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Johnson Bia
Iowa State University

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ANALYSIS OF NEEDS: ADULT AND POSTSECONDARY AGRICULTURAL EDUCATION IN THE EASTERN NAVAJO AGENCY

Iowa State University

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300 N. Zeib Road, Ann Arbor, MI 48106
Analysis of needs: Adult and postsecondary agricultural education in the Eastern Navajo Agency

by

Johnson Bia

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of DOCTOR OF PHILOSOPHY

Major: Agricultural Education

Approved:

Members of the Committee:

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In Charge of Major Work

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For the Major Department

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For the Graduate College

Iowa State University
Ames, Iowa
1986
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER I. INTRODUCTION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>The Problem</td>
<td>2</td>
</tr>
<tr>
<td>Need for the Study</td>
<td>4</td>
</tr>
<tr>
<td>Purpose and Objectives</td>
<td>8</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>9</td>
</tr>
<tr>
<td>Basic Assumptions</td>
<td>9</td>
</tr>
<tr>
<td>Delimitations and Limitations</td>
<td>10</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>10</td>
</tr>
<tr>
<td>Summary</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER II. REVIEW OF LITERATURE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The American Indian Situation</td>
<td>15</td>
</tr>
<tr>
<td>The Navajo Nation Situation</td>
<td>18</td>
</tr>
<tr>
<td>The Planning Process</td>
<td>27</td>
</tr>
<tr>
<td>Needs Assessment in Educational Planning</td>
<td>31</td>
</tr>
<tr>
<td>Summary</td>
<td>39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER III. METHODS OF INVESTIGATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotheses</td>
<td>41</td>
</tr>
<tr>
<td>Population</td>
<td>41</td>
</tr>
<tr>
<td>Design</td>
<td>43</td>
</tr>
<tr>
<td>Data Collection</td>
<td>46</td>
</tr>
<tr>
<td>Analysis of Data</td>
<td>48</td>
</tr>
</tbody>
</table>
CHAPTER IV. ANALYSIS AND FINDINGS

Demographic/Profile Information
Reliability Tests
Rank Order by Means
Analysis of Variance and Duncan Post-Hoc Tests
T-tests
Multiple Regression and Correlations

CHAPTER V. DISCUSSION AND IMPLICATIONS

Discussion of Profile/Demographic Information
Discussion of Perceptions and Interests
Discussion of Qualitative Responses
Discussion of Implications

CHAPTER VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary
Conclusions
Recommendations
Additional Recommendations

REFERENCES

ACKNOWLEDGEMENTS

APPENDIX

Map of the Navajo Nation
Great Seal of the Navajo Tribe
Statistics from the 1980 Census
Letter to Crownpoint Institute of Technology (formerly Navajo Skill Center, Inc.) for research possibilities
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter from Crownpoint Institute of Technology expressing interest in sponsoring a research project</td>
<td>146</td>
</tr>
<tr>
<td>Letter to Crownpoint Institute of Technology to confirm arrangements for a research discussed via telephone</td>
<td>147</td>
</tr>
<tr>
<td>Cover letter to dissertation proposal submitted to Crownpoint Institute of Technology</td>
<td>149</td>
</tr>
<tr>
<td>Letter to Bureau of Indian Affairs-Shiprock Agency Superintendent for access to names and addresses of grazing permittees</td>
<td>150</td>
</tr>
<tr>
<td>Letters from Bureau of Indian Affairs-Shiprock Agency with accompanying Bill of Sales or Transfer Agreements of grazing permits</td>
<td>151</td>
</tr>
<tr>
<td>Letter of update to Crownpoint Institute of Technology</td>
<td>156</td>
</tr>
<tr>
<td>Cover letter to a draft copy of the survey instrument submitted to Crownpoint Institute of Technology</td>
<td>157</td>
</tr>
<tr>
<td>Letter to Land Board members and Chapter presidents to arrange for hosting educational meetings</td>
<td>158</td>
</tr>
<tr>
<td>Cover letter to the survey instrument</td>
<td>159</td>
</tr>
<tr>
<td>Survey instrument</td>
<td>160</td>
</tr>
<tr>
<td>Boyle's program development model</td>
<td>166</td>
</tr>
<tr>
<td>Human subjects research approval form</td>
<td>167</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>Description of the Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Percent distribution of the 1984 Navajo Nation population by age and sex</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Results of reliability tests on the survey instrument regarding perceptions of need related to agriculture and agricultural training in the Eastern Navajo Agency</td>
<td>73</td>
</tr>
<tr>
<td>3</td>
<td>Results of reliability tests on the survey instrument regarding interest in agricultural topic areas</td>
<td>73</td>
</tr>
<tr>
<td>4</td>
<td>Rank order of perception statements by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency (N = 150)</td>
<td>74</td>
</tr>
<tr>
<td>5</td>
<td>Means and standard deviations regarding level of interest in selected topics in range and watershed management as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>77</td>
</tr>
<tr>
<td>6</td>
<td>Means and standard deviations regarding level of interest in selected topics in crop production as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>78</td>
</tr>
<tr>
<td>7</td>
<td>Means and standard deviations regarding level of interest in selected topics in livestock production as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>79</td>
</tr>
<tr>
<td>8</td>
<td>Means and standard deviations regarding level of interest in selected topics in agricultural mechanics as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>81</td>
</tr>
<tr>
<td>9</td>
<td>Means and standard deviations regarding level of interest in selected topics in management as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>81</td>
</tr>
<tr>
<td>10</td>
<td>Means and standard deviations regarding level of interest in selected topics in general agriculture as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)</td>
<td>83</td>
</tr>
</tbody>
</table>
TABLE 11. Rank order of interest in agricultural topic areas by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency .......................... 83

TABLE 12. Rank order of interest in specific agricultural topics by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146) .................................................. 84

TABLE 13. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by level of education .............................. 87

TABLE 14. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by age .............................. 89

TABLE 15. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by amount of income derived from agricultural production .............................. 90

TABLE 16. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by amount of annual gross income derived from all sources .............................. 92

TABLE 17. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of rangeland used ........................................... 95

TABLE 18. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of cattle herd owned ........................................... 97

TABLE 19. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of sheep flock owned ........................................... 98

TABLE 20. A comparison of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by gender (sex) .................. 100
<table>
<thead>
<tr>
<th>TABLE</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>A comparison of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by employment status</td>
<td>101</td>
</tr>
<tr>
<td>22</td>
<td>Results of regression analysis in predicting the composite rating of interest in agricultural topics</td>
<td>103</td>
</tr>
<tr>
<td>23</td>
<td>Results of regression analysis in predicting the level of interest in agricultural topics related to crop production</td>
<td>103</td>
</tr>
<tr>
<td>24</td>
<td>Results of regression analysis in predicting the level of interest in agricultural topics related to agricultural mechanics</td>
<td>105</td>
</tr>
<tr>
<td>25</td>
<td>Results of regression analysis in predicting the level of interest in agricultural topics related to management</td>
<td>105</td>
</tr>
<tr>
<td>26</td>
<td>Results of regression analysis in predicting the composite rating on perception statements</td>
<td>107</td>
</tr>
<tr>
<td>27</td>
<td>Relationship between selected variables and the composite rating of interest in agricultural topics</td>
<td>108</td>
</tr>
</tbody>
</table>
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIGURE 1</td>
<td>The 1984 Navajo Nation population distribution by age and sex</td>
<td>19</td>
</tr>
<tr>
<td>FIGURE 2</td>
<td>Model of curriculum development system</td>
<td>34</td>
</tr>
<tr>
<td>FIGURE 3</td>
<td>Model of curriculum development system</td>
<td>35</td>
</tr>
<tr>
<td>FIGURE 4</td>
<td>Model of curriculum development system</td>
<td>36</td>
</tr>
<tr>
<td>FIGURE 5</td>
<td>Needs analysis and review</td>
<td>44</td>
</tr>
<tr>
<td>FIGURE 6</td>
<td>Distribution of respondents by gender (N = 150)</td>
<td>53</td>
</tr>
<tr>
<td>FIGURE 7</td>
<td>Distribution of respondents by level of formal education attained (N = 150)</td>
<td>54</td>
</tr>
<tr>
<td>FIGURE 8</td>
<td>Distribution of respondents by age groups (N = 150)</td>
<td>55</td>
</tr>
<tr>
<td>FIGURE 9</td>
<td>Distribution of respondents by size of rangeland (acres) used (N = 150)</td>
<td>56</td>
</tr>
<tr>
<td>FIGURE 10</td>
<td>Distribution of respondents by size of farmland (acres) used (N = 150)</td>
<td>57</td>
</tr>
<tr>
<td>FIGURE 11</td>
<td>Distribution of respondents by size of cattle herd owned (N = 150)</td>
<td>58</td>
</tr>
<tr>
<td>FIGURE 12</td>
<td>Distribution of respondents by size of sheep flock owned (N = 150)</td>
<td>59</td>
</tr>
<tr>
<td>FIGURE 13</td>
<td>Distribution of respondents by size of goat flock owned (N = 150)</td>
<td>60</td>
</tr>
<tr>
<td>FIGURE 14</td>
<td>Distribution of respondents by number of horses owned (N = 150)</td>
<td>61</td>
</tr>
<tr>
<td>FIGURE 15</td>
<td>Distribution of respondents by number of mules/donkeys owned (N = 150)</td>
<td>61</td>
</tr>
<tr>
<td>FIGURE 16</td>
<td>Distribution of respondents by employment status (N = 150)</td>
<td>62</td>
</tr>
</tbody>
</table>
FIGURE 17. Distribution of respondents by amount of income derived from agricultural production (N = 150) .......................................................... 62

FIGURE 18. Distribution of respondents by gross income derived from all sources (N = 150) .......................................................... 64

FIGURE 19. Frequency of responses to sources of new information about livestock production and/or range management (N = 150) .......................................................... 65

FIGURE 20. Frequency of responses to activities (practices) performed in connection with livestock production (N = 150) .......................................................... 66

FIGURE 21. Frequency of responses to how livestock products were used (N = 150) .......................................................... 68

FIGURE 22. Frequency of responses to alternative ways of making improvements to range livestock production in the Eastern Navajo Agency (N = 150) .......................................................... 69

FIGURE 23. Frequency of responses to the types of educational meetings preferred (n = 146) .......................................................... 70

FIGURE 24. Distribution of respondents by extent of interest in participating in an agricultural training program if it was offered in the Eastern Navajo Agency (N = 150) .......................................................... 71
CHAPTER I. INTRODUCTION

Background

The economic development philosophy of the Navajo Nation is to promote the private sector, ultimately creating a stable and viable economy which affords the Navajo people the maximum opportunity for a decent standard of living. This development philosophy is based upon the premise that the Navajo people desire, as individuals and as a nation, to achieve economic self-sufficiency by utilizing land, water, capital and human resources in the most efficient manner. The Navajo Nation will utilize its resources to develop employment and income opportunities as well as to provide goods and services for its people through the promotion of agricultural, commercial, industrial, financial, tourism and energy development. Such development will be based upon individual and group initiatives with limited tribal [government] participation (Division of Economic Development, 1985, p. 21).

The Navajo Nation is located in the southwestern part of the United States and it extends into the States of Arizona, Utah, and New Mexico (Appendix). The Navajo Nation is comprised of 25,000 square miles of land which serves as the land base for the 192,000 Navajo Indians. The area is characterized by mountain regions, juniper-pinion mesas, drybed arroyos, rocky rangeland, sandstone ridges, sandy hills, and rolling and flat alluvial terrain. The valleys are suitable for marginal farm production while the uplands are used year-round for livestock grazing -- predominantly cattle, sheep, goats, and horses.

Economic development in the Navajo Nation has been pursued through various means such as development of nonrenewable natural resources (oil, coal, uranium) and the establishment of tribal enterprises and shopping centers. The primary wage employers include the Navajo Tribe, Bureau of Indian Affairs (BIA), Indian Health Service (IHS), and few private businesses and industries. In the rural areas of the
Navajo Nation, cattle and sheep grazing remain the predominant enterprises.

The Navajo Nation is divided into five regions or agencies (Tuba City, Chinle, Fort Defiance, Shiprock, and Eastern). The New Mexico portion of the Navajo Nation consists of approximately 4,000,000 acres. The Eastern Navajo Agency is located in the New Mexico portion of the Navajo Nation. The Eastern Navajo Agency (ENA) is often referred to as the "checkerboard" area of the Navajo Nation because of its 15 different classifications of land status.

The Problem

One of the goals of the Navajo Nation is indigenous development (self-determination) through economic self-sufficiency and political sovereignty. In the 1980s, however, the Navajo Nation remains characteristically rural, poor, and essentially outside of the mainstream of the larger society. These conditions are not new and have many roots -- historic, economic, social and cultural (Preston, 1984, p. 1). Minhas et al. (1984) attributed the problems faced by American Indian tribes to a lack of adequate planning on the part of those responsible for program development, implementation, and evaluation.

Like most other developing societies, the Navajo Nation is struggling to formulate plans for successful rural economic development. Land, water, livestock, farming, and people resources have historically been the economic base for the Navajo people. The economy of the rural sector is based on pastoralism and small-scale dry-land farming, not
withstanding the unprecedented changes and advances throughout the modern world in recent decades. Iverson (1977) pointed out that development of land resources must remain the central thrust of the economic efforts in the Navajo Nation. The question is how to reach and mobilize the rural small-scale producers for improvement in agricultural practices and production. It is a question of how best to utilize the agricultural resources to benefit the Navajo people.

Development of agricultural and human resources is not an easy task. It requires an in-depth understanding of the agricultural situation before developing plans for intervention. The first step in developing a plan, however, requires knowing what to plan for -- knowing what problems exist, why they exist, and what can be done to improve the situation. However, one of the historical impediments to development and planning within the Navajo Nation has been the absence of a clear-cut reliable data base (Division of Economic Development, 1985). The basis for past and present programs includes individual observations and impressions of a program planner. This approach thus far has been futile as evidenced by the continuing problems which perplex the Navajo producers.

Planning is a necessary component of any program development process. According to McClure (1978), no organization can consistently achieve its objectives without effective planning. In discussing the strategies of planning, McClure (1978, p. 457) highlighted the importance of planning to organizational effectiveness when he stated that, "Without plans, no rational indicators of effectiveness can be determined."
Planning is pervasive; it can and should be done at all organizational levels; it can and should be done with all organizational members; and it is an ongoing and continuous process." Further, planning (1) provides a legitimate road map for a rational response to uncertainty, (2) facilitates control of organizational operations by collecting information to analyze needs and evaluate its programs and services, and (3) orients the organization to a futuristic leadership stance" (Boone, 1985, p. 80).

Although the focus of this study is not on economic development per se, it is, nevertheless, important to visualize indigenous development in a broad context. It is critically important to the future of the Navajo Nation that steps be taken to seek solutions to the complex problems being experienced by Navajo agricultural producers. Education is seen as one way to assist in the solution of some of these problems. Educational programs in agriculture could aid in linking agricultural development with economic development plans of the Navajo Tribe for an overall indigenous development of the Navajo Nation. The Navajo people and leaders have expressed the need for agricultural development in the Navajo Nation (Goodluck, 1984; Bia, 1984). The Crownpoint Institute of Technology has also expressed interest in developing a comprehensive plan for serving the Eastern Navajo Agency in agricultural-related training needs (Appendix).

Need for the Study

The Navajo situation presents many questions of critical importance to the future of the Navajo people. In order to facilitate the Navajo Nation's quest for indigenous development, there is a dire need
for research to answer questions which are important to the development of agricultural resources in the Navajo Nation. There is a need to systematically analyze the perceptions of Navajo agricultural producers regarding agricultural development, the present conditions, alternative approaches to improvement, and interest in agricultural education. These types of information are key components of any program development process, and they serve as baseline data for subsequent program planning, monitoring and evaluation. Presently, there exists no reliable data for input into educational program planning in agriculture. Without adequate information on the perceptions and priorities of the Navajo people, many development projects are doomed to collapse before they achieve lasting results.

An important criteria of the effectiveness of an adult and post-secondary educational program is how well it meets the needs and interests of its clientele. An undergirding premise is the involvement of the target clientele in designing, implementing, and evaluating educational programs. Failure to involve the target clientele in program planning or exclusive reliance on outside technical experts with no regard for local input will engender either dependence or distrust, neither of which is healthy for long-term indigenous development.

Fanale (1982) recommended that in the Navajo Nation, planning should be in the context of Navajo opinions, perceptions and interpretations of the historical process, as well as based on current ways of making a living. Fanale mentioned that for Navajos, all changes seem to take place first and primarily at the cultural level, with
ramifications for social life, livelihood and the health of the environment. Because Navajos interpret reality in a basic cultural context, this level must be the locus for generation of action involving land management or other changes.

Transfer of advanced technology to small-scale Navajo producers is not a simple task. Diffusion and adoption of new technology in the Navajo Nation must be planned in light of Navajo perceptions and interests; particularly if the target clientele include the "grassroots" level of the Navajo society. The "grassroots" level remains an untapped and under-utilized source of energy for improvement. Included in this category are Grazing Committee members, Land Board members, Chapter officers, land/livestock owners, shepherders, farmers, ranchers, parents, students, community leaders, and other interested parties.

One of the planning techniques used in education to solicit clientele involvement is use of a needs assessment (or analysis of needs). A needs assessment can be used to obtain information which can be used for educational planning, problem solving, making educational decisions, accountability, and supporting applications for funding. In educational systems development, the information and data obtained from a needs assessment are used to design, implement, and evaluate instructional products or programs (Trimby, 1979).

An appropriate needs assessment is necessary to determine the need for agricultural education in the Navajo Nation. There is no better way to identify the needs of clientele than to go to them and request their input. What they think and what they perceive as their needs are
important considerations in planning educational programs. When the subjective responses of the target population are analyzed, the information gleaned can serve as valuable sources of evidence for input into decision-making concerning intervention. Misanchuk (1984, p. 1) emphasized this point by stating, ". . . instructional developers are becoming increasingly involved in needs assessment, determining what needs to be taught as well as determining how best to teach and evaluate it."

There is a need for research throughout the entire Navajo Nation. However, the interest expressed by the Crownpoint Institute of Technology in developing a comprehensive plan for serving the agricultural-related training needs of the Eastern Navajo Agency (Appendix) offers an excellent starting point. The Eastern Navajo Agency can benefit from an agricultural education needs assessment in several ways:

1. It can provide a means for direct clientele involvement in the program development process.
2. It can help identify problems and determine needs.
3. It can serve as the basis for designing intervention strategies to meet needs.
4. It can provide baseline data for future program monitoring and evaluation to determine how well needs are being met.

In summary, a needs assessment would be beneficial to the Crownpoint Institute of Technology in planning educational services in agriculture for the Eastern Navajo Agency. Agricultural development in the Navajo Nation must be designed with input from Navajo agricultural producers at the "grass-roots" level.
Purpose and Objectives

The purpose of this study was to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. The specific objectives of the study were as follows:

1. To establish a profile of Navajo agricultural producers and agricultural production in the Eastern Navajo Agency.
2. To determine and rank the perceptions of Navajo agricultural producers regarding general agricultural conditions and need for agricultural training in the Eastern Navajo Agency.
3. To determine and rank the extent of interest in specific agricultural topics by Navajo agricultural producers in the Eastern Navajo Agency.
4. To determine if significant differences existed in the level of interest in agricultural topics when Navajo agricultural producers were grouped and compared on the basis of: agricultural income, gross income, education, age, size of rangeland, size of cattle herd, size of sheep flock, employment status, and gender.
5. To determine if a significant relationship existed between perceptions of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.
6. To determine if the level of interest in agricultural topics can be predicted by knowing selected demographic variables of the respondents.
Hypotheses

The null hypotheses investigated in this study were stated as follows:

1. There are no significant differences in the level of interest in agricultural topics when Navajo agricultural producers are grouped and compared by selected demographic variables.

2. There is no significant relationship between perceptions of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.

3. Level of interest in agricultural topics cannot be predicted by knowing selected demographic variables of the respondents.

Basic Assumptions

The researcher assumed certain conditions to be true which served as the basis for the study and, therefore, were not tested in the study. In this study, the researcher assumed the following to be true:

1. A needs assessment could be used successfully among Navajo adults to determine perceptions and interests, and construct a profile of Navajo agricultural producers for program planning in adult and postsecondary agricultural education.

2. The respondents clearly understood the statements and questions contained in the survey forms whether the questions were presented in the English language or the Navajo language.

3. The respondents were sufficiently knowledgeable about the agricultural situation in the Eastern Navajo Nation.
Delimitations and Limitations

The study has the following delimitations and limitations:

1. Out of the many different groups of people who could have been consulted, the focus of this study was on the needs and interests of Navajos who were engaged in agricultural production in the Eastern Navajo Agency. The findings of this study should not be generalized to the overall Navajo population in the Eastern Navajo Agency. The results of this study should be used as a reflection of perceptions of those Navajos who had an interest in agriculture.

2. All data collection sites were located in the Eastern Navajo Agency, excluding Districts 21 and 22 (Appendix).

3. The questionnaire items consisted of information synthesized from preliminary inquiries and literature available at the time of the study.

4. To counter the possibility that a large proportion of the respondents could not read and write the English language, the questionnaire was administered within a group setting with explanations given both in the Navajo and English languages.

Definition of Terms

The following terms are defined to provide clarity in understanding the research project:

**Adult education in agriculture** refers to organized instruction in agriculture for persons beyond the age of compulsory school attendance to increase knowledge and skills. An adult class is generally
characterized by flexible scheduling and content and objectives related specifically to the needs and interests of adults.

Advisory committee in agricultural education refers to a local group whose members are selected from the local community to advise a school on matters pertaining to instruction in agriculture. Members are selected because of their interest, knowledge and expertise to advise educators.

Agricultural education and agricultural training are terms used interchangeably to refer to the process by which learning takes place in the broad instructional areas of education in agriculture. The primary instructional areas include: agricultural production, agricultural supplies and services, agricultural mechanics, agricultural products processing and marketing, ornamental horticulture, agricultural resources, and forestry.

Agricultural education curriculum refers to the organized sequence of educational experiences planned for the purpose of meeting the needs and interests of learners in agriculture.

Chapter (e.g., Mariano Lake Chapter) refers to a local political precinct within the Navajo tribal government. The Navajo Nation consists of 109 Chapters. Each Chapter has a gathering hall referred to as a Chapter house.

Grazing districts and land management districts are terms used interchangeably to refer to sub-divisions of land for land management and grazing permit allocation purposes. Districts 21, 22, and 23 are
part of the Navajo Nation, but are not part of the Navajo Reservation proper.

Native Americans and American Indians are terms used interchangeably to refer to aboriginal natives of North America and are recognized as such by the United States government.

The Navajo Tribe is used as a collective term which refers to the Navajo people and official members of the Navajo Tribe of Indians.

The Navajo Reservation refers to the land reserved and held in trust by the United States government for use by the Navajo Tribe.

The Navajo Nation refers to the Navajo Tribe with its reservation and government. A resolution passed by the Advisory Committee (Executive Committee) of the Navajo Tribal Council in 1969 called for the use of the term "Navajo Nation" (Navajo Tribal Code, 1, pp. 7-8).

Needs assessment and analysis of needs are terms used interchangeably to refer to the systematic procedure used to identify, prioritize and validate needs on the basis of a discrepancy between what is and what is desired. The term "analysis" is used to indicate that advanced statistical procedures (analysis of variance, correlation, and regression) have been used to analyze some of the elements of need using the scientific approach.

Postsecondary education in agriculture refers to academic, vocational, or technical instruction in agriculture for persons who have completed or terminated their secondary education or who are beyond the age of compulsory education. The attainment of educational,
professional, or vocational objectives may be realized by a person enrolled in such an educational program.

Program planning and program development are terms used interchangeably to refer to a deliberate series of actions and decisions to plan a program that will contribute to improving the health (educational, economic, and social) of the people and their communities.

Research refers to a formal and systematic investigation which employs the scientific or problem-solving method and is directed toward the identification, clarification and/or resolution of a problem.

Vocational education in agriculture refers to organized educational programs, services, and activities which are related directly to the preparation of individuals for paid and unpaid employment in agriculture, or for additional preparation of individuals for careers not requiring a baccalaureate or advanced degree in agriculture.

