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An Assessment of Agriculture and Natural Resource Extension Program Needs on American Indian Reservations in Idaho, Nevada, Oregon, and Washington

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Abstract: This article summarizes the results of a needs assessment involving American Indians and outreach professionals on reservations in Idaho, Nevada, Oregon and Washington. The survey featured 36 questions about agricultural and natural resource issues that may pose challenges on reservation lands. A comparison between reservation residents and outreach professionals indicates that issue perceptions differ significantly for 23 of the 36 issues. Acknowledging these perceptual differences can help Extension to identify program gaps and opportunities with tribal nations. It can also increase Extension's appreciation for cultural diversity, thereby improving its capacity to execute its outreach mission on American Indian reservations.

Introduction

Previous research published in the *Journal of Extension* has addressed the lack of effective and sufficient Extension programs that target American Indians, particularly those bound by reservations (Hiller, 2005; Emm & Breazeale, 2008; Hart, 2006). These indicate that a better understanding of Indian culture, including tribal leadership and reservation environments, can improve the capacity of Extension to work more collaboratively and effectively with tribal nations.

Additional needs assessment research involving Indian producers on reservations in the western U.S. supports this argument (Emm & Singletary, 2009; Lewis, Breazeale, & Emm, 2002). This research indicates that both American Indian producers and Extension professionals perceive there are major obstacles to the adoption of sustainable agricultural and natural resource management practices on reservations.

Although the exact nature of the obstacles remains unclear, the perception that obstacles exist suggests that in order to work effectively with American Indians and tribal governments, Extension professionals must understand and appreciate Indian culture, socioeconomic situations, and political attributes unique to individual reservations (Emm & Singletary, 2009). Others have described this task as simply making more of an effort to understand another culture's "way of knowing" rather than assuming that an expert-driven educational model is always best (Hassel, 2004). It has been argued that Extension's future relevance to diverse cultural groups, including American Indians, depends on Extension professionals' awareness and appreciation for cultural diversity. Only then can Extension and the land-grant university fully execute its outreach mission (Hassel, 2007).

Methods

This article describes needs assessment research conducted between 2005 and 2007, using data collected from interviews with individuals living on the 10 largest American Indian reservations in Idaho, Nevada, Oregon, and Washington. The survey targeted Indian agricultural producers, elected tribal government officials, and tribal leaders, among other tribal members. An identical survey was made available via the Internet to Extension and other outreach professionals conducting agricultural and natural resource programs on Indian reservations. The purpose of the study was to compare perceptions between individuals living on Indian reservations and outreach professionals working on reservations in order to identify potential program gaps that exist on these reservations.

Two surveys with identical questions targeted two different sample populations on the 10 largest reservations in Idaho, Nevada, Oregon, and Washington. Data were collected through face-to-face interviews with Indians living on these reservations. Hand-written questionnaires were used to record the survey data. Completed questionnaires were returned to the Extension or similar outreach program office located on each reservation. An identical survey was delivered via Internet to agricultural and natural resource outreach professionals working on Indian reservations. This target population included employees of Extension (including the Federally Recognized Tribe Extension Program or FRTEP), Natural Resource Conservation Service, and Farm Service Agency within the four-state study area.

The purpose of conducting two surveys was to: 1) identify and assess the perceived agricultural and natural resource outreach program needs of Indian reservation residents and outreach professionals who are charged with conducting Extension and similar outreach educational programs on Indian reservations in the four-state study area and 2) compare the relative importance of perceived needs between the two groups. For the purpose of the study, a set of 36 survey items was developed to assess agricultural and natural resource issues on reservations, thus identifying potential outreach program opportunities. Each question used a five-point

equal weighted Likert-type scale. Survey questions were developed to blend elements of agricultural and natural resource issues with issues pertinent to American Indian tribal governance, culture, and reservation environments (Ahmadvand, 2009; Emm & Singletary, 2009; Hassel, 2007, 2004; Singletary, Clinehans, & Goodyear, 2003; Theodori, 2001).

A draft of the questionnaire was pre-tested by subsets of the targeted survey population. That is, the questionnaire was pre-tested by a panel of seven Extension outreach faculty in Nevada and nine officers of the Indian Agriculture Council and selected American Indian tribal officials. These individuals were later omitted from the study sample. The purpose of the pre-test was to identify missing items, evaluate content validity, and to check for clarity and comprehension of question items. The questionnaire was revised based upon the pre-test results.

Results and Discussion

Completed interview and Internet survey questionnaires served as the data sources for the study. The data were analyzed utilizing the Statistical Package for Social Sciences (SPSS, Version 16.0) for Windows XP. Cronbach's coefficient alpha (CCA) was used to estimate internal consistency of the 36 Likert-type scale items for each survey group. The Cronbach score for the 36 items was high for both groups (reservation respondents, $r = .964$; outreach professionals, $r = .943$). These scores indicate that, regardless of the survey population, there was high internal consistency among variables (Carmines & Zeller, 1979).

