), and inventory of wildlife resources (54.3%).

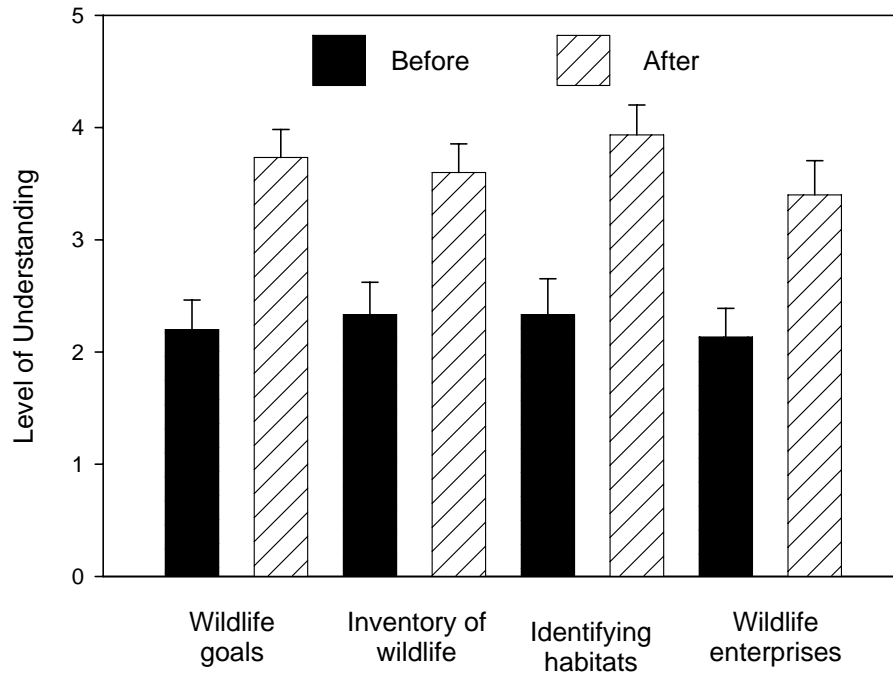


Figure 4. Mean ( $\pm$  SEM) level of understanding before and after the TRM workshop for topics within the wildlife management subject.

The total mean change in the level of understanding for the topic in grazing management subject was 54% (Figure 5). The greatest change was observed in the understanding of setting range goals (60.0%); lower levels of change in understanding were observed in planned grazing (55.0%), balancing animal numbers with forage supply (53.8%), grazing control (53.7%), matching animal nutrient demand and supply cycles (52.6%), and range inventory (48.8%).

All of the participants responded that they learned the ability to analyze their ranch situation and make better ranch management decisions after participating in this workshop.

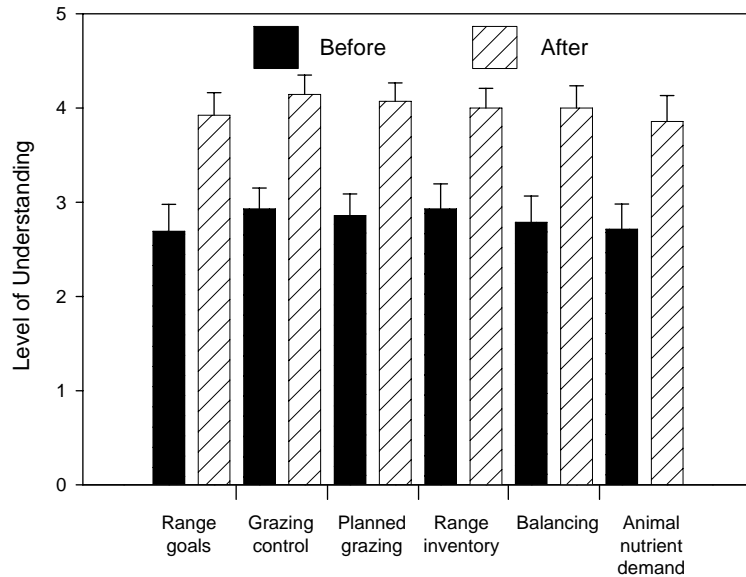


Figure 5. Mean ( $\pm$ SEM) level of understanding before and after the TRM workshop topics in the grazing management subject

## DISCUSSION

Through the use of strategic management concepts centered upon the strategic planning process, TRM provides educational programs that integrate multi-level planning to provide a tool for rangeland managers to use in the decision-making process (Fox & Carpenter, 2004).

Based on the results of this study we can conclude that the TRM workshop proved to be a tool to accomplish change in the decision making process for ranch management activities. The TRM workshop participants increased the levels of understanding for all the subjects taught in. The greatest change after the TRM workshop was observed in the understanding of the subjects related to livestock enterprises, wildlife management and grazing management. An intermediate level of understanding was observed in the strategic planning in ranching. The lowest level of understanding was for the economics subject.

The participants made some judgment about changes they applied in their operations from the knowledge attained from the TRM workshop. For a better understanding the opinions were organized and synthesized in groups as follows:

1. Efficient management of all the ranch resources.
2. More efficient use of forage in the range and grazing management. Shift to a proper stocking rate in accordance with the forage resources in the ranch. Better control of this during the dry season. In one case it was mentioned this was

carried out to favor wildlife populations. Also, to monitor wildlife for adjusting stocking rate.

3. Proper water supply to cattle.
4. Feeding supplements and minerals.
5. Brush control.
6. A different cattle management, including better health and weight to wean; early weaning and cattle genetic improvement for better commercialization.
7. Better budgeting. Costs reduction and better commercialization.
8. Improvement in the human resources management.

The “before” and “after” survey allowed knowing the opinion of the participants in reference to the changes and decisions made in their ranches. In the future, is necessary to reinforce the economics information, because the change in the level of understanding before the workshop and after the workshop was not as dramatic as in other subjects and the participants considered this subject as an important topic to make decisions in their ranches.

The TRM program has provided a valuable platform to continue the education and assistance to landowners and managers. The need to manage natural resources for sustainable use will continue and the current TRM program will continue to provide assistance to not only professionals, but also the general public (Fox & Carpenter, 2004). In this context, education and training are no longer seen simply as processes of transferring knowledge or information, but rather as means to help people to become critical thinkers and problem solvers in order to learn, share information and address problems and priorities (FAO, 2000; Freire, 2005).

#### **Implications**

As a program, TRM has been proven to be a platform to convey and continue education for ranchers and operators as well as to improve the decision making process in the ranch management activity. This program will provide Mexican ranchers with additional critical knowledge which in turn will generate focal points of technology transfer that allows the economic development process to be easier and in an economically affordable manner for both large and small ranchers. Mexican ranchers are welcoming, through TRM, a technology transfer mechanism that was not in place. The next level of TRM is to allow and help ranchers to organize themselves into information sharing clubs, providing a domino effect in the technology transfer action as economic development.

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