Summary

The Navajo Nation aspires to become a self-sufficient nation through the development of its resources. However, the majority of the Navajo Nation remains rural, poor, and dependent upon a subsistence level agricultural economy. With a young and rapidly increasing Navajo population within a fixed land base, there is no alternative but to plan for efficient utilization of land, water, and human resources. The problem is a question of how best to reach and mobilize the rural sector for improvement in agricultural output which would, in turn, contribute to economic development in the Navajo Nation. Education is seen as one way of seeking solutions to these perplexing problems. One of the
postsecondary schools in the Navajo Nation, the Crownpoint Institute of Technology, has taken the initiative to sponsor a study which would contribute to the establishment of an information-base for educational program planning in agriculture. Development of agricultural programs within any setting requires a rationale and a systematic approach to planning.
An extensive literature review revealed the lack of research in agricultural education designed for American Indians. Therefore, this chapter includes a review of literature and research related to the topic of the study and is presented under the following headings: (1) The American Indian Situation, (2) The Navajo Nation Situation, (3) The Planning Process, and (4) Needs Assessment in Educational Planning.

The American Indian Situation

Although there have been extensive allocation of funds through numerous federal agencies and programs, the American Indian social and economic problems have not shown commensurate improvement (Minhas et al., 1984). Minhas et al. stated:

Statistics gathered by the Bureau of Indian Affairs show that unemployment on reservations remains an average of seven times higher than the total United States rates. With an increasing reservation labor force, a static unemployment rate indicates some economic growth. But that growth offers little consolation in light of the immensity of unemployment and the static nature of earning power, job levels, and per-family income. . . . Systematic programs to ensure the development of skills to meet the realistic needs of the tribal community and economic development plans are often lacking (Minhas et al., 1984, p. 1).

Minhas et al. attributed the problems to a lack of adequate planning on the part of those responsible for program development, implementation, and evaluation. Available literature reveals the complicated educational, economic and social problems which American Indians face. First and foremost, the American Indian is collectively at the bottom of the poverty scale among the ethnic groups in America.
The needs of American Indians are so great that Indian income makes other minorities seem prosperous (Horse, 1979, p. 15).

Kelly et al. (1980, p. 1) found that most American Indian reservations share similar economic characteristics: a high rate of unemployment, lack of adequate housing and community facilities, lack of access to capital, low levels of education and skills, lack of job opportunities, and geographical isolation with insufficient facilities in place to attract and sustain business development. The General Accounting Office of the federal government assessed economic activities on American Indian reservations and concluded:

The reservations' economic environment is typified by high unemployment and low family income levels. On some reservations, more than 80 percent are unemployed. No matter where Indians live, the pattern is essentially the same -- incomes are lower than that of the population at large, and more Indians earn below the poverty level (GAO, 1978, p. 1).

The GAO also concluded that not only is development on American Indian reservations both unique and difficult, but solutions that have been tested and found successful in other rural areas may be inappropriate. According to the GAO (1978, p. 9-10), factors which contribute to and sustain reservation poverty include:

a) Cultural values -- Indian traditions lack entrepreneurial and managerial values.

b) Sense of community -- Indians generally have a stronger sense of community than do most other Americans.

c) Isolation -- Most tribes are isolated geographically as well as culturally from the rest of American society. This isolation creates problems of access to markets, capital, entrepreneurial ideas, and management resources.
d) Relationships with the land — Indian culture, religion, tradition, and economic pursuits have been largely land-based. Accordingly, American Indians are more sensitive to the natural environment and its preservation than are most other groups within the Nation. . . . While Indians as a group are not land poor, their land is largely of poor quality.

e) Political history — Historically, the white man, eager for personal gain, often took advantage of the Indian. The economic plight of many tribes today stems from past exploitation by the white man.

In a study by Horse (1979), the American Indian Higher Education Consortium (AIHEC) identified barriers to development on American Indian reservations and attributed the problems to: a) the majority of American Indian reservations are remote from major market areas; b) there is a pervasive lack of belief among American Indians that the future will be better; c) there is a shortage of management skills; d) the reservations receive dismally poor quality of technical assistance; and e) Indians are not used to thinking in terms of money-making schemes. Kelly et al. (1980, pp. 1-4) also identified similar barriers to development on American Indian reservations and added such factors as:

a) the Indian community has little political power;

b) tribal members often face discrimination when seeking employment off the reservation or in non-Indian-owned businesses on the reservation;

c) the federal support upon which most tribes depend for development is actually dispersed by a number of agencies on a categorial — that is, program by program — basis rather than in a comprehensive manner. Each agency has different application and reporting requirements, different funding priorities, different application deadlines and funding cycles, and different program monitoring and performance requirements. Such fragmented funding and program operations are time-consuming and costly to tribes.
The Navajo Nation Situation

Robbins (1981) described the Navajo predicament as "the deplorable state of the Navajo economy." Robbins stated: "The Navajo Reservation economy remains impoverished, characterized by high unemployment rates, low tribal-government income, poor housing, modest medical services, and an increasing population with a rapidly swelling labor force... The population is increasing at about 2.4 percent per year, a figure similar to that of poor Third World nations. The male median age is 16.8 years and the median age of females is 17.8 years among the Navajo as compared to an overall median age of over 30 years for the entire United States population" (Robbins, 1981, p. 117). In 1984, 25 percent of the Navajo population was 9 years of age or under and nearly 61 percent was 24 years of age or under (Figure 1 and Table 1). This large dependent population places hardship on Navajo wage earners and the reservation economy.

The 1980 Decennial Census conducted by the U.S. Department of Commerce showed a total count of Navajos as being: 132,052 within the Navajo Nation; 18,822 in the immediate border area surrounding the Navajo Nation; 19,822 in more distant areas of 7 western states; for a total of 170,739 (Division of Economic Development, 1985, pp. 8-9). A 1986 estimate placed the Navajo population at 192,000 with a projected Navajo population of 200,000 in 1988 (Navajo Times Today, 6-5-1986).

The problems which characterize the Navajo Nation are shared by other Indian tribes in North America, Central America, South America, and most of the peoples of Third World developing countries. As with
Figure 1. The 1984 Navajo Nation population distribution by age and sex (see Table 1 for identification of age groups)
Table 1. Percent distribution of the 1984 Navajo Nation population by age and sex

<table>
<thead>
<tr>
<th>ID</th>
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<th>Male</th>
<th>Female</th>
<th>Total</th>
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<tr>
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<tr>
<td>B</td>
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<td>6.1</td>
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<tr>
<td>D</td>
<td>15 - 19</td>
<td>6.5</td>
<td>6.7</td>
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</tr>
<tr>
<td>E</td>
<td>20 - 24</td>
<td>4.9</td>
<td>5.5</td>
<td>10.4</td>
</tr>
<tr>
<td>F</td>
<td>25 - 29</td>
<td>3.9</td>
<td>4.2</td>
<td>8.1</td>
</tr>
<tr>
<td>G</td>
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<td>H</td>
<td>35 - 39</td>
<td>2.3</td>
<td>2.7</td>
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</tr>
<tr>
<td>I</td>
<td>40 - 44</td>
<td>2.0</td>
<td>2.2</td>
<td>4.2</td>
</tr>
<tr>
<td>J</td>
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<td>K</td>
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<tr>
<td>L</td>
<td>55 - 59</td>
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</table>

\(^{a}\)Division of Economic Development (1985, p. 10).
studies of underdeveloped countries around the world, the general findings are that inhibitors to economic development in the Navajo society include lack of (Griffith, 1979a, p. 1):

a. capitalization
b. technical knowledge
c. specially trained manpower
d. sound planning
e. good public administration
f. adequate public education and literacy.

The Navajo Nation is characterized by severe economic, social, and health problems. In 1982, 12 percent of the total U.S. housing was substandard while 64 percent of Navajo housing was substandard (Division of Community Development, 1983, p. 34). Nearly 20 percent of Navajo homes had no electricity and substandard water, housing, health, and educational services were commonplace (Robbins, 1981, p. 117). [Additional statistics from the 1980 Census are provided in the Appendix.] The Division of Community Development (1983, p. 37) called for changes in the grazing rights system because it "blocks needed housing projects and has outlived its usefulness in developing areas. It works against community needs and should be revised in these areas, particularly growth centers and other communities." Ninety-four percent of Navajos can't afford conventional homes without government assistance. This situation is hardly a stimulant to housing production in a time when government aid is being curtailed (Division of Community Development, 1983, p. 37). The Division further stated:
The issue is not whether the important class of middle and upper income Navajos are neglected or shortchanged by existing HUD/BIA [Housing and Urban Development/Bureau of Indian Affairs] programs (they are); nor whether these programs reward the poor for being poor (they do). The really crucial issue is the long-term effect of maintaining the status quo. Federal programs have typically put band-aids on problems. They usually deal with results; seldom with causes. These programs also promote continued dependence on the federal government, and the belief that it is the only hope for improvement in living conditions. These are not healthy trends (Division of Community Development, 1983, p. 38).

Under the Economic Recovery Act of 1981, there was a substantial reduction in federal funding which negatively impacted the Navajo economy. Due to the disproportionate size of the public sector, the continuing reduction in federal government spending is having a greater negative effect on the Navajo economy than other surrounding areas. The private sector which exists in the Navajo Nation is not of sufficient magnitude to compensate for the direct loss of money and jobs caused by public sector cutbacks. The federal funding cutbacks have translated into reductions in employment, health, housing and education opportunities, resulting in a slow deterioration of the economic well-being of the Navajo people. The Navajo Tribe itself presently does not have sufficient financial resources to invest in development projects to reduce the high unemployment rate and to generate income (Division of Economic Development, 1985, p. 20).

Agricultural economic enterprises such as timber, crop, and livestock production serve as a permanent economic base upon which to build the industrial and commercial sectors of the economy. Improvements in these enterprises should be made so that more productive use of the resources take place. Further development of the agricultural sector of
the economy has the potential for many benefits, including the protection of Navajo water rights (Division of Economic Development, 1985, p. 17). Despite low overall agricultural productivity, subsistence level agriculture still represents an important component in the Navajo economy and will likely remain so for the foreseeable future. The most viable approach may be to start with what the Navajo people have -- range livestock production -- which remains the predominant economic base. This approach can capitalize on the interest of the Navajo people and direct it toward increased production and increased income.

Efforts to develop the agricultural capacity of the Navajo Nation have been primarily motivated by two objectives: (1) to develop an economic base for the Navajo people which will minimize the presently increasing dependency on an intricate network of welfare; and (2) to develop a viable means to utilize the scarce water resources to which the Navajo Tribe is entitled by treaty. If the Navajo Tribe does not or cannot use the water, the right to use it is relinquished. In response to these pressing needs, irrigation projects have been initiated in the San Juan Basin, the Little Colorado drainages, and the Fort Defiance Plateau drainages (NCC, 1985). In addition, the Holistic Resource Management (HRM) grazing approach was introduced on the Navajo Reservation to aid Navajo ranchers in increasing production and to naturally rehabilitate range resources. However, neither the Navajo Tribe nor the Bureau of Indian Affairs maintain agricultural statistics on the Navajo Nation. A lack of information severely limits the data-base necessary for systematic development planning.
Indeed, the agricultural sector of the Navajo Nation is mired in economic troubles. Approximately 95 percent of the Navajo livestock producers are operating at a net loss each year. Calving and lambing totals for Navajo producers are only one-half the national average and Navajo producers receive only 60 percent of the market value of their products due to an inefficient marketing system (Navajo Times, 7-26-1984). Meanwhile, officials of the Bureau of Indian Affairs have described the situation as (Navajo Times, 9-17-1984):

... this [poor production] is a direct result of poor management practices. It's known that the land is in bad shape, even while land users refuse to recognize the fact by adopting better methods of range management and animal husbandry.

The need for improving agricultural output through improvement of practice has long been recognized. The first educational workshops were conducted in the 1930s by the Indian Service (forerunner to the Bureau of Indian Affairs) which was followed by development of irrigation projects. The Navajo Tribe and the Bureau of Indian Affairs attempted a shortcut to agricultural development through establishment of a 110,632-acre corporate-style agribusiness known as the Navajo Agricultural Products Industries (NAPI). NAPI is a tribal enterprise with a tribally appointed management board. The original intent was for NAPI to develop its full acreage through the profits it generated; instead, it has severely failed with a resulting debt of over $30 million and only 55,000 acres developed. The immediate concern of the tribe is to service the mounting debt incurred by the enterprise.

Other tribal initiatives to develop the Navajo agricultural economy have included a Basic Farm Training Program offered by the Navajo
Community College - Shiprock Campus to train skilled workers for the Navajo Agricultural Products Industry; a short-lived Agriculture/Livestock Program offered by the Navajo Skill Center; the establishment of a Navajo Department of Agriculture which remains largely uncoordinated with other agencies; contract with the New Mexico State University for agricultural extension services; occasional newspaper articles from the University of Arizona; and over 30 known marketing and production cooperatives have been attempted, but not one has been successful (NCC, 1985).

The Tribal initiatives reflect a realization of the immediate and critical need to reverse the economic plight of the Navajo agricultural producers. Unfortunately, many of the initiatives were only short-lived, and the results were futile and failed to address the long-term needs of the Navajo people and the Navajo Nation. The hasty and reactionary development of programs to meet pressing needs appears to have severely hindered the consideration of systematic long-term development planning. Despite numerous development attempts, the "grassroots" level of the Navajo populace remains largely unchanged and unbefuddled.

A prime example of development efforts based on non-renewable natural resources gone sour is the Eastern Navajo Agency. The Eastern Navajo Agency temporarily flourished in response to the United States' need for energy. The Eastern Navajo Agency is endowed with coal, oil, and uranium reserves. The first wave of uranium development (primarily 1950s exploration) took place in the Chapters of Casamero Lake, Smith Lake, and Mariano Lake. Contemporary developments in the 1970s reached
the Chapters of Pinedale, Church Rock, Nahodisgish (Dalton Pass), Crown-point, Becenti, and Little Water (Griffith, 1979b, p. 1). During the 1980s, however, the slow down in demand for energy diminished the prospect for continued economic growth based on non-renewable natural resources. The need to develop agricultural resources became more significant than ever before.

The Eastern Navajo Agency has an estimated unemployment rate of 32.7 percent (Division of Economic Development, 1985, p. 83). Land status is very complex off the Navajo Reservation in the so-called "checkerboard" area. Private and state lands are intermingled with public domain, railroad, tribal trust and fee lands, deeded land, administrative reserves, Bureau of Land Management land, leased land, and Navajo allotments (Griffith, 1979b, p. 2).

The data-base necessary for program planning is nearly non-existent in the Navajo Nation. This lack of information is particularly acute in the agricultural sector. Two recent studies attempted to initiate the establishment of such information. Goodluck (1984) interviewed Navajo cattle producers in the Tuba City, Fort Defiance, and Shiprock sub-agencies and concluded that a Navajo agricultural curriculum should be developed. Bia (1984) also found members of the Navajo Tribal Council, the governing legislative body of the Navajo Nation, indicating a strong need for adult agricultural education for the Navajo people. Both studies stressed the need for further research to identify specific areas that should be included in planning an adult agricultural education program. At least one Navajo chapter has passed a resolution requesting
the Bureau of Indian Affairs to teach the community members about range
plants and range management (Navajo Times, 9-17-1984).

The Planning Process

McClure (1978) emphasized that no organization can consistently
achieve its objectives without effective planning. Boone (1985)
described the evolution of inquiry from the common sense approach to the
scientific approach as involving the following levels: (1) common sense
approach, (2) deductive reasoning, (3) inductive reasoning, (4) deductive
+ inductive reasoning, (5) problem solving, and (6) scientific approach
to inquiry. The important concept is that planning is a designing proc­
ess which entails systematic inquiry to obtain valid information for
decision-making. The scientific approach to inquiry includes five
general steps (Boone, 1985, p. 51):

1. Defining a problem or a question that is in need of a solution
or an answer.

2. Stating hypotheses formulated to serve as tentative explanations
of the problem; this step requires a prior review of literature
related to the problem.

3. Deducing consequences of the hypotheses; if the hypotheses were
true, what would be observed?

4. Collecting and analyzing data, through observation, experimenta­
tion, and testing.

5. Confirming or rejecting the hypotheses on the basis of whether
or not evidence was produced to support the hypothesized rela­
tionship(s) between variables.

In the scientific approach of inquiry, however, no claim is made to
prove a hypothesis. Rather, the researcher merely concludes that the
findings or evidence from testing the implied relationship does or does not support the hypothesis.

Program planning is the lifeblood of effective educational process: (1) what kinds of data are needed to facilitate program planning, (2) how can this information be obtained, and (3) how will these data be used. The simple truth is that research and planning cannot by themselves solve all the problems besetting educational programming. Perhaps the greatest potential value of a good research program lies in its capacity to improve the quality and quantity of the data inputs used in decision-making and program planning. More and better data will enable decision-makers to make more effective decisions and plan better programs (Burback, 1977).

Boone (1985) identified five basic assumptions which guide program planning:

1. Planning is a futuristic activity.
2. The planning behavior is proactive rather than reactive.
3. Planning enhances efficiency.
4. Planning is sequential or stepwise, involving collecting and analyzing related information, and identifying, assessing, and analyzing needs.
5. Planning is collaborative; that is, it includes representatives of all who are affected by it.

Program development is really an attempt to plan an educational program that will contribute to improving the health (economic, environmental, cultural) of the people and their community. Program development is a deliberate series of actions and decisions through which
representatives of the people affected by the potential program are involved with a programmer to (Boyle, 1981, p. 5):

1. Develop an organizational structure for analyzing, interpreting, and making decisions about problems or situations that should be changed or improved.

2. Effectively utilize resources in the study and analysis of the people and their communities.

3. Establish priorities on the problems and situations for which desirable changes should be identified in the plan of action.

4. Identify desired outcomes to be attained through the program with people and communities.

5. Identify resources and support for effective promotion and implementation of the programs.

6. Design an instructional plan that provides for extensive involvement of the learners in appropriate learning experiences.

7. Implement the plan of action that is designed to provide appropriate learning opportunities such as conferences, meetings, workshops, individual consultations, and radio and television programs.

8. Develop appropriate accountability approaches so as to make effective judgments about the value of the program.

9. Communicate the value of the program to financial decision-makers, the participants, and other interested individuals and groups.

Change is an assumption of program development. Within any social system, change may be caused by forces inside the system or by forces brought to bear on the system from without. Change resulting from internal forces may be described as "imminent change," while that resulting from external forces is "contact change." Changes may be either planned or unplanned. Boyle states (1981, p. 41), "... one of the far-reaching consequences of social change in our time has been that
we, as individuals and as groups, have become more "future-oriented," and thus sense the need for more intelligent and systematic planning.

The undergirding assumptions of planned change include:

1. Planned change is a necessary prerequisite to effective economic and social progress for people and communities.

2. The most desirable change is predetermined and democratically achieved.

3. Continuing educational programs, if properly planned and implemented, can make a significant contribution to planned change.

4. Educational change in knowledge, skills, and attitudes of people are necessary to achieve economic, environmental, and social change.

5. It is possible to select, organize, and administer a continuing education program that will contribute to the social and economic progress of people and communities.

6. People and communities need the guidance and leadership of a continuing educator to help them solve their problems and achieve more desirable ways of living and of making a living (Boyle, 1981, p. 41).

The philosophy of programming with adults is based on the belief that active participation by people in the process is essential for effective educational programs to evolve. It is only through this approach that the continuing educator is able to provide people with educational opportunities that relate to their needs and interests and contribute to resolving problems pertinent to their economic and social well-being (Boyle, 1981, p. 42).

Although each society is somewhat unique, there are problems which seem to be common among developing societies: (1) the people are caught in the middle of the "old" and "new" ways of making a living; (2) development endeavors invariably raise deep-rooted cultural, social,
economical, and political issues; and (3) development plans are often
drafted by "outside experts" based upon the outsider's impressions of
what the needs of the people are and what solutions appear appropriate.
There is little or no systematic effort made to see the world as the
clientele see it.

Needs Assessment in Educational Planning

A good idea may fail for the wrong reasons. Recognition of this
fact has propelled "needs assessment" into an integral part of curriculum
development in recent years. Success in education is almost never the
result of sheer luck. It is, instead, the outcome of careful planning
(Kaufman, 1983). New program development, upgrading existing programs,
and termination of unneeded programs is the lifeblood of any technical
or vocational education institution (Wenrich and Wenrich, 1974).

The term "needs assessment" refers to any array of procedures
for identifying and validating needs and establishing priorities among
them. Needs assessment has been increasingly recognized as a necessary
part of curriculum design since the 1960s in requesting funds. A needs
assessment involves the collection of both opinion and factual data.
One of the main innovations of the process is that it requires obtaining
judgments from all the main constituents of the school. The value of
objective data in the form of social, economic, and demographic indices,
and observed patterns of behavior, is that they are based on action
rather than words. By illuminating, validating, or discrediting the
opinions expressed by the public, they allow a more convincing determina-
tion of needs (Pratt, 1980).
Need is a condition between what is and what should be, or between what is and what is more desirable. Need is a key instigator of behavior in that it creates a state of disequilibrium. People are motivated to fulfill the need or find a substitute to restore the equilibrium. Thus, a need represents an imbalance, a lack of adjustment, or a gap between a present situation or state of being and a new or changed set of conditions assumed to be more desirable ... it is necessary to compare what is -- the present situation -- with what should be -- the more desirable condition. The result of this comparison will be a description of the gap or the need (Boyle, 1981, p. 155).

It is critical to make decisions for educational program development based on data produced by the needs assessment in order to effectively meet the needs of learners or training system (Price, 1983). In general, needs assessment is the process by which people identify needs and decide on priorities among them (Kosecoff and Fink, 1982). An educational need can be described as a discrepancy or gap between a person's present level and the preferred or required level of capabilities for effective performance defined by the person, the organization, or society (Caffarella, 1982). Trimby (1979) indicated needs assessment is the first step in many of the systems approaches to educational development. In regards to the effect of needs assessment, he stated that:

In the educational setting, this process (needs assessment) yields information which can be used in educational planning, in problem solving, for making educational decisions, for accountability, and for supporting applications for funding. In educational systems development, the information and data obtained from a needs assessment are used to design, implement, and evaluate instructional products or programs" (Trimby, 1979, p. 24).
Prior to the 1960s, curricular goals and objectives were often established on the basis of educational theory and experiences, and decided by teachers and administrators. Borich (1980) noted needs assessment can be used for self, summative, and formative evaluation in follow-up studies. Smith and Woeste (1983, p. 22) pointed out that: "Too little time is usually spent on evaluation of in-service educational programs before their implementation. Perfectly good programs may have little or no positive impact because they were not on target."

There is a large amount of literature which addresses the design of needs assessment. A needs assessment may focus on a specific program or an entire school curriculum. Pratt (1980, pp. 484-486) depicted needs assessment as the first major component of a curriculum development system (Figures 2-4). Boyle (1981, p. 185) also presented a program development model which depicted the following major phases (Appendix): (1) organizational and individual commitment, (2) situational analysis, (3) broad program objectives, (4) identification of resources and support, (5) program design, (6) instructional design, (7) delivery of program, (8) program's value, and (9) communication of results.

In identifying training needs, Schiffer (1978) mentioned that felt needs of trainees are as important as organizational goals. Kaufman and English (1979) divided needs assessment into two types: internal and external. From an internal view, the needs felt by learners, educators, and the community are considered. The external needs refer to the societal goals and objectives. They stated (1979, p. 227) that: "Felt needs are only the entry point for realistic goal setting
Figure 2. Model of curriculum development system (Pratt, 1980, p. 84)
Figure 3. Model of curriculum development system (Pratt, 1980, p. 85)
Figure 4. Model of curriculum development system (Pratt, 1980, p. 86)
and needs identification. A needs assessment process requires both perceived needs and needs substantiated by external reality."

Several techniques are appropriate for conducting a needs assessment. Caffarella (1982) described the following techniques:

1. Survey
2. Key informant interviews
3. Consultation
4. Observation
5. Group meeting
6. Review of written materials
7. Informal

Formal needs assessment techniques suggested by Boyle (1981) included: (1) surveys, (2) critical incident, (3) individual profile, and (4) competency analysis. Informal needs assessment techniques discussed by Boyle (1981) also included: (1) informal conversations, (2) physical evidence, (3) document/reports, and (4) observations.

Chmura (1981, p. 26) stated: "For a training needs assessment to work effectively, it must be viewed as part of a continuous process of training and development in an organization." Benseman (1980, p. 28) discussed the changing nature of needs. Benseman viewed the assessment of needs to be a continuous process for taking into account the dynamic and shifting nature of needs. Benseman (1980, p. 28) argued that "one-shot efforts to assess needs run the risk of overlooking, to some degree at least, peoples' changing environment and their on-going personal development."
The process of needs assessment tends to identify a large number of needs. A curriculum that attempts to meet too many different needs at once is unlikely to be effective. In order to decide which needs curriculum revision or development will address first, priorities must be established. Left to their own devices, many people will react only to immediate needs, ignoring long-term needs until catastrophe is imminent. It is one of the functions of planning to counterbalance this human tendency (Pratt, 1980). Prioritizing is an integral element in needs assessment. An educational program cannot satisfy all educational needs. It is important to decide which needs are to receive priority and the amount of resources to be used (Benseman, 1980).

However prioritization is accomplished, consideration must be given to the following groups: society/community, clientele, politics, organization, resources, and personnel. An educator's decisions with regard to specific programming strategies should be based on the particular cultural group at which the program may be directed (Boone, 1985). Boone emphasized that efforts of educators to motivate and effect change in disadvantaged segments of society whose motivation and value systems differ from the norm have been and continue to be a perplexing but challenging task. Boone defined culture as the behavior or way of life of a definable grouping of people: "Culture may be thought of as all the learned and expected ways of life shared by members of a society: artifacts, buildings, tools, and other physical things, as well as techniques, social institutions, attitudes, beliefs, motivations, and value systems known to the group" (Boone, 1985, p. 10).
In the Navajo Nation a needs assessment must take into consideration the needs and perceptions of the Navajo people. The people most affected by change need to be involved at all levels of program development and implementation. The perceptions of the Navajo people are critically important in assessing the feasibility of a program's success and sustainability. The "grassroots" level indicates the rate of adoption of new techniques.

Summary

A situational description of the conditions in American Indian reservations, and the Navajo Nation in particular, depicts a struggle of indigenous people for survival and attainment of a dream -- a dream of economic self-sufficiency and political sovereignty. In order for American Indian tribes, and the Navajo Nation in particular, to attain indigenous development, it must begin with the present conditions and embark upon an incremental approach to improvement through planned change.

Planning is a rational approach to achieving goals. From the review of literature, the essentiality of and rationale for needs assessment in educational program planning was established. The undergirding concept explored was that identification of clientele needs and interests was basic to planning educational programs. Needs assessment is a basic tool for productive, rational, and logical thinking about problems and solutions. It is the first step in developing a functional and constructive planned change. A needs assessment could be invaluable in planning educational programs in agriculture for the Navajo people.
CHAPTER III. METHODS OF INVESTIGATION

The main purpose of this study was to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. The specific objectives of the study were as follows:

1. To establish a profile of Navajo agricultural producers and agricultural production in the Eastern Navajo Agency.

2. To determine and rank the perceptions of Navajo agricultural producers regarding general agricultural conditions and need for agricultural training in the Eastern Navajo Agency.

3. To determine and rank the extent of interest in specific agricultural topics by Navajo agricultural producers in the Eastern Navajo Agency.

4. To determine if significant differences existed in the level of interest in agricultural topics when Navajo agricultural producers were grouped and compared on the basis of: agricultural income, gross income, education, age, size of rangeland, size of cattle herd, size of sheep flock, employment status, and gender.

5. To determine if a significant relationship existed between perceptions of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.

6. To determine if the level of interest in agricultural topics can be predicted by knowing selected demographic variables of the respondents.
Hypotheses

The null hypotheses investigated in this study were stated as follows:

1. There are no significant differences in the level of interest in agricultural topics when Navajo agricultural producers are grouped and compared by selected demographic variables.

2. There is no significant relationship between perceptions of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.

3. Level of interest in agricultural topics cannot be predicted by knowing selected demographic variables of the respondents.

To accomplish the stated objectives, several procedures were used. These procedures are discussed under the following headings: (1) Population, (2) Design, (3) Collection of Data, and (4) Analysis of Data.

Population

Originally, the plan was to utilize a statistical sample from as many different groups as possible which would represent a cross-section of the Navajo population in the New Mexico portion of the Navajo Nation. However, several serious impracticalities were encountered. The plan to utilize mail questionnaires was dismissed when the researcher found that reliable sources of names and addresses of Navajo agriculturalists was non-existent (Appendix). The few names and addresses that could be obtained contained trading post and general delivery addresses. Another
concern was the potential for low literacy rate among Navajo adults from which information was desired.

Potential respondents were initially identified and they included: grazing permittees, community leaders (chapter officers, land board members, and council delegates), high school students, parents of high school students, and businesses. Alternative data collection methods were also identified and they included:

1. personal interviews with a statistical sample
2. mail questionnaires to a statistical sample
3. group meetings with a non-statistical sample

The advantages and disadvantages of each alternative were carefully considered before a final decision was made. Some of the factors which were considered in arriving at the final decision included: number of people who could be reached, potential response rates, literacy of respondents, interaction through questions and comments, time constraints, and expenses. The most practical approach was to make an on-site visit and collect the desired information in the field through group meetings. Although the group meetings approach did not guarantee a statistical sample, the total number of Navajo agriculturalists who could be reached through this means was much higher than if personal interviews would have been used.

A total of approximately 275 survey forms were made available to potential respondents. The data were collected and the responses showed a total of 148 usable survey forms returned at the meetings and 2 additional survey forms were later received in the mail. The respondents
consisted of Navajo adults who attended educational meetings, the focus of which was the delivery of information on approved practices in livestock production. The responses showed that the group included a cross-section of Navajo adults of all ages, educational abilities, employment status, but who for the most part had an interest in agriculture.

Although other groups could legitimately have been included in an agricultural education needs analysis, it was deemed by the researcher through the review of literature and preliminary inquiry that interested Navajo agricultural producers would suffice in gathering the information needed to answer the stated objectives of the study. Navajo agricultural producers were deemed to have the greatest vested interest in agriculturally related matters and any program planning in agricultural education would necessarily include this segment of the Navajo population.

Design

The nature of the objectives classified this study as descriptive basic research. The study was designed to meet the stated objectives and to test the hypotheses. The Iowa State University Committee on the Use of Human Subjects in Research reviewed the research project and concluded that the rights and welfare of the human subjects were adequately protected, that risks were outweighed by the potential benefits and expected value of the knowledge sought, that confidentiality of data was assured and that informed consent was obtained by appropriate procedures (Appendix). The research project was made possible through partial funding from the Crownpoint Institute of Technology (CIT). The type of
information collected through the study reflected, in part, the desire of CIT to develop a comprehensive plan for serving the agricultural-related training needs in the Eastern Navajo Agency.

The needs analysis and review process that was used in this study is diagrammed in Figure 5.

Step 1: Telephone contacts and correspondence
Step 2: Extensive literature review - tribal reports and published literature
Step 3: Demographic information from respondents
Step 4: Subjective responses - perceptions and interests
Step 5: Analysis of needs - rank order of needs
Step 6: Determination of program feasibility by the school

Figure 5. Needs analysis and review

During the preliminary inquiry, an extensive literature and document review was conducted to establish a situational description of the Navajo agricultural, educational, economic, and social conditions. Additionally, agricultural workers on the Navajo Reservation were...
consulted through telephone contacts to explore major problems in agriculture. The preliminary inquiry culminated in a two-week on-site visit by the researcher to the Eastern Navajo Agency prior to development of the questionnaire.

Information collected through preliminary inquiry was used to develop a questionnaire (Appendix) for data collection. The questionnaire had two parts. Part A consisted of perception statements and interest in agricultural training programs. Part B consisted of demographic information to establish a profile of agricultural production and agricultural producers in the Eastern Navajo Agency. The dependent variables included: rating perceptions on the agricultural situation and the need for agricultural training in the Eastern Navajo Agency; ranking priorities regarding alternative approaches to improvement of agricultural production; and rating the extent of interest in learning more about specific topics in agriculture.

The ratings of perceptions employed a five-point Likert scale (5 = Strongly Agree, 4 = Somewhat Agree, 3 = Neutral, 2 = Somewhat Disagree, and 1 = Strongly Disagree). The ratings of interest in learning more about specific agricultural topics also employed a five-point Likert scale (5 = Very Interested, 4 = Interested, 3 = Somewhat Interested, 2 = Little Interest, and 1 = No Interest). Both rating scales also had a provision for "Don't Know" designated by a "?" on the questionnaire. The "Don't Know" column was used to insure that those who did not understand or could not relate to the statements could legitimately respond with a "don't know" response rather than being
forced to indicate a response to a statement about which they knew little. The instrument was refined with inputs from the Branch of Land Operations, New Mexico Extension Service, Crownpoint Institute of Technology, and Agricultural Education faculty at the Iowa State University.

Data Collection

Once the on-site data collection procedure was agreed upon, the researcher embarked upon coordinating the collection effort. Telephone contacts were made with key people in the Branch of Land Operations in Crownpoint, New Mexico, and McKinley County Agricultural Extension Service in Gallup, New Mexico. The general feeling was that Navajo agriculturalists would probably want some useful information about agriculture and livestock management if they were to contribute to a study by completing a questionnaire. A three-week data collection was agreed upon, taking into consideration the schedules of the Land Board members and chapter officers in the Eastern Navajo Agency.

A letter (Appendix) was sent to each chapter president and Land Board member in the Eastern Navajo Agency to ensure that each chapter was notified of the plan to conduct educational meetings. Several chapters volunteered to host the educational meetings and the meetings were scheduled during March 17 - April 4, 1986. The educational meetings were announced at chapter meetings by local chapter officials and Land Board members, on local radio stations (KGAK, KTNN, and KNDN), and local newspapers (The Navajo Times Today and Gallup Independent).
The researcher made an on-site visit and conducted nine educational meetings. The educational meetings were all conducted in the Navajo language by the researcher with assistance from the McKinley County and San Juan County agricultural Extension agents. The researcher introduced the subject to be discussed and also briefly explained that the meeting was part of a research project. Videotapes on agricultural practices (lambing/calving, baby lamb starvation, bull soundness, and growth implants) were shown, followed by discussion and questions. Charts, handouts, and other visual aids (including samples) were used in discussing treatment of cattle grubs, lice, and use of gestation tables. Provisions were also made to entertain questions related to other aspects of agriculture such as farming and mechanics. However, there were few questions related to either of these areas. Each session lasted approximately three hours.

Approximately halfway through the session, a 15-30 minute coffee break was taken. After the coffee break, the survey instruments were distributed and the researcher explained in the Navajo language the nature of the study and the request for completion of the questionnaire. Voluntary participation and confidentiality of the information provided by the respondents were explained. Each page of the questionnaire was explained with the aid of an overhead transparency. Assistance was provided to individuals who had difficulty reading or writing the English language. The survey forms were completed in a group setting, although each person gave independent responses. Consistency was maintained in
the explanation of the survey form, although the researcher responded to questions as they arose.

   Educational meetings were conducted at the following locations:
   Huerfano Chapter House
   Ramah Chapter House
   Whiterock Chapter House
   Whitehorse Lake Chapter House
   Red Rock Chapter House
   Nageezi Chapter House
   Crownpoint Chapter House
   Pinedale Chapter House

   A meeting was also conducted with the Joint Eastern Land Board.
Although a total of approximately 275 survey questionnaires were made available to potential respondents, only 150 usable questionnaires were returned to the researcher. The remaining questionnaires were either not returned, returned blank, or were only partially completed. Some of the potential respondents actually told the researcher that the questionnaire would be completed and returned in the business reply envelope which was provided. However, only two responses were received by return mail.

Analysis of Data

The data were compiled and coded onto a WYLBUR file and analyzed using the updated version of the Statistical Package for the Social Sciences (SPSSx, 1983). All analyses were conducted at the Iowa State
University Computation Center. The data were analyzed to meet the specific objectives of the study. The statistical procedures employed to analyze and summarize the data included:

1. Frequencies were computed for all items in the instrument to double-check the coded data and provide an overview of the data for a proper revision of the analysis design.

2. Cronbach's Alpha procedure was used to test reliability of the grouped items in each perception and interest category to estimate the level of internal consistency.

3. Frequencies and percentages were computed for non-parametric items in the instrument. Priority ranking of responses was achieved by ordering frequency values in a descending order.

4. Means, standard deviations, and medians were computed for all parametric items in the instrument. Priority ranking of responses was achieved by ordering mean values in a descending order.

5. Analysis of Variance and t-test procedures were employed to determine if significant differences existed in the perception and interest ratings when respondents were grouped by selected demographic variables: size of rangeland, size of cattle herd, size of sheep flock, agricultural income level, gross income level, education level, age, employment status, and sex. The Duncan post-hoc test was used to locate the source of differences when significance (.05 level) was found. The .05 level of significance was established a priori as the critical
standard for rejecting the hypotheses.  

6. Pearson Correlation Coefficient was computed to determine if a significant relationship existed between perception of Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.  

7. Regression procedures were employed to determine if knowledge of selected demographic variables would help in predicting the level of interest in agricultural topics.
In this chapter, analysis of data and findings of the study are presented in order to meet the stated objectives and hypotheses. The primary purpose of this study was to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. The study sought to establish a profile of Navajo agricultural producers, determine perceptions regarding agricultural conditions and need for agricultural training, determine extent of interest in agricultural topics, and test hypotheses relevant to the purpose of the study.

Because this was a descriptive study, a profile of the respondents is presented first. This chapter is divided into the following parts: (1) Demographic/Profile Information, (2) Reliability Tests, (3) Rank Order by Means, (4) Analysis of Variance and Duncan Post-Hoc Tests, (5) T-tests, and (6) Multiple Regression and Correlations.

Demographic/Profile Information

Through a series of questions throughout the survey questionnaire, information concerning personal data and agricultural production was collected to provide an understanding of the background of the respondents and to answer objective one of the study. The respondents were informed that the information they were to provide was voluntary and confidential. Some of the questions were open-ended where the respondents had to record actual values (for example, size of rangeland, size of cattle herd, age, etc.). The responses to the open-ended questions were later grouped by the researcher for purposes of data
summarization and analysis. Frequencies and percentages were computed for all non-parametric items in the instrument. Priority ranking of responses was achieved by ordering frequency values in a descending order.

Distribution of respondents by gender (sex) is shown in Figure 6. There were a total of 150 respondents of which 94 (62.66%) were males and 55 (36.67%) were females. Only one person (0.67%) did not give a response.

Participants were asked to indicate their level of formal education attained. The data from these respondents are summarized in Figure 7. The largest group, which consisted of 45 respondents (30%), indicated the highest formal education they attained was grade 12. The second largest group, which consisted of 36 respondents (24%), indicated their highest formal education was between grade 7 and grade 11. The third largest group, which consisted of 31 respondents (20.67%), indicated they had attained grades 13 to 16. All postsecondary education (academic and vocational) was grouped into this category. There were 2 respondents with a bachelor of science degree who were included as completers of grade 16. Eighteen respondents (12%) indicated their highest formal education was between grade 1 and grade 6 while 17 respondents (11.33%) indicated they received no formal education. Three participants (2%) did not indicate a response.

The distribution of respondents by age groups is presented in Figure 8. Thirty-six respondents (24%) indicated an age between 19 and 30 years; 38 respondents (25.3%) indicated an age between 31 and 40
Figure 6. Distribution of respondents by gender (N = 150)

years; 24 respondents (16%) indicated an age between 41 and 50 years; 31 respondents (20.7%) indicated an age between 51 and 60 years; and 20 respondents indicated an age of 61 years or above. The lowest reported age was 19 years and the highest reported age was 90 years. Only one respondent did not indicate an age. The age distribution of the respondents indicates that interest in agricultural training is not restricted to any age range. One may have expected more interest from either the younger generation because these respondents may be more familiar with the educational process or from the older generation because these respondents depend on livestock production for their livelihood.

Figure 9 graphically illustrates the distribution of respondents by size of rangeland (acres) used. Originally, the question was stated
Figure 7. Distribution of respondents by level of formal education attained (N = 150)

in terms of rangeland "owned". However, the question was rephrased during the educational meetings to the size of rangeland "used" because the reservation land cannot be individually owned. All participants were asked to indicate the size of rangeland they generally use and that they considered their use-area (not necessarily based on grazing permits) for livestock production. Sixty-three respondents (41.99%) indicated a size of 1,000 acres or below. The next largest group, which consisted of 60 respondents (40%), did not indicate a rangeland size. Thirteen respondents (8.67%) indicated they use between 1,001 and 2,000 acres for livestock production while 10 respondents (6.67%) indicated they use between 2,001 and 3,000 acres of rangeland. The smallest group consisted of 4 respondents who indicated that they use 3,001 acres or above.
of rangeland for livestock production purposes. Based on those who indicated a response, the mean value was 883.62 acres, the median value was 360 acres, the mode was 640 acres, and it ranged from 0 to 5,000 acres of rangeland.

The distribution of respondents by whether or not they owned ("used") a farmland (cropland) is presented in Figure 10. The largest group consisted of 61 respondents who did not indicate a farmland size. Thirty-five respondents (23.33%) indicated having small dry-land plots of land which they use for growing crops. The responses ranged from none to 100 acres with 8.77 acres as the mean. The geographic characteristics of the Eastern Navajo Agency are not conducive to wide-scale farming.
Shown in Figure 11 is the distribution of respondents by size of cattle herd owned. The majority of the respondents, which consisted of 99 respondents (66%), indicated a cattle herd size between 1 to 50 head. Eleven respondents (7.33%) owned between 51 to 100 head and 3 respondents (2%) owned 101 head or above. Sixteen respondents (10.67%) indicated they did not have any cattle and 21 respondents (14%) did not indicate a cattle herd size. Based on those who gave a response, the range was from 0 to 300 head with a mean of 26 head and a median of 18 head. The responses indicated Navajo ranchers were small-scale producers.

The data in Figure 12 depicts the distribution of respondents based on the size of sheep flock owned. The majority of the respondents, which consisted of 93 respondents (61.99%), indicated a sheep flock size
of between 1 and 100 head. Six respondents (4%) indicated a sheep flock size between 101 and 200 head and only 4 respondents (2.67%) indicated a sheep flock size of 201 head or above. Twenty-two respondents (14.67%) indicated they did not own any sheep and 25 respondents (16.7%) did not indicate a sheep flock size. Based on those who gave a response, the range was from 0 to 301 head with a mean of 40 head and a median of 20 head.

The distribution of respondents by size of goat flock owned is illustrated in Figure 13. The respondents were simply grouped into those who owned goats, did not own goats, and those who did not indicate a response. The largest group consisted of 94 respondents (62.22%) indicated they owned a goat flock while 31 respondents (20.67%) indicated
they did not own any goats and 25 respondents (16.67%) gave no response. Based on those who indicated a response, the range was from 0 to 95 head with a mean of 20 head and a median of 10 head.

Figure 14 presents the distribution of respondents by the number of horses owned. The respondents were grouped into those who owned horses, did not own horses, and those who did not indicate a response. The majority of the respondents, which consisted of 107 respondents (71.33%), indicated they own at least one horse. Twenty-one respondents (14%) indicated they did not own any horses and 22 respondents (14.67%) did not indicate a response. Based on those who gave a response, the range was from 0 to 30 head with a mean of 4 head and a median of 3 head.
Based on information provided by the respondents, the majority of the respondents do not own any mules or donkeys. Distribution of respondents based on whether or not they owned any donkeys or mules is shown in Figure 15. Only 4 respondents (2.67%) indicated they owned donkeys and/or mules while 118 respondents (78.66%) indicated they did not own any donkeys or mules. The largest number of donkeys or mules owned was four head. Twenty-eight respondents (18.67%) did not give a response.

All respondents were asked to indicate their employment status at the time they participated in the educational meetings. The results of the response are summarized in Figure 16. Forty-six respondents (30.66%) indicated they had some type of part-time employment while
another 40 respondents (26.67%) indicated they had full-time employment for a total of 86 respondents (57.33%) who had part- or full-time employment. Of those respondents who indicated they were unemployed, 33 (22%) indicated they were seeking employment while 28 (18.67%) indicated they were not seeking employment for a total of 61 respondents (40.67%) who were unemployed. Three respondents (2%) did not indicate their employment status.

Figure 17 shows the distribution of respondents based on the amount of income derived from agricultural production. The majority of the respondents, which consisted of 95 respondents (63.33%), indicated the income derived from agricultural production totaled $2,500 or less...
Figure 14. Distribution of respondents by number of horses owned (N = 150)

Figure 15. Distribution of respondents by number of mules/donkeys owned (N = 150)
Figure 16. Distribution of respondents by employment status (N = 150); (unemployed A = seeking employment; unemployed B = not seeking employment)

Figure 17. Distribution of respondents by amount of income derived from agricultural production (N = 150)
per year. Twenty-two respondents (14.67%) indicated an agriculturally-derived income between $2,501 and $5,000 per year. Only 8 respondents (5.33%) indicated income from agricultural production above $5,001 per year. Twenty-five (16.67%) did not give a response. Based on those who provided a response, the range was from 0 to $20,000 per year with a mean of $2,073 and a median and a mode of $1,000.

The gross annual income of respondents is illustrated in Figure 18. All respondents were asked to indicate their gross income derived from all sources. Fifty-one respondents (34%) reported an annual gross income of $10,000 or less; 39 respondents (26%) reported a gross income between $10,001 and $20,000; 19 respondents (12.67%) reported a gross income between $20,001 and $30,000; and 8 respondents reported a gross income above $30,001 with the highest reported gross income of $40,000. Thirty-three respondents (22%) chose not to disclose their gross income.

Ranking the frequency of responses to sources of new information about livestock production and/or range management is presented in Figure 19. The respondents indicated all sources that they rely on to get new information. The most frequently mentioned source was 'friends/other ranchers' with 95 responses (63.3%). The remaining sources were ranked in descending order as follows: 'family members/relatives' with 70 responses (46.7%); 'Branch of Land Operation' with 69 responses (46%); Navajo Tribe Department of Agriculture with 65 responses (43.3%); 'New Mexico Extension Service' with 57 responses (38%); 'vocational agriculture teacher' with 47 responses (31.3%); 'radio' with 42 responses (28%); 'sales people' with 39 responses (26%); 'newspaper/magazines' with 39
Figure 18. Distribution of respondents by gross income derived from all sources (N = 150)

responses (26%); and 'television' with 26 responses (17.3%). Only six respondents (4%) indicated 'none' meaning they did not use any source for new information. The finding suggested that nearly all of the respondents acquired new information from various sources and the most frequently mentioned source was friends and other ranchers.

Ranking the frequency of responses to activities (practices) performed in connection with livestock production is presented in Figure 20. The most frequently mentioned practice performed was 'buy feed' with 134 responses (89.3%). The remaining practices were ranked in a descending order as follows: 'hot-iron brand' with 119 responses (79.3%); 'castrate' with 119 responses (79.3%); 'dip or spray' with 112 responses (74.7%); 'haul water' with 110 responses (73.3%); 'vaccinate'
A = Rank 1 = Friends/other ranchers (n = 95, 63.3%)
B = Rank 2 = Family members/relatives (n = 70, 46.7%)
C = Rank 3 = Branch of Land Operations (n = 69, 46.0%)
D = Rank 4 = Navajo Tribe Department of Agriculture (n = 65, 43.3%)
E = Rank 5 = New Mexico Extension Service (n = 57, 38.0%)
F = Rank 6 = Vocational agriculture teacher (n = 47, 31.3%)
G = Rank 7 = Radio (n = 42, 28.0%)
H = Rank 8 = Sales people (n = 39, 26.0%)
I = Rank 9 = Newspaper/magazines (n = 39, 26.0%)
J = Rank 10 = Television (n = 26, 17.3%)
K = Rank 11 = None (n = 6, 4.0%)

Figure 19. Frequency of responses to sources of new information about livestock production and/or range management (N = 150)

with 108 responses (72%); 'treat pink-eyes' with 88 responses (58.7%);
'dehorn' with 84 responses (56%); 'deworm' with 81 responses (54%);
'purchase breeding stock' with 54 responses (36%); 'purchase sires' with 45 responses (30%); 'keep records' with 38 responses (25.3%); 'hire labor' with 32 responses (21.3%); and 'implant growth hormone' with 31
A = Rank 1 = Buy feed (n = 134, 89.3%)
B = Rank 2 = Hot-iron brand (n = 119, 79.3%)
C = Rank 3 = Castrate (n = 119, 79.3%)
D = Rank 4 = Dip or spray (n = 112, 74.7%)
E = Rank 5 = Haul water (n = 110, 73.3%)
F = Rank 6 = Vaccinate (n = 108, 72.0%)
G = Rank 7 = Treat pink-eyes (n = 88, 58.7%)
H = Rank 8 = Dehorn (n = 84, 56.0%)
I = Rank 9 = Deworm (n = 81, 54.0%)
J = Rank 10 = Purchase breeding stock (n = 54, 36.0%)
K = Rank 11 = Purchase sires (n = 45, 30.0%)
L = Rank 12 = Keep records (n = 38, 25.3%)
M = Rank 13 = Hire labor (n = 32, 21.3%)
N = Rank 14 = Implant growth hormone (n = 31, 20.7%)

Figure 20. Frequency of responses to activities (practices) performed in connection with livestock production (N = 150)
responses (20.7%). The activities which are most basic and essential to any livestock production were most frequently mentioned by respondents while those practices which require more skill training were mentioned less often.

Ranking the frequency of responses to how livestock products raised were used is presented in Figure 21. The most frequently mentioned use of livestock was 'use for food' with a frequency of 114 (76%). The remaining uses were ranked in a descending order as follows: 'sell at auctions/sales' with 97 responses (64.7%); 'sell to traders/storekeepers' with 79 responses (52.7%); 'use for social/religious obligations' with 67 responses (44.7%); and 'use for bartering (exchange for other products)' with 46 responses (30.7%). The results indicated that livestock raised were used most widely as food products and to a lesser extent as a medium of exchange.

Ranking the frequency of responses to alternative ways of making improvements to range livestock production is illustrated in Figure 22. The three most frequently mentioned alternatives included 'technical knowledge in livestock production' with 87 responses (65.9%); 'access to more land' with 85 responses (64.4%); and 'technical knowledge in range management' with 84 responses (63.6%). The remaining alternatives were ranked in a descending order as follows: 'changes in existing land-use policies' with 58 responses (43.9%); 'business management skills (ex: maximizing profit)' with 46 responses (34.8%); 'available and sufficient credit (ex: loans)' with 45 responses (34.1%); and 'access to alternative markets' with 30 responses (22.7%). The results indicated a
A = Rank 1 = Use for food (n = 114, 76.0%)
B = Rank 2 = Sell at auctions/sales (n = 97, 64.7%)
C = Rank 3 = Sell to traders/storekeepers (n = 79, 52.7%)
D = Rank 4 = Use for social/religious obligations (n = 67, 44.7%)
E = Rank 5 = Use for bartering (exchange for other products) (n = 46, 30.7%)

Figure 21. Frequency of responses to how livestock products are used (N = 150)

willingness to improve upon the present level of production, but with less emphasis on the "business" aspect of livestock production.

All respondents who indicated an interest in participating in an agricultural training program were asked to indicate the types of educational meetings they would prefer. The results are presented in Figure 23. The majority of the respondents preferred two types of educational meetings: '1-2 day workshops/seminars once every month' with 112
A = Rank 1 = Technical knowledge in livestock production (n = 87, 58.0%)
B = Rank 2 = Access to more land (n = 85, 56.7%)
C = Rank 3 = Technical knowledge in range management (n = 84, 56.0%)
D = Rank 4 = Changes in existing land-use policies (n = 58, 38.7%)
E = Rank 5 = Business management skills (ex: maximizing profit) (n = 45, 30.7%)
F = Rank 6 = Available and sufficient credit (ex: loans) (n = 45, 30.0%)
G = Rank 7 = Establishing a cooperative (n = 41, 27.3%)
H = Rank 8 = Access to alternative markets (n = 30, 20.0%)
I = Rank 9 = No improvement is needed (n = 17, 11.3%)

Figure 22. Frequency of responses to alternative ways of making improvements to range livestock production in the Eastern Navajo Agency (N = 150)

responses (76.7%) and '1-2 weeks short courses once every 6 months' with 92 responses (63%). The remaining types of educational meetings were ranked in a descending order as follows: '3 months regular semester courses 1-5 hours every week' with 58 responses (39.7%); '3 months
A = Rank 1 = 1-2 day workshops/seminars (n = 112, 76.7%)
B = Rank 2 = 1-2 weeks short courses (n = 92, 63.0%)
C = Rank 3 = 3 months regular semester courses, 1-5 hours every week
   (n = 58, 39.7%)
D = Rank 4 = 3 months regular semester courses, 6-10 hours every week
   (n = 34, 23.3%)
E = Rank 5 = 1-2 day workshops/seminars (n = 34, 23.3%)
F = Rank 6 = 1-2 weeks short courses once every year (n = 21, 14.4%)

Figure 23. Frequency of responses to the types of educational meetings
preferred (n = 146)

regular semester course 6-10 hours every week with 34 responses (23.3%);
'1-2 day workshops/seminars once every 3 months' with 34 responses
(23.3%); and '1-2 weeks short courses once every year' with 21 responses
(14.4%). The major finding indicated preference for nonformal education
on a somewhat regular basis.
A key question presented to the respondents was for them to indicate their willingness to participate in an agricultural training program if it were offered in the Eastern Navajo Agency. The results are shown in Figure 24. An overwhelming majority, which consisted of 103 respondents (68.7%), indicated a definite yes while another 29 respondents (19.3%) indicated a probable yes for a total of 132 (88%) affirmative responses. Fourteen respondents (9.3%) were undecided; 3 respondents (2%) indicated a probable no; and one respondent (.7%) indicated a definite no. The results showed a definite interest in agricultural training programs in the Eastern Navajo Agency.

**Figure 24.** Distribution of respondents by extent of interest in participating in an agricultural training program if it was offered in the Eastern Navajo Agency (N = 150)
Reliability Tests

The Cronbach's Alpha procedure was used as a part of the data analysis to test the reliability of the instrument. Alpha coefficients were computed to examine the level of internal consistency and stability of the grouped items in the perception and agricultural topic categories. Results of the reliability tests are presented in Table 2 and Table 3. The perception statements were categorized into two subgroups for discussion and analysis. The Alpha coefficient for perception statements on the agricultural production (conditions) in the Eastern Navajo Agency was .68. The perception statements on agricultural training in the Eastern Navajo Agency had an Alpha coefficient of .84. The Alpha coefficient for the entire instrument on the perception category was .84.

The agricultural topic category was divided into six subgroups. The Alpha coefficients for subgroups in agricultural topic areas ranged from .73 to .90 and they are presented in Table 3. The Alpha coefficient for the entire agricultural topic category was .94. The coefficient values were deemed to be sufficiently high to proceed with analysis and interpretation.

Rank Order by Means

Means, standard deviations, and medians were computed for all parametric items in the instrument. Priority ranking of responses was achieved by placing mean values in a descending order. The rankings of perception statements are summarized in Table 4. The four highest rated perception statements dealt with agricultural training within a community setting. The highest rated statement was that agricultural training...
Table 2. Results of reliability tests on the survey instrument regarding perceptions of need related to agriculture and agricultural training in the Eastern Navajo Agency

<table>
<thead>
<tr>
<th>Perceptions</th>
<th>Number of Items</th>
<th>Cronbach's Alpha Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions on Navajo agricultural production</td>
<td>5</td>
<td>.68</td>
</tr>
<tr>
<td>(conditions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions on agricultural training</td>
<td>7</td>
<td>.84</td>
</tr>
<tr>
<td>Overall</td>
<td>12</td>
<td>.84</td>
</tr>
</tbody>
</table>

Table 3. Results of reliability tests on the survey instrument regarding interest in agricultural topic areas

<table>
<thead>
<tr>
<th>Topic Areas</th>
<th>Number of Items</th>
<th>Cronbach's Alpha Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range and watershed management</td>
<td>4</td>
<td>.78</td>
</tr>
<tr>
<td>Crop production</td>
<td>4</td>
<td>.74</td>
</tr>
<tr>
<td>Livestock production</td>
<td>7</td>
<td>.90</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>3</td>
<td>.81</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
<td>.73</td>
</tr>
<tr>
<td>General agriculture</td>
<td>4</td>
<td>.79</td>
</tr>
<tr>
<td>Overall</td>
<td>25</td>
<td>.94</td>
</tr>
</tbody>
</table>

should be offered at the Crownpoint Institute of Technology. This statement also had the least variability with a standard deviation of .99. The second highest rated statement was that agricultural training
Table 4. Rank order of perception statements by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency (N = 150)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Perception Statements</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agricultural training should be offered at the Crownpoint Institute of Technology.</td>
<td>4</td>
<td>146</td>
<td>4.51</td>
<td>.99</td>
</tr>
<tr>
<td>2</td>
<td>Agricultural training should be offered at the community level in the Eastern Navajo Agency.</td>
<td>6</td>
<td>144</td>
<td>4.35</td>
<td>1.31</td>
</tr>
<tr>
<td>3</td>
<td>I would like to adopt new agricultural practices.</td>
<td>6</td>
<td>144</td>
<td>4.30</td>
<td>1.23</td>
</tr>
<tr>
<td>4</td>
<td>Agricultural training should be offered primarily for local Navajo producers.</td>
<td>5</td>
<td>145</td>
<td>3.93</td>
<td>1.45</td>
</tr>
<tr>
<td>5</td>
<td>Navajo producers are jealous of one another's successes.</td>
<td>14</td>
<td>136</td>
<td>3.93</td>
<td>1.34</td>
</tr>
<tr>
<td>6</td>
<td>Agricultural training should include remediation in basic skills (reading, writing, math).</td>
<td>13</td>
<td>137</td>
<td>3.66</td>
<td>1.50</td>
</tr>
<tr>
<td>7</td>
<td>Agricultural training should be offered primarily for job training.</td>
<td>5</td>
<td>145</td>
<td>3.64</td>
<td>1.50</td>
</tr>
<tr>
<td>8</td>
<td>Agricultural training should be offered primarily for transferable college credits.</td>
<td>20</td>
<td>130</td>
<td>3.58</td>
<td>1.42</td>
</tr>
<tr>
<td>9</td>
<td>I produce quality livestock comparable to most non-Navajo producers in the area.</td>
<td>10</td>
<td>140</td>
<td>3.30</td>
<td>1.36</td>
</tr>
<tr>
<td>10</td>
<td>Even if agricultural training was offered, agricultural practices will not change.</td>
<td>12</td>
<td>138</td>
<td>2.99</td>
<td>1.70</td>
</tr>
<tr>
<td>11</td>
<td>There are many job opportunities in the Eastern Navajo Agency.</td>
<td>25</td>
<td>125</td>
<td>2.83</td>
<td>1.56</td>
</tr>
<tr>
<td>12</td>
<td>There are many business opportunities in agriculture in the Eastern Navajo Agency.</td>
<td>25</td>
<td>125</td>
<td>2.73</td>
<td>1.48</td>
</tr>
</tbody>
</table>
should be offered at the community level in the Eastern Navajo Agency. The third highest rated statement dealt with the desire to adopt new agricultural practices while the fourth statement dealt with offering educational programs for local Navajo producers. These four statements suggest some form of a community outreach program in agriculture from a centralized location.

A somewhat surprising but not totally unexpected high rating was on the subject of jealousy among Navajo agricultural producers. This statement was ranked fifth, but it did not include 14 respondents (9.4%) who indicated a 'don't know' response. Differentiation was made and explained between the responses 'don't know' and 'neutral', and the 'don't know' responses were not used in computing the mean. All respondents were instructed to use the 'don't know' response whenever they did not understand a statement, were not familiar with the meaning of a statement, or honestly did not know enough about the issue to indicate a level of agreement or disagreement.

The next three perception statements dealt with various aspects of agricultural training, such as remediation in basic skills (ranked 6th), job training (ranked 7th), and transferable college credits (ranked 8th). These rankings suggest that basic skills, job training, and college credits are all important but are secondary to community level educational programs for local producers. There were, however, 13 (8.7%) 'don't know' responses to the statement on remediation in basic skills and 20 (13.3%) 'don't know' responses to the statement on transferable college credits.
The last group of statements dealt with perception on the quality level of present production, prospects for changes in agriculture, and business opportunities in agriculture. The relatively low ranking of the statement 'I produce quality livestock comparable to most non-Navajo producers in the area' suggests a low confidence and poor image of the present quality of livestock produced by Navajos. The low ranking of the statement 'Even if agricultural training was offered, agricultural practices will not change' could be interpreted in a positive manner. The relatively low rating suggests disagreement with the statement which means that there is potential for agricultural practices to change with the introduction of agricultural training programs. This group of statements also had two of the highest 'don't know' responses.

The lowest rated (ranked 11th and 12th out of 12 statements) were statements on job and business opportunities in agriculture in the Eastern Navajo Agency. The responses indicate a lack of confidence in, but perhaps not a fatalistic attitude toward, the present level of economic activity in agriculture (and perhaps economic development in general) in the Eastern Navajo Agency. The implications of these perceptions are far-reaching and they underscore the dire need for agricultural development in the private sector. These two statements also had the highest number of 'don't know' responses with each receiving 25 (16.7%).

Table 5 shows the level of interest in agricultural topics related to range and watershed management. Topics in watershed management (water-harvesting, erosion control, conservation), range management
Table 5. Means and standard deviations regarding level of interest in selected topics in range and watershed management as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Watershed Management (water-harvesting, erosion control, conservation)</td>
<td>5</td>
<td>141</td>
<td>4.30</td>
<td>1.15</td>
</tr>
<tr>
<td>2</td>
<td>Range Management Practices (reseeding, range vegetation, fences)</td>
<td>0</td>
<td>146</td>
<td>4.29</td>
<td>1.08</td>
</tr>
<tr>
<td>3</td>
<td>Grazing Systems (conventional systems, Holistic Resources Management)</td>
<td>3</td>
<td>143</td>
<td>4.27</td>
<td>.94</td>
</tr>
<tr>
<td>4</td>
<td>Land Measurements (surveying, land areas, legal descriptions)</td>
<td>0</td>
<td>146</td>
<td>4.08</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td>Overall rating</td>
<td>146</td>
<td>4.23</td>
<td>.82</td>
<td></td>
</tr>
</tbody>
</table>

practices (reseeding, range vegetation, fences) and grazing systems (conventional systems, Holistic Resources Management) received high ratings in this sub-group. The topic in land measurements (surveying, land areas, legal descriptions) received a relatively low rating. The idea of learning about water-harvesting techniques in an area which is known for livestock water shortage may have captivated some attention which resulted in a relatively high rating.

Items on farming practices were included because some Navajos were also involved in small-scale dry-land farming in the Eastern Navajo Agency. Level of interest in agricultural topics related to crop production is shown in Table 6. The two topics rated the highest in this subgroup dealt with general crop production practices (planting,
Table 6. Means and standard deviations regarding level of interest in selected topics in crop production as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topic</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crop Production Practices (planting, cultivating, harvesting)</td>
<td>5</td>
<td>141</td>
<td>3.98</td>
<td>1.24</td>
</tr>
<tr>
<td>2</td>
<td>Fertilizers &amp; Pesticides (calibration, application, safety precautions)</td>
<td>7</td>
<td>139</td>
<td>3.89</td>
<td>1.34</td>
</tr>
<tr>
<td>3</td>
<td>Drip Irrigation Farming (intensive crop production on small acreages)</td>
<td>17</td>
<td>129</td>
<td>3.61</td>
<td>1.47</td>
</tr>
<tr>
<td>4</td>
<td>Horticulture (greenhouse, gardening, turf installation, landscape design)</td>
<td>10</td>
<td>136</td>
<td>3.59</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td>Overall rating</td>
<td></td>
<td>145</td>
<td>3.74</td>
<td>1.02</td>
</tr>
</tbody>
</table>

cultivating, harvesting) and fertilizers & pesticides (calibration, application, safety precautions). The two lowest rated topics in this subgroup were drip irrigation farming (intensive crop production on small acreages) and horticulture (greenhouse, gardening, turf installation, landscape design). Both of these topics may be considered somewhat unconventional for the Eastern Navajo Agency, although both topics have been taught and utilized in the past in the Eastern Navajo Agency.

Level of interest in agricultural topics related to livestock production is summarized in Table 7. All of the topics in this subgroup were rated relatively high, but the four highest rated topics in this subgroup dealt with livestock health (diseases, sicknesses, and prevention), livestock production practices (vaccinating, dehorning,
Table 7. Means and standard deviations regarding level of interest in selected topics in livestock production as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Livestock Health (diseases, sicknesses, and prevention)</td>
<td>4</td>
<td>142</td>
<td>4.66</td>
<td>.67</td>
</tr>
<tr>
<td>2</td>
<td>Livestock Production Practices (vaccinating, dehorning, castrating, shearing, implanting)</td>
<td>1</td>
<td>145</td>
<td>4.55</td>
<td>.87</td>
</tr>
<tr>
<td>3</td>
<td>Livestock Feeds &amp; Feeding (feedstuff, feed content, buying feed, feeding)</td>
<td>0</td>
<td>146</td>
<td>4.49</td>
<td>.83</td>
</tr>
<tr>
<td>4</td>
<td>Herd Improvement (breeding programs, sire testing, replacement stock)</td>
<td>2</td>
<td>144</td>
<td>4.44</td>
<td>.89</td>
</tr>
<tr>
<td>5</td>
<td>Breeds of Livestock (breeds and characteristics of breeds)</td>
<td>2</td>
<td>144</td>
<td>4.35</td>
<td>.96</td>
</tr>
<tr>
<td>6</td>
<td>Livestock Chemicals (calibration, application, safety precautions)</td>
<td>4</td>
<td>142</td>
<td>4.33</td>
<td>1.12</td>
</tr>
<tr>
<td>7</td>
<td>Livestock Selection (desirable and undesirable traits)</td>
<td>2</td>
<td>144</td>
<td>4.13</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>Overall rating</td>
<td>146</td>
<td></td>
<td>4.42</td>
<td>.72</td>
</tr>
</tbody>
</table>

castrating, shearing, implanting), livestock feeds & feeding (feedstuff, feed content, buying feed, feeding), and herd improvement (breeding programs, sire testing, replacement stock). Each one of these four topics also had little variability with standard deviations ranging from .67 to .89. The next three topics in this subgroup were breeds of livestock (breeds and characteristics of breeds), livestock chemicals (calibration, application, safety precautions), and livestock selection (desirable and
undesirable traits). The findings suggest that there is interest in almost all aspects of livestock production from concerns for livestock health to feeding to improvement.

Level of interest in agricultural topics related to agricultural mechanics is illustrated in Table 8. Only the topic on facilities design & construction (basic carpentry, welding, blueprints) received a relatively high rating in this subgroup. The other two topics in the subgroup which were rated relatively low were agricultural machinery maintenance (maintenance and repair of equipment), and agricultural machinery management (rental cost, purchase cost, depreciation, capacities). The finding suggests interest in development of practical and construction-oriented skills rather than machinery maintenance and machinery management.

Management skills and marketing are the primary concerns of agribusinesses. Navajo agricultural producers were asked to rate their interest in agricultural topics related to management and the results are presented in Table 9. The two topics which received relatively high ratings in this subgroup were marketing strategies (market options, prices, timing) and agribusiness management (budgeting, records, plans/schedules, decision-making). The third rated topic in this subgroup was a topic on computers in agriculture (spreadsheets, data storage/retrieval, word processing). This topic also received 19 (12.7%) 'don't know' responses. The results indicate an interest in agribusiness management, but there is a large segment of the respondents who do not
Table 8. Means and standard deviations regarding level of interest in selected topics in agricultural mechanics as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Facilities Design &amp; Construction (basic carpentry, welding, blueprints)</td>
<td>4</td>
<td>141</td>
<td>4.15</td>
<td>1.04</td>
</tr>
<tr>
<td>2</td>
<td>Agricultural Machinery Maintenance (maintenance and repair of equipment)</td>
<td>4</td>
<td>141</td>
<td>3.85</td>
<td>1.24</td>
</tr>
<tr>
<td>3</td>
<td>Agricultural Machinery Management (rental cost, purchase cost, depreciation, capacities)</td>
<td>6</td>
<td>140</td>
<td>3.81</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>Overall rating</td>
<td></td>
<td>144</td>
<td>3.93</td>
<td>.98</td>
</tr>
</tbody>
</table>

Table 9. Means and standard deviations regarding level of interest in selected topics in management as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marketing Strategies (market options, prices, timing)</td>
<td>5</td>
<td>141</td>
<td>4.14</td>
<td>1.03</td>
</tr>
<tr>
<td>2</td>
<td>Agribusiness Management (budgeting, records, plans/schedules, decision-making)</td>
<td>6</td>
<td>140</td>
<td>4.10</td>
<td>1.21</td>
</tr>
<tr>
<td>3</td>
<td>Computers in Agriculture (spreadsheets, data storage/retrieval, word processing)</td>
<td>19</td>
<td>127</td>
<td>3.87</td>
<td>1.32</td>
</tr>
<tr>
<td></td>
<td>Overall rating</td>
<td></td>
<td>143</td>
<td>4.05</td>
<td>.96</td>
</tr>
</tbody>
</table>

know the application or use of computers as it relates to agricultural production.
There were several agricultural topics which cannot be easily classified into one of the subgroups so these were identified as topics in general agriculture. Level of interest in agricultural topics related to general agriculture is shown in Table 10. Two topics in this subgroup which received a relatively high rating were Navajo grazing regulations (Navajo Tribe and BIA-BLO policies) and project proposals related to agricultural improvements. Both of these topics also had relatively low variability with standard deviations of .93 and .99, respectively. The third ranked topic in this subgroup was Navajo water rights — legal issues and implications; and the fourth ranked topic was establishing producer cooperatives. The relatively low rating of establishing producer cooperatives and a relatively high rating of Navajo grazing regulations indicated interest in clarifying grazing regulations and an individualistic approach to improvement rather than on a cooperative basis. Also, past cooperative ventures were primarily focused on farming and not on livestock production.

The six subgroups of agricultural topics were ranked by subgroup means and the results are presented in Table 11. The two highest rated subgroups, based on subgroup mean values, were livestock production and range and watershed management. The topics on general agriculture and management were tied, based on mean values, but general agriculture had less variability based on standard deviations. The two lowest rated subgroups were agricultural mechanics and crop production.

Table 12 contains the relative ratings and rankings of all agricultural topics studied. The results clearly illustrated the high
Table 10. Means and standard deviations regarding level of interest in selected topics in general agriculture as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Navajo Grazing Regulations (Navajo Tribe and BIA-BLO policies)</td>
<td>4</td>
<td>142</td>
<td>4.19</td>
<td>.93</td>
</tr>
<tr>
<td>2</td>
<td>Project Proposals related to agricultural improvements</td>
<td>4</td>
<td>140</td>
<td>4.14</td>
<td>.99</td>
</tr>
<tr>
<td>3</td>
<td>Navajo Water Rights - legal issues and implications</td>
<td>7</td>
<td>139</td>
<td>4.07</td>
<td>1.18</td>
</tr>
<tr>
<td>4</td>
<td>Establishing Producers Cooperatives</td>
<td>6</td>
<td>140</td>
<td>3.78</td>
<td>1.07</td>
</tr>
</tbody>
</table>

Table 11. Rank order of interest in agricultural topic areas by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topic areas</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Livestock production</td>
<td>4.42</td>
<td>.72</td>
</tr>
<tr>
<td>2</td>
<td>Range and watershed management</td>
<td>4.23</td>
<td>.82</td>
</tr>
<tr>
<td>3</td>
<td>General agriculture</td>
<td>4.05</td>
<td>.83</td>
</tr>
<tr>
<td>4</td>
<td>Management</td>
<td>4.05</td>
<td>.96</td>
</tr>
<tr>
<td>5</td>
<td>Agricultural mechanics</td>
<td>3.93</td>
<td>.98</td>
</tr>
<tr>
<td>6</td>
<td>Crop production</td>
<td>3.74</td>
<td>1.02</td>
</tr>
</tbody>
</table>

interest in topics related to livestock production and watershed/range management and the low interest in topics related to crop production.
Table 12. Rank order of interest in specific agricultural topics by mean values as perceived by Navajo agricultural producers in the Eastern Navajo Agency (n = 146)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Agricultural topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Livestock Health (diseases, sicknesses, and prevention)</td>
<td>4</td>
<td>142</td>
<td>4.66</td>
<td>.67</td>
</tr>
<tr>
<td>2</td>
<td>Livestock Production Practices (vaccinating, dehorning, castrating, shearing, implanting)</td>
<td>1</td>
<td>145</td>
<td>4.55</td>
<td>.87</td>
</tr>
<tr>
<td>3</td>
<td>Livestock Feeds &amp; Feeding (feed-stuff, feed content, buying feed, feeding)</td>
<td>0</td>
<td>146</td>
<td>4.49</td>
<td>.83</td>
</tr>
<tr>
<td>4</td>
<td>Herd Improvement (breeding programs, sire testing, replacement stock)</td>
<td>2</td>
<td>144</td>
<td>4.44</td>
<td>.89</td>
</tr>
<tr>
<td>5</td>
<td>Breeds of Livestock (breeds and characteristics of breeds)</td>
<td>2</td>
<td>144</td>
<td>4.35</td>
<td>.96</td>
</tr>
<tr>
<td>6</td>
<td>Livestock Chemicals (calibration, application, safety precautions)</td>
<td>4</td>
<td>142</td>
<td>4.33</td>
<td>1.12</td>
</tr>
<tr>
<td>7</td>
<td>Watershed Management (water-harvesting, erosion control, conservation)</td>
<td>5</td>
<td>141</td>
<td>4.30</td>
<td>1.15</td>
</tr>
<tr>
<td>8</td>
<td>Range Management Practices (re-seeding, range vegetation, fences)</td>
<td>0</td>
<td>146</td>
<td>4.29</td>
<td>1.08</td>
</tr>
<tr>
<td>9</td>
<td>Grazing Systems (conventional systems, Holistic Resources Management)</td>
<td>3</td>
<td>143</td>
<td>4.27</td>
<td>.94</td>
</tr>
<tr>
<td>10</td>
<td>Navajo Grazing Regulations (Navajo Tribe and BIA-BLO policies)</td>
<td>4</td>
<td>142</td>
<td>4.19</td>
<td>.93</td>
</tr>
<tr>
<td>11</td>
<td>Facilities Design &amp; Construction (basic carpentry, welding, blueprints)</td>
<td>4</td>
<td>141</td>
<td>4.15</td>
<td>1.04</td>
</tr>
<tr>
<td>12</td>
<td>Marketing Strategies (market options, prices, timing)</td>
<td>5</td>
<td>141</td>
<td>4.14</td>
<td>1.03</td>
</tr>
</tbody>
</table>
Table 12. Continued

<table>
<thead>
<tr>
<th>Rank</th>
<th>Agricultural topics</th>
<th>Don't know</th>
<th>Valid cases</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Project Proposals related to agricultural improvements</td>
<td>4</td>
<td>140</td>
<td>4.14</td>
<td>.99</td>
</tr>
<tr>
<td>14</td>
<td>Livestock Selection (desirable and undesirable traits)</td>
<td>2</td>
<td>144</td>
<td>4.13</td>
<td>1.11</td>
</tr>
<tr>
<td>15</td>
<td>Agribusiness Management (budgeting, records, plans/schedules, decision-making)</td>
<td>6</td>
<td>140</td>
<td>4.10</td>
<td>1.21</td>
</tr>
<tr>
<td>16</td>
<td>Land Measurements (surveying, land areas, legal descriptions)</td>
<td>3</td>
<td>143</td>
<td>4.27</td>
<td>.94</td>
</tr>
<tr>
<td>17</td>
<td>Navajo Water Rights - legal issues &amp; implications</td>
<td>7</td>
<td>139</td>
<td>4.07</td>
<td>1.18</td>
</tr>
<tr>
<td>18</td>
<td>Crop Production Practices (planting, cultivating, harvesting)</td>
<td>5</td>
<td>141</td>
<td>3.98</td>
<td>1.24</td>
</tr>
<tr>
<td>19</td>
<td>Computers in Agriculture (spreadsheets, data storage/retrieval, word processing)</td>
<td>19</td>
<td>127</td>
<td>3.87</td>
<td>1.32</td>
</tr>
<tr>
<td>20</td>
<td>Agricultural Machinery Maintenance (maintenance and repair of equipment)</td>
<td>4</td>
<td>141</td>
<td>3.85</td>
<td>1.24</td>
</tr>
<tr>
<td>21</td>
<td>Fertilizers &amp; Pesticides (calibration, application, safety precautions)</td>
<td>7</td>
<td>139</td>
<td>3.82</td>
<td>1.34</td>
</tr>
<tr>
<td>22</td>
<td>Agricultural Machinery Management (rental cost, purchase cost, depreciation, capacities)</td>
<td>6</td>
<td>140</td>
<td>3.81</td>
<td>1.15</td>
</tr>
<tr>
<td>23</td>
<td>Establishing Producers Cooperatives</td>
<td>6</td>
<td>140</td>
<td>3.78</td>
<td>1.07</td>
</tr>
<tr>
<td>24</td>
<td>Drip Irrigation Farming (intensive crop production on small acreages)</td>
<td>17</td>
<td>129</td>
<td>3.61</td>
<td>1.47</td>
</tr>
<tr>
<td>25</td>
<td>Horticulture (greenhouse, gardening, turf installation, landscape design)</td>
<td>10</td>
<td>136</td>
<td>3.59</td>
<td>1.44</td>
</tr>
</tbody>
</table>
Analysis of Variance and Duncan Post-Hoc Tests

Analysis of variance procedures were employed to determine if significant differences existed in the level of interest when respondents were grouped by selected demographic variables: size of rangeland, size of cattle herd, size of sheep flock, agricultural income level, gross income level, education level, age, employment status, and sex. The Duncan post-hoc test was used to locate the source of differences when significance (.05 level) was found. The null hypothesis tested was stated as follows:

Hypothesis 1: There are no significant differences in the level of interest in agricultural topics when Navajo agricultural producers are grouped and compared by selected demographic variables.

In Table 13, the mean interest ratings obtained from respondents grouped by educational level were compared. A significant difference (p < .05) was found in the level of interest concerning topics in general agriculture. The Duncan post-hoc test revealed that both group 1 (No formal education) respondents and group 4 (Grade 12) respondents rated interest in general agriculture significantly lower than both group 2 (Grades 1 to 6) respondents and group 5 (Grades 13 to 16) respondents. There were no clear explanations for these observed differences. The remaining topic areas were rated similarly (as evidenced by no significant differences at the .05 level) by all educational levels. The findings suggest that, for the most part, there are no significant differences in the level of interest in agricultural topics among Navajo
Table 13. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by level of education

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Level of education</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1</td>
<td>Group 2</td>
<td>Group 3</td>
<td>Group 4</td>
<td>Group 5</td>
<td>F-ratio</td>
<td>F-prob.</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>S.D.</td>
<td>n</td>
<td>Mean</td>
<td>S.D.</td>
<td>n</td>
</tr>
<tr>
<td>Range and watershed</td>
<td>16</td>
<td>3.83</td>
<td>1.26</td>
<td>15</td>
<td>4.37</td>
<td>0.80</td>
<td>36</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop production</td>
<td>16</td>
<td>3.38</td>
<td>1.00</td>
<td>15</td>
<td>3.72</td>
<td>0.93</td>
<td>36</td>
</tr>
<tr>
<td>Livestock production</td>
<td>16</td>
<td>4.20</td>
<td>0.90</td>
<td>15</td>
<td>4.41</td>
<td>1.05</td>
<td>36</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>14</td>
<td>3.67</td>
<td>1.25</td>
<td>15</td>
<td>3.96</td>
<td>0.98</td>
<td>36</td>
</tr>
<tr>
<td>Management</td>
<td>15</td>
<td>3.79</td>
<td>1.09</td>
<td>15</td>
<td>3.84</td>
<td>0.92</td>
<td>36</td>
</tr>
<tr>
<td>General agriculture</td>
<td>16</td>
<td>3.73</td>
<td>0.96</td>
<td>15</td>
<td>4.43</td>
<td>0.61</td>
<td>36</td>
</tr>
<tr>
<td>Overall</td>
<td>16</td>
<td>3.79</td>
<td>0.85</td>
<td>15</td>
<td>4.16</td>
<td>0.70</td>
<td>36</td>
</tr>
</tbody>
</table>

*Group 1 = No formal education.
Group 2 = Grades 1 to 6.
Group 3 = Grades 7 to 11.
Group 4 = Grade 12 or equivalent.
Group 5 = Grades 13 to 16.
*p < .05.
agricultural producers with different levels of education. Interest in agricultural topics cut across all educational levels among the respondents.

In Table 14, the mean interest ratings obtained from respondents grouped by age groups were compared. A significant difference (p < .05) was found in the level of interest concerning topics in agricultural mechanics. The Duncan post-hoc test revealed that group 3 (41 to 50 years) respondents rated interest in agricultural mechanics significantly lower than group 1 (19 to 30 years) respondents, group 2 (31 to 40 years) respondents, and group 4 (51 to 60 years) respondents. However, the remaining topic areas were rated similarly by all age groups which indicated that interest in agricultural topics cuts across all age groups of the respondents.

Four significant differences were found in the level of interest in agricultural topics when respondents were grouped by amount of agriculturally-derived income. In Table 15, the outcomes of the analysis of variance on interest in agricultural topics by amount of agricultural income are presented. A highly significant difference (p < .01) was found in the level of interest concerning topics in livestock production. The Duncan post-hoc test revealed that group 4 (Not Indicated) respondents rated interest in livestock production significantly lower than all the other agricultural income groups.

A second highly significant difference, significant at the .01 level, was also found in the level of interest concerning agricultural mechanics. The Duncan post-hoc test revealed that group 4 (Not
Table 14. Analysis of variance of interest in agricultural topic area when Navajo agricultural producers in the Eastern Navajo Agency are grouped by age

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Age groups</th>
<th>Group 1 Mean S.D.</th>
<th>Group 2 Mean S.D.</th>
<th>Group 3 Mean S.D.</th>
<th>Group 4 Mean S.D.</th>
<th>Group 5 Mean S.D.</th>
<th>F-ratio</th>
<th>F-prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range and watershed management</td>
<td></td>
<td>36 4.19 0.82</td>
<td>37 4.34 0.69</td>
<td>24 4.04 1.00</td>
<td>29 4.38 0.77</td>
<td>19 4.08 0.94</td>
<td>.90</td>
<td>.466</td>
</tr>
<tr>
<td>Crop production</td>
<td></td>
<td>36 3.83 1.02</td>
<td>37 3.96 1.08</td>
<td>23 3.25 1.05</td>
<td>29 3.86 0.96</td>
<td>19 3.64 0.85</td>
<td>2.01</td>
<td>.096</td>
</tr>
<tr>
<td>Livestock production</td>
<td></td>
<td>36 4.43 0.74</td>
<td>37 4.39 0.65</td>
<td>24 4.34 0.71</td>
<td>29 4.49 0.59</td>
<td>19 4.45 1.03</td>
<td>.15</td>
<td>.962</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td></td>
<td>36 4.06 1.04</td>
<td>37 3.89 0.93</td>
<td>24 3.38 1.03</td>
<td>27 4.26 0.74</td>
<td>19 3.96 1.02</td>
<td>2.96*</td>
<td>.022</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td>36 4.33 0.99</td>
<td>36 3.88 0.93</td>
<td>23 3.83 1.06</td>
<td>29 4.07 0.86</td>
<td>18 4.02 0.94</td>
<td>1.37</td>
<td>.249</td>
</tr>
<tr>
<td>General agriculture</td>
<td></td>
<td>36 4.22 0.69</td>
<td>37 3.89 0.97</td>
<td>24 3.86 0.84</td>
<td>29 4.15 0.80</td>
<td>19 4.12 0.76</td>
<td>1.15</td>
<td>.335</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>36 4.20 0.74</td>
<td>37 4.12 0.64</td>
<td>24 3.87 0.75</td>
<td>29 4.23 0.54</td>
<td>19 4.09 0.78</td>
<td>1.16</td>
<td>.334</td>
</tr>
</tbody>
</table>

*Group 1 = 19 - 30 years.
Group 2 = 31 - 40 years.
Group 3 = 41 - 50 years.
Group 4 = 51 - 60 years.
Group 5 = 61 years and above.
*p < .05.
Table 15. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by amount of income derived from agricultural production

<table>
<thead>
<tr>
<th>Topic area</th>
<th>n</th>
<th>Mean (S.D.)</th>
<th>n</th>
<th>Mean (S.D.)</th>
<th>n</th>
<th>Mean (S.D.)</th>
<th>n</th>
<th>Mean (S.D.)</th>
<th>F-ratio</th>
<th>F-prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range and watershed management</td>
<td>93</td>
<td>4.25 (0.78)</td>
<td>22</td>
<td>4.33 (0.81)</td>
<td>8</td>
<td>4.31 (1.11)</td>
<td>23</td>
<td>4.04 (0.94)</td>
<td>0.53</td>
<td>.659</td>
</tr>
<tr>
<td>Crop production</td>
<td>93</td>
<td>3.74 (0.98)</td>
<td>21</td>
<td>3.58 (1.08)</td>
<td>8</td>
<td>4.45 (1.01)</td>
<td>23</td>
<td>3.66 (1.13)</td>
<td>1.50</td>
<td>.216</td>
</tr>
<tr>
<td>Livestock production</td>
<td>93</td>
<td>4.41 (0.72)</td>
<td>22</td>
<td>4.78 (0.48)</td>
<td>8</td>
<td>4.74 (0.27)</td>
<td>23</td>
<td>4.02 (0.81)</td>
<td>5.15**</td>
<td>.002</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>91</td>
<td>4.01 (0.86)</td>
<td>22</td>
<td>3.98 (0.85)</td>
<td>8</td>
<td>4.83 (0.25)</td>
<td>23</td>
<td>3.21 (1.27)</td>
<td>7.55**</td>
<td>.000</td>
</tr>
<tr>
<td>Management</td>
<td>92</td>
<td>3.97 (0.95)</td>
<td>21</td>
<td>4.37 (0.67)</td>
<td>8</td>
<td>4.50 (0.47)</td>
<td>22</td>
<td>3.90 (1.26)</td>
<td>1.78</td>
<td>.153</td>
</tr>
<tr>
<td>General agriculture</td>
<td>93</td>
<td>4.12 (0.82)</td>
<td>22</td>
<td>4.16 (0.71)</td>
<td>8</td>
<td>4.34 (0.84)</td>
<td>23</td>
<td>3.60 (0.87)</td>
<td>3.07*</td>
<td>.030</td>
</tr>
<tr>
<td>Overall</td>
<td>93</td>
<td>4.13 (0.65)</td>
<td>22</td>
<td>4.28 (0.60)</td>
<td>8</td>
<td>4.53 (0.47)</td>
<td>23</td>
<td>3.78 (0.84)</td>
<td>3.36*</td>
<td>.021</td>
</tr>
</tbody>
</table>

*Group 1 = $0 - 2,500.
Group 2 = 2,501 - 5,000.
Group 3 = 5,001 - 20,000.
Group 4 = Not indicated.

*p < .05.
**p < .01.
Indicated) respondents rated interest in agricultural mechanics significantly lower than all the other agricultural income groups. The Duncan post-hoc test also revealed that group 3 ($5,001 to 20,000) respondents rated interest in agricultural mechanics higher than all the other agricultural income groups.

A third significant difference, significant at the .05 level, was also found in the level of interest concerning topics in general agriculture. The Duncan post-hoc test revealed that group 4 (Not Indicated) respondents rated interest in general agriculture lower than all the other agricultural income groups. A one-way analysis of variance on the level of interest in all topic areas by amount of agricultural income also yielded a significant difference at the .05 level. The Duncan post-hoc test again revealed that group 4 (Not Indicated) respondents generally rated interest in agricultural topic areas lower than all the other agricultural income groups.

The 'Not Indicated' group was constituted by 23 respondents (15.8%). A review of ungrouped agricultural income frequencies revealed that only 13 respondents indicated an agricultural income below $100, and the mode for the agricultural income frequencies was $1,000. Group 1 consisted of 93 respondents, group 2 consisted of 22 respondents, and group 3 consisted of 8 respondents. Based on these circumstances, it appears reasonable to expect that group 4 (Not Indicated) consisted of respondents from the low end of the agricultural income scale.

The outcomes of analysis of variance on the level of interest in agricultural topic areas by gross income are presented in Table 16. A
Table 16. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by amount of annual gross income derived from all sources

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Gross income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 Mean</td>
</tr>
<tr>
<td></td>
<td>n S.D.</td>
</tr>
<tr>
<td>Range and watershed</td>
<td></td>
</tr>
<tr>
<td>management</td>
<td>49 4.22 0.95</td>
</tr>
<tr>
<td>Crop production</td>
<td>49 3.89 0.91</td>
</tr>
<tr>
<td>Livestock production</td>
<td>49 4.41 0.90</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>48 4.18 0.99</td>
</tr>
<tr>
<td>Management</td>
<td>48 4.11 1.03</td>
</tr>
<tr>
<td>General agriculture</td>
<td>49 4.16 0.89</td>
</tr>
<tr>
<td>Overall</td>
<td>49 4.18 0.79</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>F-ratio</td>
</tr>
<tr>
<td>Range and watershed</td>
<td>3.74**</td>
</tr>
<tr>
<td>management</td>
<td></td>
</tr>
<tr>
<td>Crop production</td>
<td>2.84**</td>
</tr>
<tr>
<td>Livestock production</td>
<td>2.83*</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>3.64**</td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>General agriculture</td>
<td>2.71*</td>
</tr>
<tr>
<td>Overall</td>
<td>3.50**</td>
</tr>
</tbody>
</table>

aGroup 1 = $0 - 10,000.
Group 2 = 10,001 - 20,000.
Group 3 = 20,001 - 30,000.
Group 4 = 30,001 - 40,000.
Group 5 = Not indicated.

*P < .05.
**P < .01.
A total of six significant differences was found. A highly significant difference, significant at the .01 level, was found in the level of interest concerning range and watershed management. The Duncan post-hoc test revealed that group 4 ($30,001 to 40,000) respondents rated interest in range and watershed management significantly higher than all the other gross income groups. In addition, group 5 (Not Indicated) respondents rated interest in range and watershed management significantly lower than group 2 ($10,001 to 20,000) respondents. A second significant difference, significant at the .05 level, was also found in the level of interest concerning topics in crop production. The Duncan post-hoc test revealed that group 2 ($10,001 to 20,000) respondents rated interest in crop production significantly higher than group 3 ($20,000 to 30,000) respondents and group 5 (Not Indicated) respondents.

A third significant difference, significant at the .05 level, was found in the level of interest concerning topics in livestock production. The Duncan post-hoc test revealed that group 5 (Not Indicated) respondents rated interest in livestock production significantly lower than group 2 ($10,001 to 20,000) respondents and group 4 ($30,000 to 40,000) respondents.

A fourth highly significant difference, significant at the .01 level, was found in the level of interest concerning topics in agricultural mechanics. The Duncan post-hoc test revealed that group 5 (Not Indicated) respondents rated interest in agricultural mechanics significantly lower than group 1 ($0 to 10,000) respondents, group 2 ($10,001 to 20,000) respondents, and group 4 ($30,001 to 40,000) respondents. A
fifth significant difference, significant at the .05 level, was found in
the level of interest concerning general agriculture. The Duncan post-
hoc test revealed that group 5 (Not Indicated) respondents rated interest
in general agriculture significantly lower than group 2 ($10,001 to
20,000) respondents.

A one-way analysis of variance on the level of interest in all
agricultural topic areas by gross income also yielded a significant
difference at the .01 level. The Duncan post-hoc test revealed that
group 5 (Not Indicated) respondents generally rated interest in all
agricultural topic areas significantly lower than group 1 ($0 to 10,000)
respondents, group 2 ($10,001 to 20,000) respondents, and group 4
($30,000 to 40,000) respondents. Thirty-one respondents constituted the
'Not Indicated' group.

The general finding from the above results is that there were
several respondents who did not yield any information about their income
and they generally rated interest in agricultural topics relatively low.
No causal relationship can be established based on the information. It
could not be determined whether low interest caused these respondents
not to disclose income information or a decision not to disclose income
information caused the respondents to indicate low interest, or even if
both behaviors were caused by a third variable not investigated in the
study. But it is clear that the 'Not Indicated' group in terms of
income is significantly different from all other respondents.

Table 17 presents the outcomes of the one-way analysis of vari-
ance on the level of interest in agricultural topics by the size of
Table 17. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of rangeland used

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5 (^a)</th>
<th>F-ratio</th>
<th>F-prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n Mean S.D.</td>
<td>n Mean S.D.</td>
<td>n Mean S.D.</td>
<td>n Mean S.D.</td>
<td>n Mean S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range and watershed</td>
<td>62 4.24 0.72</td>
<td>13 4.49 0.65</td>
<td>10 4.50 0.61</td>
<td>4 4.50 0.41</td>
<td>57 4.06 0.97</td>
<td>1.69</td>
<td>.156</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop production</td>
<td>62 3.72 1.05</td>
<td>12 4.00 0.73</td>
<td>10 4.15 0.97</td>
<td>4 4.63 0.43</td>
<td>57 3.58 1.06</td>
<td>1.71</td>
<td>.152</td>
</tr>
<tr>
<td>Livestock production</td>
<td>62 4.41 0.66</td>
<td>13 4.75 0.28</td>
<td>10 4.67 0.39</td>
<td>4 4.83 0.33</td>
<td>57 4.28 0.87</td>
<td>1.89</td>
<td>.116</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>62 4.06 0.77</td>
<td>13 4.21 0.69</td>
<td>10 4.20 0.79</td>
<td>4 5.00 0.00</td>
<td>55 3.58 1.19</td>
<td>3.90**</td>
<td>.005</td>
</tr>
<tr>
<td>Management</td>
<td>60 4.23 0.68</td>
<td>13 4.00 0.93</td>
<td>10 4.30 0.66</td>
<td>4 4.67 0.38</td>
<td>56 3.78 1.21</td>
<td>2.27</td>
<td>.064</td>
</tr>
<tr>
<td>General agriculture</td>
<td>62 3.90 0.83</td>
<td>13 4.73 0.35</td>
<td>10 4.09 1.06</td>
<td>4 4.44 0.38</td>
<td>57 4.04 0.82</td>
<td>3.11*</td>
<td>.017</td>
</tr>
<tr>
<td>Overall</td>
<td>62 4.11 0.59</td>
<td>13 4.45 0.34</td>
<td>10 4.41 0.42</td>
<td>4 4.67 0.23</td>
<td>57 3.95 0.83</td>
<td>2.82*</td>
<td>.027</td>
</tr>
</tbody>
</table>

\(^a\) Group 1 = 0 - 1,000 acres. 
Group 2 = 1,001 - 2,000 acres. 
Group 3 = 2,001 - 3,000 acres. 
Group 4 = 3,001 - 5,000 acres. 
Group 5 = Not Indicated.

\(* p < .05. \) 
\(** p < .01. \)
rangeland used. Three significant differences were detected. A significant difference ($p < .01$) was found in the level of interest concerning topics in agricultural mechanics. The Duncan post-hoc test revealed that group 5 (Not Indicated) respondents rated interest in agricultural mechanics significantly lower than group 1 (0 to 1,000 acres) respondents and group 4 (3,001 to 5,000 acres) respondents.

A second significant difference ($p < .05$) was also detected in the level of interest concerning topics in general agriculture. The Duncan post-hoc test revealed that both group 1 (0 to 1,000 acres) respondents and group 5 (Not Indicated) respondents rated interest in general agriculture significantly lower than group 2 (1,001 to 2,000 acres) respondents. A one-way analysis of variance on the level of interest in all agricultural topics based on the size of rangeland used yielded a significant difference at the .05 level. The Duncan post-hoc test revealed that group 5 (Not Indicated) respondents generally rated interest in agricultural topics significantly lower than group 2 (1,001 to 2,000 acres) respondents. The 'Not Indicated' group consisted of 57 (39.0%) respondents.

Table 18 shows the outcomes of the one-way analysis of variance on the level of interest in agricultural topic areas by size of cattle herd owned. No significant differences were detected indicating that regardless of the size of the cattle herd, the responses to the agricultural topic areas were similar. Table 19 shows the outcomes of the one-way analysis of variance on the level of interest in agricultural topic areas by size of sheep flock owned. Again, no significant
Table 18. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of cattle herd owned

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Size of cattle herd</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 n Mean S.D.</td>
</tr>
<tr>
<td>Range and watershed management</td>
<td>16 4.45 0.70</td>
</tr>
<tr>
<td>Crop production</td>
<td>16 3.92 1.00</td>
</tr>
<tr>
<td>Livestock production</td>
<td>16 4.24 0.95</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>15 3.98 1.01</td>
</tr>
<tr>
<td>Management</td>
<td>16 4.07 0.97</td>
</tr>
<tr>
<td>General agriculture</td>
<td>16 4.15 0.81</td>
</tr>
<tr>
<td>Overall</td>
<td>16 4.15 0.76</td>
</tr>
</tbody>
</table>

\(^a\)Group 1 = None.  
Group 2 = 1 - 50 heads.  
Group 3 = 51 - 100 heads.  
Group 4 = 101 heads and above.  
Group 5 = Not indicated.
Table 19. Analysis of variance of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by size of sheep flock owned

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Group 1 Mean</th>
<th>Group 2 Mean</th>
<th>Group 3 Mean</th>
<th>Group 4 Mean</th>
<th>Group 5 Mean</th>
<th>F-ratio</th>
<th>F-prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>S.D.</td>
<td>n</td>
<td>S.D.</td>
<td>n</td>
<td>S.D.</td>
<td>n</td>
</tr>
<tr>
<td>Range and watershed</td>
<td>22</td>
<td>4.60</td>
<td>0.40</td>
<td>90</td>
<td>4.17</td>
<td>0.88</td>
<td>6</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop production</td>
<td>22</td>
<td>3.87</td>
<td>0.98</td>
<td>89</td>
<td>3.68</td>
<td>1.05</td>
<td>6</td>
</tr>
<tr>
<td>Livestock production</td>
<td>22</td>
<td>4.40</td>
<td>0.59</td>
<td>90</td>
<td>4.37</td>
<td>0.78</td>
<td>6</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>22</td>
<td>3.97</td>
<td>0.94</td>
<td>88</td>
<td>3.85</td>
<td>1.00</td>
<td>6</td>
</tr>
<tr>
<td>Management</td>
<td>22</td>
<td>4.25</td>
<td>0.68</td>
<td>87</td>
<td>3.90</td>
<td>1.00</td>
<td>6</td>
</tr>
<tr>
<td>General agriculture</td>
<td>22</td>
<td>3.84</td>
<td>0.88</td>
<td>90</td>
<td>4.04</td>
<td>0.84</td>
<td>6</td>
</tr>
<tr>
<td>Overall</td>
<td>22</td>
<td>4.19</td>
<td>0.50</td>
<td>90</td>
<td>4.05</td>
<td>0.74</td>
<td>6</td>
</tr>
</tbody>
</table>

*Group 1 = None.
Group 2 = 1 - 100 heads.
Group 3 = 101 - 200 heads.
Group 4 = 201 heads and above.
Group 5 = Not indicated.
differences were detected indicating that regardless of the size of the sheep flock owned, the responses to the agricultural topic areas were similar.

T-tests

The t-test procedure was used to determine if any significant differences existed in the level of interest in agricultural topic areas when respondents were grouped according to employment status and sex. A comparison of the mean ratings between male and female respondents is shown in Table 20. Three significant differences were detected at the .05 level concerning agricultural topics in range and watershed management, livestock production, and agricultural mechanics. In each of these topic areas, male respondents indicated higher levels of interest than female respondents. The only agricultural topic area in which the females had a slightly higher, though not statistically significant, mean than the males was in crop production.

A comparison of the mean ratings between those respondents who were employed and those respondents who were not employed is shown in Table 21. Only one significant difference was found (p < .05) concerning level of interest in management. The unemployed respondents rated management higher than employed respondents. The only two topic areas in which the employed respondents had a slightly higher mean, though not statistically significant, was in range and watershed management and livestock production.
Table 20. A comparison of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by gender (sex)

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Male Mean</th>
<th>S.D.</th>
<th>Female Mean</th>
<th>S.D.</th>
<th>t-value</th>
<th>prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range and watershed management</td>
<td>4.37</td>
<td>0.72</td>
<td>4.00</td>
<td>0.95</td>
<td>-2.38*</td>
<td>.020</td>
</tr>
<tr>
<td>Crop production</td>
<td>3.75</td>
<td>1.06</td>
<td>3.76</td>
<td>0.95</td>
<td>0.02</td>
<td>.986</td>
</tr>
<tr>
<td>Livestock production</td>
<td>4.53</td>
<td>0.62</td>
<td>4.25</td>
<td>0.83</td>
<td>-2.15*</td>
<td>.035</td>
</tr>
<tr>
<td>Agricultural mechanics</td>
<td>4.08</td>
<td>0.80</td>
<td>3.64</td>
<td>1.22</td>
<td>-2.31*</td>
<td>.024</td>
</tr>
<tr>
<td>Management</td>
<td>4.16</td>
<td>0.82</td>
<td>3.88</td>
<td>1.14</td>
<td>-1.55</td>
<td>.124</td>
</tr>
<tr>
<td>General agriculture</td>
<td>4.09</td>
<td>0.82</td>
<td>3.99</td>
<td>0.87</td>
<td>-0.73</td>
<td>.466</td>
</tr>
<tr>
<td>Overall</td>
<td>4.21</td>
<td>0.58</td>
<td>3.97</td>
<td>0.82</td>
<td>-1.39</td>
<td>.062</td>
</tr>
</tbody>
</table>

*p < .05.

Multiple Regression and Correlations

The forward stepwise multiple regression procedure in SPSSx was used to determine if knowledge of selected demographic variables about Navajo respondents would help indicate (predict) their level of interest in agricultural topics. The null hypothesis tested was stated as follows:

Hypothesis 3: Level of interest in agricultural topics cannot be predicted by knowing selected demographic variables of the respondents.

Multiple regression allows one to study the linear relationship between a set of independent variables and a number of dependent
Table 21. A comparison of interest in agricultural topic areas when Navajo agricultural producers in the Eastern Navajo Agency are grouped by employment status

| Topic area                        | Employed | | | | | Unemployed | | | | | | t-value | prob. |
|----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Range and watershed management   | 84       | 4.26     | 0.76     | 59       | 4.21     | 0.91     | .38      | .707     |          |          |          |          |          |          |
| Crop production                  | 83       | 3.75     | 1.07     | 59       | 3.76     | 0.91     | -0.06    | .956     |          |          |          |          |          |          |
| Livestock production             | 84       | 4.44     | 0.68     | 59       | 4.39     | 0.79     | 0.34     | .732     |          |          |          |          |          |          |
| Agricultural mechanics           | 82       | 3.82     | 0.97     | 59       | 4.07     | 0.99     | -1.50    | .137     |          |          |          |          |          |          |
| Management                       | 83       | 3.88     | 0.94     | 57       | 4.30     | 0.96     | -2.53*   | .012     |          |          |          |          |          |          |
| General agriculture              | 84       | 4.01     | 0.83     | 59       | 4.15     | 0.81     | -1.02    | .311     |          |          |          |          |          |          |
| Overall                          | 84       | 4.09     | 0.65     | 59       | 4.16     | 0.73     | -0.36    | .576     |          |          |          |          |          |          |

*p < .05.

variables while taking into account the interrelationships among the independent variables. Multiple regression analysis was used in this study to select combinations of independent variables which accounted for the greatest amount of variation in the level of interest in agricultural topic areas. The independent variables considered for each regression analysis included: amount of income derived from agricultural production, level of formal education attained, age, amount of gross income from all sources, size of rangeland, size of cattle herd, size of sheep flock, employment status, and gender (sex). PIN was established at .05 for each regression analysis conducted.
The results of regression analysis in predicting the composite rating of interest in agricultural topics are summarized in Table 22. Out of the eight independent variables considered, only the size of rangeland was entered before PIN = .05 was reached, and it accounted for only 8.73% of the variation. However, on the basis of this analysis, the hypothesis was rejected at the (F (1,73) = 8.08, p < .01). After size of rangeland had been considered, none of the remaining variables made a significant contribution to the prediction. The best prediction equation for the composite rating of interest in agricultural topics was:

\[ Y' = 1.383 \times 10^{-4} \text{size of rangeland} + 4.139; \]

Where: 1.383 \times 10^{-4} is the score weight by which the independent variable is multiplied

\[ Y' \text{ is the predicted composite level of interest} \]

Regression analysis was further conducted for each of the six agricultural topic areas, but no variables were entered prior to reaching PIN = .05 for the following three topic areas: range and watershed management, livestock production, and general agriculture. The results of regression analysis for the other three topic areas are reported in Tables 23, 24, and 25.

The results of regression analysis in predicting the level of interest in agricultural topics related to crop production is presented in Table 23. Only size of rangeland was entered before PIN = .05 was reached, and it accounted for only 5.63% of the variation (F (1,72) = 5.36, p < .05). After the effects of size of rangeland had been considered, none of the remaining variables made a significant contribution
Table 22. Results of regression analysis in predicting the composite rating of interest in agricultural topics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Cumulative percentage of variance accounted for by R</th>
<th>Variable standard error</th>
<th>B^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of rangeland</td>
<td>.316</td>
<td>8.735</td>
<td>.471</td>
<td>1.383-04</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>4.139</td>
</tr>
</tbody>
</table>

^aB is the coefficient of the variable in the prediction equation.

Table 23. Results of regression analysis in predicting the level of interest in agricultural topics related to crop production

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Cumulative percentage of variance accounted for by R</th>
<th>Variable standard error</th>
<th>B^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of rangeland</td>
<td>.263</td>
<td>5.638</td>
<td>.910</td>
<td>2.189-04</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>3.693</td>
</tr>
</tbody>
</table>

^aB is the coefficient of the variable in the prediction equation.

to the prediction. The best equation for predicting the level of interest in agricultural topics related to crop production was:

\[ Y' = 2.189-04 \text{(size of rangeland)} + 3.693 \]

Where: 2.189-04 is the score weight by which the independent variable is multiplied

\[ Y' \text{ is the predicted level of interest} \]

The results of regression analysis in predicting the level of interest in agricultural topics related to agricultural mechanics are
shown in Table 24. Two variables were entered into the prediction equation before PIN = .05 was reached. The first variable entered (level of formal education attained) accounted for 4.86% of the variation, while the second variable entered (amount of income derived from agricultural production) accounted for an additional 7.74% of the variation for a total of 12.60% of the variation accounted for (F (2,72) = 6.34, p < .01). After level of formal education attained and amount of income derived from agricultural production were considered, none of the remaining variables made a significant contribution to the prediction. The best prediction equation for level of interest in agricultural topics related to agricultural mechanics was:

\[ Y' = -.054(\text{level of formal education attained}) + 5.586-05(\text{amount of income derived from agricultural production}) + 4.626 \]

Where: -.054 and 5.586-05 are the score weights by which the independent variables are multiplied

\[ Y' \] is the predicted level of interest

The results of regression analysis in predicting the level of interest in agricultural topics related to management are shown in Table 25. The only variable entered before PIN = .05 was reached was employment status. Employment status was recoded into employed and unemployed categories. Employment status accounted for only 7.29% of the variation (F (1,72) = 6.75, p < .05). After employment status was considered, the remaining variables did not make a significant contribution to the prediction. The best prediction equation for interest in agricultural topics related to management was:
Table 24. Results of regression analysis in predicting the level of interest in agricultural topics related to agricultural mechanics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Cumulative percentage of variance accounted for by R</th>
<th>Variable standard error</th>
<th>$B^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of formal education attained</td>
<td>.248</td>
<td>4.864</td>
<td>.678</td>
<td>-.054</td>
</tr>
<tr>
<td>Amount of income derived from agricultural production</td>
<td>.387</td>
<td>12.604</td>
<td>.650</td>
<td>5.586-05</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>4.626</td>
</tr>
</tbody>
</table>

$^aB$ is the coefficient of the variable in the prediction equation.

Table 25. Results of regression analysis in predicting the level of interest in agricultural topics related to management

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Cumulative percentage of variance accounted for by R</th>
<th>Variable standard error</th>
<th>$B^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment status</td>
<td>.293</td>
<td>7.298</td>
<td>.694</td>
<td>.423</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>3.597</td>
</tr>
</tbody>
</table>

$^aB$ is the coefficient of the variable in the prediction equation.

$$Y' = .423(\text{employment status}) + 3.597$$

Where: .423 is the score weight by which the independent variable is multiplied

$Y'$ is the predicted interest rating
A regression analysis was also conducted to determine if knowledge of selected demographic variables would help in predicting the composite rating of perception statements. The results are shown in Table 26. Two variables were entered before PIN = .05 was reached. Size of cattle herd owned accounted for 5.79% of the variation while amount of income derived from agricultural production accounted for an additional 6.02% for a total of 11.80% of the variation accounted for (F (2,73) = 6.02, p < .01). None of the remaining variables made a significant contribution to the prediction. The best prediction equation for composite rating of perception statements was:

\[ Y' = -.013(\text{size of cattle herd}) + 1.043^{-04}(\text{amount of income derived from agricultural production}) + 3.833 \]

Where: -.013 and 1.043^{-04} are the score weights by which independent variables are multiplied

\[ Y' \] is the predicted composite rating

The researcher was unable to show that knowledge of selected demographic variables of respondents would help in predicting the level of interest in agricultural topics. Of the several prediction equations developed, none was considered by the researcher to be a strong indicator of the level of interest in agricultural topics. Other variables not analyzed in the regression analysis may have accounted for the variance in the level of interest.

The Pearson Product-Moment Correlation Coefficient was computed to determine if a significant relationship existed between perceptions
Table 26. Results of regression analysis in predicting the composite rating of perception statements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>Cumulative percentage of variance accounted for by R</th>
<th>Variable standard error</th>
<th>$B^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of cattle owned</td>
<td>.265</td>
<td>5.790</td>
<td>.953</td>
<td>-.013</td>
</tr>
<tr>
<td>Amount of income derived from agricultural production</td>
<td>.376</td>
<td>11.805</td>
<td>.922</td>
<td>1.043-04</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>3.833</td>
</tr>
</tbody>
</table>

$^a$ $B$ is the coefficient of the variable in the prediction equation.

of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics. The null hypothesis tested was stated as follows:

Hypothesis 2: There is no significant relationship between perceptions of the Navajo agricultural situation in the Eastern Navajo Agency and interest in agricultural topics.

The following scale was used to describe the relationships (Leedy, 1981, p. 115):

0.80 to 1.00 highly dependable relationship
0.60 to 0.79 moderate to marked relationship
0.40 to 0.59 fair degree of relationship
0.20 to 0.39 slight relationship
0.00 to 0.19 negligible or chance relationship

The relationship between the composite score on perceptions and the composite score on level of interest is shown in row one of Table 27.
Table 27. Relationship between selected variables and the composite rating of interest in agricultural topics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of cases</th>
<th>Coefficient$^a$</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite rating of perception statements</td>
<td>146</td>
<td>.008</td>
<td>.928</td>
</tr>
<tr>
<td>Amount of income derived from agricultural production</td>
<td>123</td>
<td>.169*</td>
<td>.031</td>
</tr>
<tr>
<td>Level of formal education attained</td>
<td>143</td>
<td>.150*</td>
<td>.037</td>
</tr>
<tr>
<td>Age</td>
<td>145</td>
<td>-.025</td>
<td>.381</td>
</tr>
<tr>
<td>Amount of gross income from all sources</td>
<td>115</td>
<td>.056</td>
<td>.275</td>
</tr>
<tr>
<td>Size of rangeland</td>
<td>89</td>
<td>.331**</td>
<td>.001</td>
</tr>
<tr>
<td>Size of cattle herd</td>
<td>125</td>
<td>.118</td>
<td>.096</td>
</tr>
<tr>
<td>Size of sheep flock</td>
<td>122</td>
<td>.065</td>
<td>.237</td>
</tr>
<tr>
<td>Gender (sex)</td>
<td>146</td>
<td>.136</td>
<td>.051</td>
</tr>
<tr>
<td>Employment status</td>
<td>143</td>
<td>.047</td>
<td>.288</td>
</tr>
</tbody>
</table>

$^a$Pearson product-moment coefficient.

$^*_{p} < .05$.

$^{**}_{p} < .01$.

The correlation coefficient between the composite perception score and the composite score on level of interest was 0.0075 with a probability of .928. The researcher was unable to show a significant relationship between the overall perceptions and the overall level of interest in agricultural topics.
After the null hypothesis was retained, additional correlation coefficients were computed to determine if a significant relationship existed between selected demographic variables and the composite rating of interest in agricultural topics. The additional computation of correlation coefficients revealed only a slight positive correlation between the size of rangeland and overall level of interest in agricultural topics \( (r = .331, p < .01) \). Another statistically significant relationship found was between the amount of income derived from agricultural production and composite rating of the level of interest in agricultural topics \( (r = .169, p < .05) \). The final statistically significant relationship found was between the level of formal education attained and composite rating of the level of interest in agricultural topics \( (r = .15, p < .05) \). Both of the latter relationships were found to be statistically significant, but otherwise lacked practical significance because of negligible relationships.
CHAPTER V. DISCUSSION AND IMPLICATIONS

In recognition of the need to relate the findings of this study to the practical aspect of program planning, this chapter is devoted to discussing specific findings and synthesizing an overall "picture" of the implications for the Eastern Navajo Agency. The discussions are presented under the following headings: (1) Discussion of Profile/Demographic Information, (2) Discussion of Perceptions and Interests, (3) Discussion of Qualitative Responses, and (4) Discussion of Implications.

Participants of the educational meetings from whom data was collected provided a wealth of information which reflected upon themselves as well as other Navajos who had similar interests in agriculture in the Eastern Navajo Agency. Although generalization beyond the respondents is often difficult if a statistical sample was not used, the cross-section of representation in this study, as indicated by the findings, minimizes the threat of nonrepresentativeness. The study was not designed to reflect on the general population in the Eastern Navajo Agency, but it was designed to reflect the perceptions and interests of those Navajos who had an interest in agriculture.

Discussion of Profile/Demographic Information

One of the objectives of the study was to establish a profile of Navajo agricultural producers and agricultural production in the Eastern Navajo Agency. A major finding relevant to this objective was that participation in an educational meeting in agriculture was not
restricted by many demographic variables such as gender (sex), age, and level of formal education. This finding suggests that educational programs for Navajo agricultural producers need to address a broad range of educational abilities as well as age. Presentations in the native language or presentations with the assistance of interpreters would be necessary to ensure that those participants who had little or no formal education received the benefits of the educational presentations.

The age distribution of the respondents indicates that interest in agricultural training is not restricted to any age range. One may have expected more interest from either the younger generation because they are familiar with the educational process or from the older generation because they depend on livestock production for their livelihoods.

A major finding of this study was that withholding or not disclosing certain types of information was quite evident among the respondents. The reasoning behind reluctance to disclose certain types of information is not readily known, but the fact is certain information was consistently not given. The highest incidences of not indicating a response occurred with questions pertaining to land size, livestock holdings, and income. The "Not Indicated" group was large enough that it was treated as a group in the analyses and the findings showed that this group was significantly different from the other groups in many respects. The "Not Indicated" group is explained further in the discussion on perceptions and interests.
For example, 4 out of every 10 respondents did not indicate the size of rangeland used. There are several possible explanations for a failure to record the size of rangeland used: (1) there was some confusion on the part of the respondents when the word "owned" was changed to the word "used"; (2) there was uncertainty among the respondents as to the actual size of their range use area acres; (3) there was uncertainty among the respondents as to size of rangeland they are permitted to use (if they owned a grazing permit which is based on the number of sheep units); and/or (4) the respondents did not own a grazing permit and did not wish to risk disclosing the size of rangeland used for illegal grazing of livestock. Very few respondents indicated a range size of over 1,000 acres.

The size of agricultural holdings and the amount of income derived from agricultural production reported by the respondents would classify them as small-scale producers. Four out of every 10 respondents indicated the rangeland they use for livestock production was less than 1,000 acres; two-thirds of the respondents reported a cattle herd size of 1 to 50 head; 6 out of every 10 respondents indicated a sheep flock of 1 to 100 head; 6 out of every 10 respondents indicated they own some goats; nearly three-fourth of the respondents have at least one horse; and only negligible number owned any mules or donkeys. Although the majority of the respondents may be classified as small-scale producers, there were very few respondents who had a relatively large livestock holding.
The amount of income derived from agricultural production was likewise small. The majority of the respondents received $2,500 or less from agricultural production. The gross income reported was also quite small with slightly over one-third of the respondents receiving less than $10,000 per year. Six out of every 10 respondents reported an annual gross income of $20,000 or less with very few receiving more than $20,000 per year. Generally, the respondents tended to receive low income from all sources.

The employment status of the respondents revealed that approximately 4 out of every 10 respondents were unemployed. The unemployed respondents were evenly split between those who were seeking employment and those who were not seeking employment. Those who were not seeking employment consisted of respondents who were retired, elderly with no formal education, handicapped, or those who were simply not actively seeking employment. Nevertheless, the unemployment among those who were seeking employment remained at a relatively high 22%. The educational implication of a high unemployment rate is to focus on increasing agricultural production to increase income.

The finding that friends and other ranchers were the sources of information most commonly mentioned was highly significant with many implications for diffusion of new information and adoption of new technology. Future introduction of new information and technology must either capitalize upon this social-oriented diffusion or attempt to introduce an alternative medium of diffusion.
The finding that the most frequently mentioned activity was buying feed for the livestock was significant. The image it portrayed was that Navajo livestock producers were supporting their livestock rather than the livestock supporting the livestock producer. Another significant finding was that hauling water was more frequently mentioned than many other management practices. The practices most frequently mentioned (for example, branding, castrating, dipping or spraying, vaccinating, etc.) were be considered "basic" to any livestock operation. The practices mentioned least frequently were those that could have made the most contribution to increasing the present level of production to a new plateau. There is a need to increase and improve the present level of production to a more sophisticated level which involve purchasing breeding stock, maintaining records, and improving growth.

The finding that livestock raised were used most widely as food products and to a lesser extent as a medium of exchange suggests that the purpose for which Navajo producers raised livestock was more for domestic use rather than a business operation. The significance of this finding was that it was contrary to the purpose of agricultural business whose aim was to make a profit, not for domestic consumption. The business orientation to agricultural production was either lacking or was lower in priority than domestic uses. This is where planned change is most critical. Initially, the introduction of a new educational program in agriculture would need to focus on improving existing practices. The concept of increasing production to increase income should then be gradually introduced. Agricultural production in the Navajo Nation has the
potential to be used for a dual-purpose as a source of food supply as well as a viable source of income.

The finding on the alternative ways of making improvements suggested that the desire was there for making improvement through better education and not so much through emphasis on the "business" aspect of agricultural production. However, a somewhat surprising response was the 'access to more land' alternative which was really not a practical alternative because of the diminishing availability of rangeland with an increasing Navajo population on a fixed land base. There were two ways to interpret this finding. One was to interpret it as an indication that more technical knowledge is needed and should be delivered. The other interpretation was that there was a need to try to convince the producers about the value of the 'business-oriented' operation.

The finding on the preference for educational meetings indicated a preference for nonformal education on a somewhat regular basis, not once a year which was ranked the lowest based on frequency counts. Nearly 9 out of every 10 respondents also indicated that they would either definitely or probably participate in an agricultural education program if it was offered in the Eastern Navajo Agency.

Discussion of Perceptions and Interests

The general perceptions of the respondents included a strong indication for some form of a community outreach program in agricultural education. The four highest rated perception statements dealt with this issue. The preference was for nonformal education on a somewhat regular basis.
The relatively low ranking of the statement 'I produce quality livestock comparable to most non-Navajo producers in the area' suggested a low confidence and/or poor image of the present quality of livestock produced by Navajos. The low ranking of the statement 'Even if agricultural training was offered, agricultural practices will not change' could be interpreted in a positive manner. The relatively low rating suggested disagreement with the statement which mean that there was potential that agricultural practices could be improved with the introduction of agricultural training programs.

The intermediate ratings of basic skills, job training, and college credits in agricultural education suggested that they were all important but were secondary to community level educational programs for local producers.

The low rating of perceptions regarding job and business opportunities in agriculture indicated a lack of confidence in, but perhaps not a fatalistic attitude toward, the present level of economic activity in agriculture (and perhaps economic development in general) in the Eastern Navajo Agency. The implications of these perceptions were far-reaching and they underscored the dire need for agricultural improvement in the private sector.

The relative rating and ranking of all agricultural topics clearly illustrated the high interest in topics related to livestock production and watershed/range management. The rating and ranking also showed the low interest in topics related to crop production. Agricultural education in the Eastern Navajo Agency would logically be
introduced with a focus on livestock production and watershed/range management.

The relatively low rating of establishing producer cooperatives reflected the individualistic approach to agricultural production by Navajo agricultural producers rather than on a cooperative basis. Also, past cooperative ventures, most of which have failed, have focused primarily on farming and not on livestock production.

The relatively low rating of computers in agriculture was due either to the perception that computers were inappropriate for the Navajo agricultural producers or the lack of knowledge concerning application of computers as it related to agricultural production.

Horticulture and drip-irrigation farming were both rated relatively low. Both of these topics were probably considered somewhat unconventional for the Eastern Navajo Agency, although both topics have been taught and utilized in the past in the Eastern Navajo Agency. The idea of learning about water-harvesting techniques in an area which is known for livestock water shortage may have captivated the attention of the respondents which resulted in a relatively high rating.

The general finding from the study was that there were some respondents who would not yield any information about their income and they generally rated interest in agricultural topics relatively low. No causal relationship could be established based on the information on whether low interest caused the respondent not to disclose income information or decision not to disclose income information caused the respondent to indicate low interest, or even if both behaviors were
caused by a third variable not investigated in this study. There were 23 respondents who did not report either an agricultural income or gross income. The characteristics which differentiated this group from the overall group included: a mean rangeland size of 188.6 acres as opposed to 883.6 acres; no farmland as opposed to a mean size of 8.7 acres; a mean education level of grade 7 and a median of grade 8 as opposed to a mean education level of grade 9 and a median of grade 12; and 77 percent of the 'Not Indicated' group consisted of females as opposed to 36.7 percent of the overall group consisted of females. It was clear that those respondents who did not report income were significantly different from the overall group.

No significant differences were detected when respondents were grouped and compared based on size of cattle herd and sheep flock owned. The finding suggested that each group rated interest in agricultural topics similarly. However, in each of the agricultural topic areas, male respondents tended to indicate higher levels of interest than female respondents. The only agricultural topic area in which the females had a slightly higher interest, although not statistically significant, than the males was in crop production.

The researcher was not able to show that knowledge of selected demographic variables of Navajo agricultural producers would help in making a reliable prediction of the level of interest in agricultural topics. The researcher was also not able to show a significant relationship between the composite rating of perception statements and the composite rating of interest in agricultural topics.
Discussion of Qualitative Responses

In this study, valuable qualitative data were also collected based upon the questions asked and comments made during the educational meetings. A summary of some of the comments and concerns are presented.

Participants at the Huerfano Chapter greatly appreciated the educational meeting and requested that the researcher conduct more educational meetings at their Chapter. The participants desiring more information were referred to Navajo Department of Agriculture and San Juan County Extension Service. They liked what they felt was a "grass-roots" involvement, and they had many questions pertaining to treatment of cattle grubs and lice. Participants at the Whitehorse Lake Chapter were appreciative of the educational meetings and they had questions pertaining to calving and lambing difficulties.

Participants at the Crownpoint Chapter also appreciated the educational meeting. But they also warned the researcher against using the results of the study to "work against" the Navajo people but to help them. The implication was that some of the past so-called development efforts were designed to take advantage of Navajo resources for the benefit of people off the Navajo reservation. The participants expressed appreciation and delight to see young Navajos teaching one another on the proper care of livestock and range management.

The primary concern of participants at the Red Rock Chapter was eradication of poisonous range plants and how to treat poisoned livestock. The McKinley County agricultural Extension agent assisted with the technical information concerning range plants. Participants at the
White Rock chapter consisted of many young Navajo who indicated they had some vocational agriculture background. The participants had many questions related to agricultural literature, subscriptions, contact persons, and opportunities to study agriculture.

Participants at the Ramah/Pinehill chapter prided themselves in their relatively modernized approach to livestock production, marketing, and range management. They expressed further interest in marketing techniques, advanced practices (pregnancy testing, artificial insemination, growth hormones), and they desired educational opportunities which would take them to a new level of increased production.

In conversing with community leaders throughout the various Eastern Navajo Agency, their primary concerns in addition to the need for agricultural training included:

1. The need to revamp the grazing permit system with provisions for designated range areas and designated community growth areas (townships).

2. The need to issue homesite leases only within designated residential areas in growth communities, not just anywhere on the rangeland.

3. The growth of residential areas will necessitate and enhance the development of a private sector through the need for services and small businesses. The concentration of people in communities will encourage better use of land resources as well as encourage development of a private sector.

4. The present homesite lease procedure reduces the availability of rangeland for livestock production, while at the same time it denies the growth areas the opportunity to develop a private sector.
Discussion of Implications

The findings of this study have implications for the role Crownpoint Institute of Technology can play in delivering agricultural-related educational services in the Eastern Navajo Agency.

The complex problems associated with development planning in the Eastern Navajo Agency necessitates a comprehensive approach across economic, political, educational, and social disciplines at all levels. Therefore, it would be advisable to form a development planning committee to advise educational planners at the Crownpoint Institute of Technology regarding the design and implementation of an agricultural education program. The committee would have representation from the following agencies: Navajo Department of Agriculture, Navajo Division of Economic Development, Navajo Agricultural Products Industry, Branch of Land Operations, Eastern Navajo Agency Land Board, McKinley County Agricultural Extension Service, and four Navajo agricultural producers. The committee would assist with the following tasks:

1. Developing program objectives - results, changes, improvements, and impact expected
2. Identification of resources and support - people, time, money, facilities, equipment, supplies, and materials
3. Program design - general content, scope, methods, and sequences
4. Instructional design - learning activities, lessons, devices, and techniques
5. Implementation of program - promotion and follow-through
6. Formative and summative evaluations - results, changes, impact, perceived benefits, and improvements observed
The findings suggest that the Crownpoint Institute of Technology should extend educational services to the communities where people live and work. The current perception is the Eastern Navajo Agency can benefit from an agricultural education program if it is delivered at the community level for local agricultural producers. There is also considerable interest in participating in such a program. The program would initially focus on improving and increasing range livestock production in the rural areas. However, such an improvement and increase should be balanced with consideration to the "holistic" interrelationships among biological species, natural resources, and environmental factors. Agricultural education would also serve as a medium of introduction to new practices, new concepts, and new technologies in agriculture.

Foremost, there is a need for the Crownpoint Institute of Technology to make an institutional commitment to delivering agricultural related educational services in the Eastern Navajo Agency. Inherent in such a commitment is the development and/or recruitment of technical expertise to develop and deliver the program. The nature of the needs being addressed would require that the program be designed and implemented with sustainability in mind over an extended period of time. Sufficient resources and support would need to be procured and committed to such a long-term development effort.

A commitment to quality education also necessitates acquisition of more information on the clientele served such as motivators, aspirations, inhibitors, and barriers to participation. Such information should be collected when the program is implemented.
CHAPTER VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The primary purpose of this study was to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. The study sought to establish a profile of Navajo agricultural producers, determine perceptions regarding agricultural conditions and need for agricultural training, determine extent of interest in agricultural training, determine extent of interest in agricultural topics, and test hypotheses relevant to the purpose of the study. This chapter is presented in four parts: (1) Summary, (2) Conclusions, (3) Recommendations, and (4) Additional Recommendations.

Summary

The study was the result of a need expressed by the Crownpoint Institute of Technology to develop a comprehensive plan for delivering agriculturally-related educational services in the Eastern Navajo Agency. The study involved cooperation between the researcher from the Department of Agricultural Education at Iowa State University, the president of Crownpoint Institute of Technology, Extension agents from McKinley and San Juan Counties in New Mexico, representatives from the Bureau of Indian Affairs-Branch of Land Operations in the Eastern Navajo Agency, Land Board members in the Eastern Navajo Agency, and Chapter officers and community leaders throughout the Eastern Navajo Agency.

A survey questionnaire was used to collect the data. The survey instrument was developed based upon a preliminary inquiry conducted by the researcher. Twelve statements were included to assess how the
Navajo agricultural producers perceived the agricultural situation in the Eastern Navajo Agency and the need for agricultural training. Twenty-five agricultural topics were also included to determine the extent of interest by Navajo agricultural producers in learning more about these topics. The remaining items dealt primarily with demographic variables to establish a profile of Navajo agricultural producers and Navajo agricultural production in the Eastern Navajo Agency. The survey instrument was bound into a booklet. The survey instrument was printed in burgundy color on an ivory colored paper.

The instrument was refined through consultation with representatives of the Branch of Land Operations, Crownpoint Institute of Technology, and the researcher's graduate committee at Iowa State University. Post-hoc reliability tests, using Cronbach's alpha procedure, were used to determine the reliability of the scales in the instrument. The reliability coefficients for the scales indicating perception of agricultural conditions and interest in agricultural topics were .84 and .94, respectively.

The population for the study was comprised of Navajo adults who attended one of the educational meetings held in nine communities throughout the Eastern Navajo Agency. The Eastern Navajo Agency is located in the New Mexico portion of the Navajo Nation (Appendix). A total of 150 usable responses were received which formed the basis for statistical analyses.

Appropriate parametric and nonparametric statistical procedures were employed to analyze and summarize the data. Frequency counts were
used to rank order nonparametric items, while means and standard deviations were used to rank order parametric items. Analysis of variance and t-tests were used to compare the responses of respondents when grouped by selected demographic variables. Pearson Product Moment Coefficients were computed to determine the relationships between the overall score on perception and the overall score on interest in agricultural topics. Correlation coefficients were also used to explore the relationships between selected demographic variables and the overall score on interest in agricultural topics. Regression analysis procedures were used to determine if knowledge of selected demographic variables about respondents would help in predicting the level of interest in agricultural topics. All analyses were conducted to answer the specific objectives of the study.

Conclusions

The researcher recognizes the limitations imposed on drawing general conclusions and making broad recommendations based on a single study. However, the researcher also recognizes the need to initiate and establish general conclusions and recommendations which can serve as a framework for planning agricultural education programs in the Eastern Navajo Agency.

The respondents consisted of Navajo agricultural producers in the Eastern Navajo Agency. A review of the findings of this study resulted in the following conclusions:

1. Nearly two-thirds of the respondents were males while slightly over one-third of the respondents were females.
2. One-half of the respondents had a formal education of at least grade 12; one-fourth of the respondents had a formal education between grade 7 and grade 11; and one-fourth of the respondents had a formal education of grade 6 or less. The formal education level ranged from none to grade 16 with a mean of grade 9 and a median of grade 12.

3. One-half of the respondents were between the ages of 19 and 40 years. The age ranged from 19 to 90 years with a mean of 43.12 years and a median of 41 years.

4. Nearly 42 percent of the respondents used 1,000 acres of rangeland or less for livestock production. The mean was 883.62 acres and the median was 360 acres. Forty percent of the respondents chosen not to report the size of rangeland they used for livestock production.

5. Nearly one-fourth of the respondents used a small acreage of land to grow crops. The mean size of farmland was 8.77 acres.

6. Two-thirds of the respondents owned between 1 and 50 head of cattle. The mean size of the cattle herd was 26 head and the median size was 18 head.

7. The majority of the respondents owned between 1 and 100 head of sheep. The mean size of the sheep flock was 40 head and the median size was 20 head.

8. The majority of the respondents owned between 1 and 95 head of goats. The mean size of the goat flock was 20 head and the median size was 10 head.
9. Nearly three-fourths of the respondents owned at least one horse. The mean number of horses owned was four head and the median number was three head.

10. Less than three percent of the respondents owned at least one mule or donkey.

11. The majority of the respondents had either part-time or full-time employment. Of those who were not employed, one-half were seeking employment while one-half were not seeking employment.

12. Nearly two-thirds of the respondents received $2,500 or less in income from agricultural production. The mean income from agricultural production was $2,073 and the median was $1,000.

13. Sixty percent of the respondents received an annual gross income of $20,000 or less and two percent of the respondents chose not to disclose their gross income. The mean gross income was $13,801 and the median gross income was $12,000.

14. The majority of the respondents used friends/other ranchers as sources of new information about livestock production and/or range management. Other sources used by less than a majority of the respondents were ranked based on frequency count in the following descending order: family members/relatives, Branch of Land Operations, Navajo Tribe Department of Agriculture, New Mexico Extension Service, vocational agriculture teacher, radio, sales people, newspaper/magazine, and television.

15. The majority of the respondents performed the following activities (practices) in connection with their livestock production:
buy feed, hot-iron brand, castrate, dip or spray, haul water, vaccinate, treat pink-eyes, dehorn, and deworm. Activities performed by less than a majority of the respondents were ranked based on frequency count in the following descending order: purchase breeding stock, purchase sires, keep records, hire labor, and implant growth hormone.

16. Over three-fourths of the respondents used the livestock they raised for food. The majority of the respondents also used the livestock they raised for the following purposes: sell at auctions/sales and sell to traders/storekeepers. Less than a majority of the respondents used the livestock they raised for the following purposes: use for social/religious obligations and use for bartering (exchange for other products).

17. The majority of the respondents felt that improvement in range livestock production in the Eastern Navajo Agency could be achieved through technical knowledge in livestock production, access to more land, and technical knowledge in range management. Less than a majority of the respondents felt that improvement in range livestock production could be achieved through changes in existing land-use policies, business management skills, available and sufficient credit, establishing a cooperative, and access to alternative markets.

18. Over three-fourths of the respondents preferred educational meetings which consisted of 1-2 day workshops/seminars once every month. The majority of the respondents also preferred
1-2 week short courses once every 6 months. Other educational meetings preferred by less than a majority of the respondents included: 3 months regular semester courses 1-5 hours every week, 3 months regular semester courses 6-10 hours every week, 1-2 day workshops/seminars once every 3 months, and 1-2 weeks short courses once every year.

19. Eighty-eight percent of the respondents were interested in participating in an agricultural education program if it were offered in the Eastern Navajo Agency.

20. The respondents believed there was a need for Crownpoint Institute of Technology to offer agricultural training programs in the Eastern Navajo Agency. The programs were to be delivered at the community level primarily for local producers.

21. The respondents believed there was a certain amount of jealousy among Navajo agricultural producers in the Eastern Navajo Agency.

22. The respondents felt that remediation in basic skills, job training in agriculture, and transferable college credits were secondary to providing community-level agricultural training for local agricultural producers.

23. The respondents perceived that the quality of livestock they produced was not quite comparable to that produced by non-Navajos in the area.

24. The respondents perceived there were not very many job opportunities or business opportunities in agriculture in the Eastern Navajo Agency.
25. The respondents were primarily interested in agricultural topics which dealt with livestock production. Interest in other agricultural topic areas was ranked in the following descending order: range and watershed management, general agriculture, management, agricultural mechanics, and crop production.

26. The respondents were very similar in their level of interest in agricultural topics when they were grouped and compared based on selected demographic variables other than gender (sex). Most of the observed differences involved the 'Not Indicated' group which consistently rated interest in agricultural topics lower than the other groups.

27. The 'Not Indicated' group consisted of respondents who were primarily females with lower educational level, smaller rangeland, no farmland, and probably low income than the overall group. There were a total of 73 respondents who did not report either a rangeland size, agricultural income, or gross income.

28. Male respondents rated interest in all agricultural topic areas higher than female respondents except in crop production.

29. There was no significant relationship between the overall rating of perceptions and the overall rating of interest in agricultural topics.

30. There were significant relationships between the overall rating of interest in agricultural topics and size of rangeland used, level of formal education, and amount of income derived from agricultural production.
31. None of the demographic variables investigated made a significant contribution to the prediction of the level of interest in agricultural topic areas.

Recommendations

Based on the findings and conclusions of this study, the following recommendations should be given consideration by program planners who are interested in economic and social development in the Eastern Navajo Agency, particularly as they relate to the agricultural sector:

1. The Crownpoint Institute of Technology should assume the lead role in designing and delivering agricultural-related educational services in the Eastern Navajo Agency.

2. Agricultural education should be delivered on a regular basis in several communities throughout the Eastern Navajo Agency to meet the needs and interests of the local Navajo agricultural producers.

3. Agricultural education should initially focus on approved "basic" practices in livestock production and watershed/range management to capitalize on existing interests of the local producers.

4. After the initial focus on existing interests, introduction of new topics should include "advanced" practices such as herd improvement, reproductive efficiency, marketing, and management.

5. Subsequent introduction of topics should also expose the clientele to capitalization with information on credits, cooperatives, and entrepreneurial skills.
6. Agricultural education should focus on improving and increasing agricultural production which is appropriate for small-scale producers.

7. Agricultural education should be presented either in the Navajo language or with the aid of a Navajo interpreter.

8. Introduction and diffusion of new information should capitalize on the existing diffusion network of friends and other ranchers.

9. Since no demographic variables studied were reliable indicators of the level of interest in agricultural topics, the educational meeting should be widely advertised to attract interested clientele.

10. In the initial stages of planning the agricultural education program for the Eastern Navajo Agency, provisions should be made to accommodate job training, transferable college credits, and remediation in basic skills at a later time. The program should be designed and delivered with sustainability in mind for a long-term development effort.

11. Potential clientele should be informed that if economic development is to occur in the Eastern Navajo Agency, the rural agricultural producers must be active players in the process by adopting improved practices and increasing agricultural production.

12. The Crownpoint Institute of Technology should initiate a pilot project to test the validity of these findings and recommendations.
Additional Recommendations

The following general recommendations are not necessarily based on the findings of this study, but they are based on the researcher's experience in conducting this study:

1. A database should be established and maintained on the estimates of annual agricultural production in the Navajo Nation to indicate production levels and trends.

2. A comprehensive list of mailing addresses of Navajo agricultural producers should be compiled and maintained to facilitate dissemination of agricultural-related information.

3. The Navajo Tribe should sponsor more research conducted by Navajo graduate students. The research will be mutually beneficial to the students as well as the Navajo Nation.

4. Further studies should be conducted in each agency of the Navajo Nation to systematically document the perceptions of Navajo agricultural producers regarding agricultural development, agricultural needs, agricultural issues, interests in agricultural education, and aspirations.

5. Further studies should be conducted by the Crownpoint Institute of Technology to document the need for existing and anticipated educational programs.
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<table>
<thead>
<tr>
<th>Appendix Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map of the Navajo Nation</td>
<td>141</td>
</tr>
<tr>
<td>Great Seal of the Navajo Tribe</td>
<td>142</td>
</tr>
<tr>
<td>Statistics from the 1980 Census</td>
<td>143</td>
</tr>
<tr>
<td>Letter to Crownpoint Institute of Technology (formerly Navajo Skill Center, Inc.) for research possibilities</td>
<td>145</td>
</tr>
<tr>
<td>Letter from Crownpoint Institute of Technology expressing interest in sponsoring a research project</td>
<td>146</td>
</tr>
<tr>
<td>Letter to Crownpoint Institute of Technology to confirm arrangements for a research discussed via telephone</td>
<td>147</td>
</tr>
<tr>
<td>Cover letter to dissertation proposal submitted to Crownpoint Institute of Technology</td>
<td>149</td>
</tr>
<tr>
<td>Letter to Bureau of Indian Affairs-Shiprock Agency Superintendent for access to names and addresses of grazing permittees</td>
<td>150</td>
</tr>
<tr>
<td>Letters from Bureau of Indian Affairs-Shiprock Agency with accompanying Bill of Sales or Transfer Agreement of grazing permits</td>
<td>151</td>
</tr>
<tr>
<td>Letter of update to Crownpoint Institute of Technology</td>
<td>156</td>
</tr>
<tr>
<td>Cover letter to a draft copy of the survey instrument submitted to Crownpoint Institute of Technology</td>
<td>157</td>
</tr>
<tr>
<td>Letter to Land Board members and Chapter presidents to arrange for hosting educational meetings</td>
<td>158</td>
</tr>
<tr>
<td>Cover letter to the survey instrument</td>
<td>159</td>
</tr>
<tr>
<td>Survey instrument</td>
<td>160</td>
</tr>
<tr>
<td>Boyle's program development model</td>
<td>166</td>
</tr>
<tr>
<td>Human subject research approval form</td>
<td>167</td>
</tr>
</tbody>
</table>
STATISTICS FROM THE 1980 CENSUS

For the big Navajo Reservation Indians only (excluding the three satellites of Ramah, Alamo and Canoncito):

Per capita income in 1979 = $ 2,414
Median household income in 1979 = $ 8,342
Median family income in 1979 = $ 9,079
Median family income, for families with female heads of household with no husbands present, in 1979 = $ 5,831
Persons below poverty level in 1979 = 51,904
(49.7% of the Indian persons on the Navajo Reservation whose poverty status was determined)
Families below poverty level in 1979 = 9,348
(47.3% of the Indian families counted on the Navajo Reservation. Total families counted = 19,753)
Families with female heads of households and no husbands present, below poverty level in 1979 = 2,789
Number of Indian families with no workers in 1979 = 4,267
(21.6% of all Indian families on the Navajo Reservation in 1979)
Percent of Indian males, 16+ years old, in the labor force = 52.0%
Percent of Indian females, 16+ years old, in the labor force = 35.4%
Percent of Indian females in the labor force with their own children under 6 years old = 45.5%
Nonworking Indians per 100 working Indians = 303
Indian persons 5+ years old - percent who speak a language other than English at home = 92.4%
Indian persons 16-19 years old - percent not enrolled in school and not high school graduates = 29.6%
Indian persons 25+ years old - percent who are high school graduates = 34.6%
Indian persons 25 years old - percent who have completed 4 or more years of college = 3.2%
Indian persons under 18 years old - percent living with 2 parents = 68.3%
Indian families - percent with their own children under 6 years old = 41.9%
Average number of children ever born to each Indian woman 35-44 years = 4.6
Total number of Indian married-couple families = 13,983
Total number of female-headed Indian families with no husband present = 4,822
Average number of persons per Indian household = 4.7
Total number of year-round housing units on the Navajo Reservation in April 1980 = 29,821
47.1% or 14,046 of the 29,821 res. housing units were built between 1970 and March, 1980.
4.2% of 1,252 of the Res. housing units were built in 1939 or earlier.
9.2% or 2,744 of the Res. housing units were apartment-type buildings
with 5 or more apartments in the building.
67.7% or 20,189 of the Res. housing units were connected to a public
water system or private company water source.
36.2% or 10,795 of the Res. housing units were connected to a public
sewer.
28.1% or 8,380 of the Res. housing units had a central heating system.
13.6% or 4,056 of the Res. housing units had complete kitchen facilities.

Of the 29,821 total year-round (occupied and vacant) housing units on
the Navajo Reservation in April 1980, a total of 22,099 were occupied
by an Indian head of household (this number seems too low; may be due
to failures to complete the 1980 Census questionnaire).
21.5% or 4,751 of the Indian households had moved into their living
quarters during the preceding year, between 1979 and March 1980.
74.4% or 16,442 of the Indian households had one or more vehicles avail­
able to them.
20.9% or 4,619 of the Indian households had a telephone.
$141 was the median monthly gross rent for Indian households which paid
rent.
15.2% or 3,353 of the Indian households had a head of household and/or a
spouse who was 65 years or older.
There were 5,578 seasonal (not habitable year-round) housing units on
the Navajo Reservation in April 1980.
71% or 21,290 of the year-round housing units were the only units at
that address.
Of the 24,421 occupied year-round housing units, a total of 15,421 were
owner-occupied.
12,322 or 50.5% of the occupied year-round housing units lacked complete
plumbing for exclusive use.
Of the 22,099 Navajo Reservation housing units occupied by an Indian
head of household, a total of 14,967 or 67.7% were owner-occupied.
12,227 or 55.3% of the Indian-occupied housing units lacked complete
plumbing for exclusive use.
The median number of persons in the Indian-occupied housing was 4.42
persons per unit.
The median number of rooms in the Indian-occupied housing was 2.7 rooms
per unit.
The number of Indian housing units which had 1.01 or more persons per
room (the Federal standard for overcrowding) was 14,340 or 64.9% of
the total Indian-occupied housing on the Navajo Reservation.
The number of Indian housing units which were overcrowded (1.01+ persons/
room) and which lacked complete plumbing for exclusive use (the Federal
definition of substandard housing) was 9,107 or 41.2% of the total
Indian-occupied housing on the Navajo Reservation.
March 15, 1985

Mr. Leo O'Neal,
President
Navajo Skill Center, Inc.
P.O. Drawer K
Crownpoint, NM 87313

Dear Mr. O'Neal:

I am a research assistant at the Iowa State University and I am working on a doctorate in agricultural education. I am exploring the possibility of doing my dissertation research in connection with an adult agricultural education program in the Navajo Nation.

My question is whether or not the Navajo Skill Center, Inc., might be interested in sponsoring a study which will be useful to the Center in formative program planning in agriculture. The study may involve any phase of program planning (e.g., needs/interest assessment, job-market survey, task analysis in curriculum development, etc.).

Any information you may provide on the position of the Center in regards to such an idea will be greatly appreciated. If the idea is favorable to the Center, I will gladly submit a proposal to you for your consideration.

Sincerely,

Johnson Bia
Research Assistant
March 19, 1985

Mr. Johnson Bia  
Department of Agricultural Education  
201 Curtiss Hall  
Iowa State University  
Ames, Iowa 50011

Dear Mr. Bia,

Thank you so much for your recent letter.

We are interested in doing comprehensive planning for serving the agricultural related training needs of Eastern Navajo. We would definitely be interested in sponsoring a needs assessment and planning study.

Please contact me via telephone as soon as possible to discuss possibilities.

Sincerely,

Butch O’Neal, President
May 9, 1985

Mr. Butch O'Neal, President
Navajo Skill Center, Inc.
P.O. Drawer K
Crownpoint, NM 87313

Dear Mr. O'Neal:

It was a pleasure to discuss research possibilities with you several weeks ago. Dr. Harold R. Crawford, my co-major professor, has also informed me that he has conversed with you over the telephone concerning our proposed research study. I simply wanted to write this letter to reiterate our intention to conduct this needs assessment study and to ensure that we agree, at least in principle, on the nature of the study and how it will be made possible.

The purpose of the study will be to identify, validate, and prioritize post-secondary agricultural training needs in the New Mexico portion of the Navajo Nation. The study is to be designed, conducted, analyzed, and reported by the researcher. The Navajo Skill Center, as the sponsor of the study, will provide the researcher with travel from Ames, Iowa, to Crownpoint, New Mexico; provide travel for on-site data collection; provide meals and lodging for approximately four weeks; and provide travel from Crownpoint, New Mexico, back to Ames, Iowa.

The tentative schedule for the research activities is as follows:

<table>
<thead>
<tr>
<th>Activities</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Develop research proposal</td>
<td>July 1985</td>
</tr>
<tr>
<td>2. Develop data collection instruments</td>
<td>July 1985</td>
</tr>
<tr>
<td>3. On-site data collection</td>
<td>August-September 1985</td>
</tr>
<tr>
<td>4. Analysis of data</td>
<td>October-January 1986</td>
</tr>
<tr>
<td>5. Preliminary report (optional)</td>
<td>April 1986</td>
</tr>
<tr>
<td>6. Final research report</td>
<td>August 1986</td>
</tr>
</tbody>
</table>

We will try our best to make it a meaningful study for your use in program development. We are currently working on development of the research proposal and data collection instruments.
We welcome your ideas and suggestions at any time so please feel free to contact us. Your agreement to sponsor the study is greatly appreciated.

Sincerely,

Johnson Bia
Research Assistant
Department of Agricultural Education

Harold R. Crawford
Assistant Dean
College of Agriculture
July 12, 1985

Mr. Butch O'Neal, President
Navajo Skill Center, Inc.
P.O. Drawer K
Crownpoint, NM 87313

Dear Mr. O'Neal:

Enclosed is a draft of my dissertation proposal. Please review it and let me have your input as soon as possible. In particular, let me have a feedback on the specific objectives of the study. Your insight and input will help strengthen this study and make it meaningful for your use.

Your help is greatly appreciated.

Sincerely,

[Signature]

Johnson Bia
Research Assistant
Department of Agricultural Education

bib
Enclosure
August 26, 1985

Mr. Donald Dodge,
Agency Superintendent
Bureau of Indian Affairs
P.O. Box 966
Shiprock, NM 87420

Dear Mr. Dodge:

The Crownpoint Institute of Technology, Navajo Community College—Shiprock Campus and Iowa State University are planning to conduct a study to determine agricultural needs of the Navajo people in the New Mexico portion of the Navajo Nation. The proposed study has implications for educational program planning and it will include a survey of a random sample of livestock/grazing permittees in the region.

This letter is a request for permission to utilize the Branch of Land Operation's records of grazing permittees as a source of names and addresses. Your favorable consideration of this request will be greatly appreciated.

Sincerely,

Johnson Bia
Research Assistant
Mr. Johnson Bia  
Iowa State University  
Department of Agricultural Education  
201 Curtiss Hall  
Ames, Iowa 50011

Dear Mr. Bia:

This letter is to serve as acknowledgement and receipt of your inquiry which has been classified as a Freedom of Information Act request, and will be processed in accordance with procedures contained in 43 CFR, Subpart B.

Once a review of the documents has been made, a response regarding your FOIA request will be forthcoming. A determination whether to grant or deny the release of the documents will be made no later than September 16, 1985. Should any delays or extension of time be required, you will be so advised.

Questions relating to your request may be directed to Francis C. Boyer at (505) 368-4317.

Sincerely,

Superintendent
Mr. Johnson Bia
Iowa State University
Department of Agricultural Education
201 Curtiss Hall
Ames, Iowa 50011

Dear Mr. Bia:

Reference Freedom of Information Act request of August 26, 1985, this letter is in response to your letter in which you requested access to the Shiprock Agency Branch of Land Operations's records of grazing permittees as a source of names and addresses to survey and determine agricultural needs of the Navajo people.

After careful review of the documents requested access to, specifically grazing permits, we have determined that the information is not available. Grazing permits do not have an insertion for addresses. Therefore, utilization of records of grazing permittees as a source for addresses is not feasible. A sample of the grazing permit is attached.

As you are aware, Bill of Sales or Transfer Agreements of grazing permits may sometimes indicate addresses of permittees, but is not indicated on all of the documents in existence. In a few cases, we have listed addresses only for our internal purpose of notifying applicants when their sales or agreements are completed. Again, this type of information is only available on a few of the most recent sales or transfer agreements. These documents would not provide you with a reliable sample since not all grazing permits are transferred or sold. Also, mailing addresses of Navajos change frequently and the few addresses available may be outdated and inaccurate.

You must understand that our limited listing of addresses will not give you a reliable sample of all livestock/grazing permittees in this Agency. It will only provide you with a portion of the permits that were sold or transferred, and if utilized may affect the validity of your study. In addition, our addresses may be outdated and will cost you postage fees if inaccurate.

We hope you will understand this situation and reconsider the approach which you have established to gather information to determine the agricultural needs of the Navajos in this Agency.
This letter is not an official denial of your request for access, but serves as an informal communiqué before the issue is pursued formally. Please call Marisa Greens on 505/863-9501, extension 301, for further information or questions.

Sincerely,

[Signature]

Ass. Area Director

Attachment
**Grazing Permit Bill of Sale and Transfer Agreement**

THIS IS TO CERTIFY that in consideration of ______________ Dollar ($ __________) receipt of which is hereby acknowledged, I, __________________________, NAME OF GRANTOR, CENSUS NO. __________,
do hereby grant, sell, transfer, assign and deliver to __________________________, NAME OF GRANTEE, CENSUS NO. __________,

_____________________ sheep units, including ___________________ horses from my current grazing permit to be grazing in the District Named above.

### Grazing Permit Data Before Transfer

<table>
<thead>
<tr>
<th>Name</th>
<th>Census No.</th>
<th>Permit No.</th>
<th>Date Issued</th>
<th>No. Sheep Units</th>
<th>No. Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grantor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grantee:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Grazing Permit Data For New Permits

<table>
<thead>
<tr>
<th>Name</th>
<th>Census No.</th>
<th>Brand</th>
<th>No. Sheep Units</th>
<th>No. Horses</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grantor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grantee:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WITNESS TO GRANTOR’S SIGNATURE: ____________________________ DATE: ____________

WITNESS TO SPOUSE’S SIGNATURE: ____________________________

WITNESS TO GRANTEE’S SIGNATURE: ____________________________ DATE: ____________

Recommendation: ____________________________

Concur: ____________________________

CHAIRMAN, DISTRICT GRAZING COMMITTEE: ____________________________ DATE: ____________

Branch of Credit: ____________________________

Approved: ____________________________

SUB-AGENCY SUPERINTENDENT: ____________________________ DATE: ____________

GRANTEE: ____________________________
NAVAJO TRIBE
GRASSING FORM NO. 6-83-1H

<table>
<thead>
<tr>
<th>(CENSUS NO.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(NAME)</td>
</tr>
</tbody>
</table>

Assigned Brand

Date Issued

Permit No.

Sheep Units

Horses Permitted, Totaling

Sheep and Other Livestock Permitted

Total Permitted

Season

of Use

This District

Elsewhere and Dates

PERMIT CONDITIONS

BY AUTHORITY of law and pursuant to the regulations in Part 72-Navajo Grazing Regulations, Title 25 C. F. R. and amendments thereto, the above-named Indian is hereby granted permission to hold and graze the number and kind of livestock as specified above on the Navajo Reservation for the time and in the district or districts as stated above and thereafter until further notice, subject to compliance with the Range Management Plan for the district or districts and any changes made in accordance with and pursuant to the said Grazing Regulations as amended.

This permit shall not be assigned, sublet, or transferred except as provided in said Grazing Regulations.

The Superintendent shall make decisions relative to the interpretation of the terms of this permit and enforcement of Grazing Regulations.

Done at the Navajo Agency on this... day of

Sub-agency Superintendent

United States
Department of the Interior
Office of Indian Affairs

Navajo Reservation
Window Rock, Arizona

[20 F. R. 2895]
September 18, 1985

Mr. Butch O'Neal, President
Crownpoint Institute of Technology
P.O. Drawer K
Crownpoint, NM 87313

Dear Mr. O'Neal:

This letter is simply to update you on the progress of our needs analysis study.

I finally received a written denial from the Shiprock B.I.A. in my attempt to get names and addresses of agricultural producers in that agency. Accordingly, the Navajo Community College has withdrawn its financial support for the study. But I do have over 2,280 names and addresses for agricultural producers in the Eastern Navajo Agency. This translates into a less extensive but more intensive study which focuses only on the Eastern Navajo Agency.

At this time, I am synthesizing the information I had collected during my visit out there four weeks ago. Revisions are also being made in the research structure and survey forms to reflect the changes mentioned above. The revisions will then have to be approved by the dissertation committee because it involves a change in the scope of the study. Although approval of the revisions won't be a problem, it does tend to be a slow process.

If you have any questions or comments, please let me know.

Sincerely,

[Signature]

Johnson Bia
Research Assistant
Department of Agricultural Education
February 6, 1986

Mr. Butch O'Neal, President
Crowpoint Institute of Technology
P.O. Drawer K
Crowpoint, NM 87313

Dear Mr. O'Neal:

Enclosed is a draft copy of the survey form which will be used to gather the information for our needs analysis research. As you will recall, the primary purpose of this study is to establish an empirical base for program development in agricultural education. The other consideration in this study is to arrive at a balance between basic needs assessment and research which employs advanced statistical procedures to analyze the data (which are expected of dissertation research).

I started out with a twelve page questionnaire which covered many areas. Since then I have been trying to simplify it and reduce it to about five or six pages. Please review the enclosed materials and feel free to comment on any aspect of the survey form or the research questions. Particularly, keep in mind the education level of the respondents and their mind-set in interpreting and responding to the questions.

I have been in contact with the Branch of Land Operations and the Extension Service in an effort to arrange a series of meetings as an alternative to using mail questionnaires. If these meetings can be arranged, then the mail questionnaires will not be used and the format of the survey forms will be slightly modified to accommodate the changes. The meetings may take place during the latter part of March.

Thank you very much for your support.

Sincerely,

Johnson Bia
Research Assistant

Enclosures
February 17, 1986

Dear Elected Navajo Leader:

The Department of Agricultural Education at the Iowa State University and the Crownpoint Institute of Technology are jointly conducting a study to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. As part of the study, several half-day meetings (between 6 and 10 meetings) are being planned for different locations throughout the Eastern Navajo Agency. The meetings are being planned for March 17 - April 2, 1986, and they will consist of an educational program in range and livestock management followed by information gathering from program participants.

What we would like to know is whether or not your Chapter would like to host one of these meetings. The primary consideration in hosting a meeting is that many local livestock producers be informed and invited to attend the meetings so we can have broad-based input. The educational program will be arranged entirely by the Iowa State University, New Mexico Extension Service, and the Branch of Land Operation.

Please let me know by March 5, 1986, whether your Chapter would like to host one of the meetings or not. I can be reached at:

Johnson Bia
Department of Agricultural Education
201 Curtiss Hall
Iowa State University
Ames, Iowa 50011
(515) 294-5872 Business
(515) 296-8514 Home

Or, you may contact Mr. Harold Cayaditto at the Crownpoint Branch of Land Operation office (786-5319 or 786-5224) and let him know of your plans. Thank you very much for helping us make this study possible.

Sincerely,

Johnson Bia
Research Assistant
Dear Navajo Agriculturalist:

Land, water, livestock, farming and people resources are the fundamental basis for the Indian heritage. The development of these resources is not an easy task. It requires an in-depth understanding of the agricultural situation on Indian reservations and making plans accordingly. The first step in developing a plan, however, requires knowing what you are planning for — knowing what problems exist, why they exist, and what can be done to improve the situation.

The Department of Agricultural Education at the Iowa State University and the Crownpoint Institute of Technology are jointly conducting a study to determine the need for postsecondary and adult agricultural education (training) programs in the Eastern Navajo Agency. We need your help. We would like to have you complete the questionnaire in order to help us identify the agricultural needs in your community and to share with us your beliefs about the agricultural situation in the Eastern Navajo Agency. Finally, we would like to know how interested you might be in participating in an agricultural education program if it should be offered in the Eastern Navajo Agency.

Don’t worry, the information you provide will be kept strictly confidential and the results will be reported only in group summary form. The information you provide will be combined with information obtained from other people in the group. All survey forms will be destroyed upon analysis of the data.

If for any reason you do not wish to participate in the study, please return the blank survey form. We thank you very much for helping us get a better understanding of the agricultural situation in the Eastern Navajo Agency.

Sincerely,

Johnson Bia
Research Assistant

Robert A. Martin
Major Professor

Harold R. Crawford
Assistant Dean and Major Professor
ANALYSIS OF NEEDS: ADULT AND POSTSECONDARY AGRICULTURAL EDUCATION IN THE EASTERN NAVAJO AGENCY

A Study Conducted By

Johnson Bia
Department of Agricultural Education
201 Curtiss Hall
Iowa State University
Ames, Iowa 50011
1986

And Funded By

Crownpoint Institute of Technology
P.O. Drawer K
Crownpoint, New Mexico 87313
ANALYSIS OF NEEDS: ADULT AND POSTSECONDARY AGRICULTURAL EDUCATION IN THE EASTERN NAVAJO AGENCY

Note: The Iowa State University and the Crownpoint Institute of Technology are jointly conducting this study to determine the need for adult and postsecondary agricultural education in the Eastern Navajo Agency. The terms "agricultural education" and "agricultural training" are used interchangeably in this study.

PART A. Agricultural Needs and Education

DIRECTIONS: This part of the survey is designed to identify perceptions of need related to agriculture and education.

1. Please indicate to what extent you agree or disagree with the following statements by circling your responses.

Perceptions on Navajo Agricultural Production
A. I produce quality livestock comparable to most non-Navajo producers in the area. 1 2 3 4 5 ?
B. I would like to adopt new agricultural practices. 1 2 3 4 5 ?
C. Navajo producers are jealous of one another's successes. 1 2 3 4 5 ?
D. There are many job opportunities in agriculture in the Eastern Navajo Agency. 1 2 3 4 5 ?
E. There are many business opportunities in agriculture in the Eastern Navajo Agency. 1 2 3 4 5 ?

Perceptions on Agricultural Training
F. Agricultural training should be offered at the Crownpoint Institute of Technology. 1 2 3 4 5 ?
G. Agricultural training should be offered at the community level in the Eastern Navajo Agency. 1 2 3 4 5 ?
H. Agricultural training should be offered primarily for job training. 1 2 3 4 5 ?
I. Agricultural training should be offered primarily for local Navajo producers. 1 2 3 4 5 ?
J. Agricultural training should be offered primarily for transferable college credits. 1 2 3 4 5 ?
K. Agricultural training should include remediation in basic skills (reading, writing, math). 1 2 3 4 5 ?
L. Even if agricultural training was offered, agricultural practices will not change. 1 2 3 4 5 ?
2. Which of the following alternatives would help you the most in making improvement to your range livestock production? Please RANK the three most helpful alternatives. Write a 1 beside the alternative which would be most helpful to you; write a 2 beside the next most helpful alternative; and write a 3 beside the third most helpful alternative.

[___] If you feel no improvement is needed, place a check mark (✓) inside the box and skip to Questions #3 below.

   A. technical knowledge in range management
   B. technical knowledge in livestock production
   C. business management skills (Ex: maximizing profit)
   D. available and sufficient credit (Ex: loans)
   E. access to alternative markets
   F. access to more land
   G. establishing a cooperative
   H. changes in existing land-use policies
   I. other: ___________________________

3. From what source(s) do you receive new information about livestock production and/or range management? The source may include people you go to for help when you have a question or a problem related either to livestock production or range management. Check (✓) all that apply.

   A. none
   B. family members/relatives
   C. friends/other ranchers
   D. newspapers/magazines
   E. New Mexico Extension Service
   F. sales people
   G. radio
   H. television
   I. Branch of Land Operations
   J. Navajo Tribe Department of Agriculture
   K. vocational agriculture teacher
   L. other ___________________________

4. Would you participate in an agricultural training program if it was offered in the Eastern Navajo Agency? Check (✓) only one response.

   A. Definitely yes, (If yes, answer all remaining questions)
   B. Probably yes, (If yes, answer all remaining questions)
   C. Undecided, (If undecided, answer all remaining questions)
   D. Probably not, (If not, skip to Part B on page 4)
   E. Definitely not, (If not, skip to Part B on page 4)
5. What topics are you interested in? Please rate your level of interest in learning more about the following topics by circling your responses.

| A. Grazing systems (conventional systems, Holistic Resources Management) | 1 2 3 4 5 ? |
| B. Land Measurements (surveying, land areas, legal descriptions) | 1 2 3 4 5 ? |
| C. Range management Practices (reseeding, range vegetation, fences) | 1 2 3 4 5 ? |
| D. Watershed Management (water-harvesting, erosion control, conservation) | 1 2 3 4 5 ? |
| E. Crop Production Practices (planting, cultivating, harvesting) | 1 2 3 4 5 ? |
| F. Fertilizers & Pesticides (calibration, application, safety precautions) | 1 2 3 4 5 ? |
| G. Drip Irrigation Farming (intensive crop production on small acreages) | 1 2 3 4 5 ? |
| H. Horticulture (greenhouse, gardening, turf installation, landscape design) | 1 2 3 4 5 ? |
| I. Livestock Production Practices (vaccinating, dehorning, castrating, shearing, implanting) | 1 2 3 4 5 ? |
| J. Livestock Chemicals (calibration, application, safety precautions) | 1 2 3 4 5 ? |
| K. Livestock Selection (desirable and undesirable traits) | 1 2 3 4 5 ? |
| L. Breeds of Livestock (breeds and characteristics of breeds) | 1 2 3 4 5 ? |
| M. Herd Improvement (breeding programs, sire testing, replacement stock) | 1 2 3 4 5 ? |
| N. Livestock Feeds & Feeding (feedstuff, feed content, buying feed, feeding) | 1 2 3 4 5 ? |
| O. Livestock Health (diseases, sicknesses, and prevention) | 1 2 3 4 5 ? |
| P. Facilities Design & Construction (basic carpentry, welding, blueprints) | 1 2 3 4 5 ? |
| Q. Marketing Strategies (market options, prices, timing) | 1 2 3 4 5 ? |
| R. Agricultural Machinery Maintenance (maintenance and repair of equipment) | 1 2 3 4 5 ? |
| S. Agricultural Machinery Management (rental cost, purchase cost, depreciation, capacities) | 1 2 3 4 5 ? |
| T. Agribusiness Management (budgeting, records, plans/schedules, decision-making) | 1 2 3 4 5 ? |
| U. Computers in Agriculture (spreadsheets, data storage/retrieval, word processing) | 1 2 3 4 5 ? |
V. Navajo Water Rights - legal issues & implications
W. Establishing Producers Cooperatives
X. Navajo Grazing Regulations (Navajo Tribe and 
   BIA-BLO policies)
Y. Project Proposals related to agricultural 
   improvements
Z. other: ___________________________________________________________________
   1 2 3 4 5

4. If agricultural training was offered, what type of educational meetings 
would you prefer to attend? Check (√) all that apply.

   Workshops and Seminars (1-2 days each)
   A. once every month
   B. once every 3 months
   Short Courses (1-2 weeks each)
   C. once every 6 months
   D. once every year
   Regular Semester Courses (3 months each)
   E. 1-5 hours every week
   F. 6-10 hours every week

   Other preferences (please specify): ___________________________________________________________________

PART B. Description of Navajo Producers

DIRECTIONS: This portion of the survey will be used to provide general 
information about agricultural production and Navajo producers in the 
Eastern Navajo Agency. In some cases you need to write the requested 
information on the blank lines while in other cases you need to place a 
check mark beside your response(s).

1. Which of the following properties are owned by your family? Please 
write the information on the blank lines.

   A. range land: _______ acres
   B. farm land: _______ acres
   C. sheep: _______ head
   D. goats: _______ head
   E. cattle: _______ head
   F. horses: _______ head
   G. donkeys/mules: _______ head
2. Which of the following activities do you do in connection with your livestock production? Check (✓) all that apply.

   A. dip or spray  I. purchase sires
   B. castrate       J. purchase breeding stock
   C. vaccinate      K. keep records
   D. deworm        L. hire labor
   E. dehorn        M. treat pink-eyes
   F. hot-iron brand N. implant growth hormone
   G. buy feed      O. other:__________________________
   H. haul water

3. What do you do with the livestock you raise? Check (✓) all that apply.

   A. use for food
   B. use for bartering (exchange for other products)
   C. sell to traders/storekeepers
   D. sell at auctions/sales
   E. use for social/religious obligations
   F. other:__________________________

4. Please estimate your last year's income from the sale of agricultural products (livestock, wool, mohair, crops, etc.) and write the amount on this line: $____________

5. Please estimate your household's total income last year from all sources and write the amount on this line: $____________

6. What is your present occupational status? Check (✓) only one response.

   A. Employed, part-time
   B. Employed, full-time
   C. Unemployed, looking for work
   D. Unemployed, not looking for work
   
   If you are employed, who (name of company or individual) is your employer?________________________________________

7. What is your sex? Check (✓) only one response.

   A. Female
   B. Male

8. What is the highest level of education you have completed? Please write the grade level or degree attained on the blank line:__________________________

9. What is your age?____________

** THANK YOU VERY MUCH FOR YOUR HELP AND PLEASE STAPLE OR TAPE THE FORM SO IT WILL NOT OPEN. DROP IT IN ANY MAILBOX AND THE POSTAGE IS PREPAID. NO STAMP IS REQUIRED.**

   Code Number:____  ______
   (Researcher's use only)
Phases for a Major Program

1. ORGANIZATIONAL AND INDIVIDUAL COMMITMENT

2. SITUATIONAL ANALYSIS

3. BROAD PROGRAM OBJECTIVE

4. IDENTIFICATION OF RESOURCES AND SUPPORT

5. PROGRAM DESIGN

6. INSTRUCTIONAL DESIGN

7. ACTION
   (Calendar of events and activities)

   January — December

   Learning opportunity
   - Time
   - Specific objectives
   - Target clientele
   - Planned learning experiences
     - Content:
       - Introduction
       - Body
       - Summary
     - Instructional resources:
       - Methods
       - Techniques
       - Devices
     - Evaluation

8. PROGRAM'S VALUE

9. COMMUNICATION OF RESULTS

Boyle (1981, p. 185)
INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH
IOWA STATE UNIVERSITY

(Please follow the accompanying instructions for completing this form.)

1. Title of project (please type): "ANALYSIS OF NEEDS: ADULT AND POSTSECONDARY AGRICULTURAL EDUCATION IN THE EASTERN NAVAJO AGENCY"

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

   Johnson Bla
   Typed Name of Principal Investigator Date 12056  Johnson Bla

   201 Curtiss Hall, ISU 294-5872
   Campus Address Campus Telephone

3. Signatures of others (If any) Date Relationship to Principal Investigator

   H.R. Crawford
   Major Professor
   Albrecht Martin
   Major Professor

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

   □ Medical clearance necessary before subjects can participate
   □ Samples (blood, tissue, etc.) from subjects
   □ Administration of substances (foods, drugs, etc.) to subjects
   □ Physical exercise or conditioning for subjects
   □ Deception of subjects
   □ Subjects under 14 years of age and/or □ Subjects 14-17 years of age
   □ Subjects in institutions
   □ Research must be approved by another institution or agency

5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.

   □ Signed informed consent will be obtained.
   X □ Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted: Month Day Year 02 27 1986
   Anticipated date for last contact with subjects: Month Day Year 05 15 1986

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and/or identifiers will be removed from completed survey instruments: Month Day Year 07 04 1986

8. Signature of Head or Chairperson Date Department of Administrative Unit

9. Decision of the University Committee on the Use of Human Subjects in Research:

   □ Project Approved  □ Project not approved  □ No action required

   George G. Karas 211380
   Name of Committee Chairperson Date Signature of Committee Chairperson