The majority of reservation respondents who completed this survey ($n = 278$) live on American Indian reservations in Washington (64.5%). This was followed by Nevada (20.7%), Idaho (8.3%), and Oregon (6.5%). By order of descending number of survey respondents, reservations represented in the results are: Colville; Walker River; Duck Water; Coeur d'Alene; Warm Springs; Pyramid Lake; Umatilla; Yakima, Nez Perce, and Fort Hall. The majority of reservation respondents were American Indian (84.2%), while 13.4% were white, 1.2% were Latino, and 1.2 were "other." Also, the majority of reservation respondents (69.6%) were over 40 years of age, while 14.1% were between 31 and 40 years, and 16.3 were less than 30 years old. The majority of respondents (44.3%) reported having lived on a reservation for 26 to 50 years while 41.5% reported 25 years or less, and 14.2% reported 51 or more years.

There was no way to determine the precise population of the study because the investigators had little control over the distribution of the surveys to the intended group of respondents. The surveys were distributed by volunteers on each reservation who were provided instructions regarding who was to receive the survey. It is assumed that each of volunteers distributed the surveys as instructed. Similarly, the surveys were distributed by agency directors to outreach professionals in the four-state area who were provided instructions regarding who was to receive the survey.

In examining the Internet survey results for outreach professionals ($n = 214$), the majority who responded reported they worked in Idaho (43.5%), followed by Nevada (29.4%), Washington (18.6%), and Oregon (8.5%). The majority of respondents (63.4%) worked for Farm Service Agency, while 24.6% of the survey respondents worked for Extension, which includes the Federally Recognized Tribes Extension Program (2.2%), and 9.8% worked for Natural Resource Conservation Services.

With regards to perceptions of agricultural and natural resource issues on Indian reservations, survey respondents were asked to rate the extent to which the issues presented were a concern, using a scale of 1 being *not a concern* to 5 being a *major concern*. Table 1 illustrates a comparison between the two survey populations of ranked mean scores for the 36 question items. Ranked means are presented for the Indian respondents from highest to lowest, with the mean score for the professionals for that same item listed alongside for comparative purposes.

These results indicate that with regards to agricultural and natural resource management issues on Indian reservations, reservation respondents ranked the majority of the 36 issues differently from outreach professionals. Further, a t-test of independent samples was conducted and revealed that differences between the two groups' mean scores were statistically significant ($p < .05$) for 23 of the 36 issue items. The t-test of independent samples was chosen rather than the nonparametric analog. Parametric tests of statistical significance, such as the t-test and F tests, are robust even when assumptions for such tests are not met (Glass, Peckham, & Sanders, 1972). Indeed, they are slightly more robust when normal or approximately normal distributions are present. In the study, the distribution of both groups was approximately normal on responses to the questions reported in this study. In addition, homogeneity of variance for the groups was present. Actual probabilities of a Type I error are reported in both tables.

In Table 1, reservation respondents ranked as their top concern, *preventing wildfire on reservations*. In contrast, outreach professionals ranked this item 14th. Similarly, reservation respondents ranked as fifth *responding to wildfire on reservations*, while professionals ranked this item 15th. And outreach professionals rated *riparian area management on reservations* as their second concern, whereas reservation respondents rated this item ninth. Looking at some of the top ranked items for outreach professionals, *create sustainable agriculture plan for reservations*, ranked as third, whereas reservation respondents ranked this item 10th. Additionally, outreach professionals ranked as fifth *ability of reservation farm families to pay bills*, while reservation respondents ranked this item 19th.

The two groups ranked several items similarly, and these should be noted. *Invasive weed control* ranked among the top three concerns for both groups and was the top concern for outreach professionals. Reservations respondents ranked *conflict among tribal government officials* as their second concern, while outreach professionals ranked this as fourth. Reservation respondents ranked *lack of organization among tribal governments* as fourth, whereas outreach professionals ranked this concern as sixth.

Table 1.
Perceived Agricultural and Natural Resource Concerns on Reservations: Ranked Mean Scores for Reservation Respondents Compared with Outreach Professionals

Agricultural and Natural Resource Concerns on Reservations	Reservation Respondents			Outreach Professionals			Mean Diff.	Prob.	df
	Rank	Mean	N	Rank	Mean	N			
Preventing wildfire on reservations	1	4.02	267	14	3.35	184	.675 ^a	.000	449
Conflict among tribal government officials	2	3.99	267	4	3.67	187	.319 ^a	.003	452
Invasive weed control	3	3.97	269	1	3.90	187	.063	.560	454
Lack of organization among tribal governments	4	3.95	270	6	3.50	187	.445 ^a	.000	455
	5	3.93	261	15	3.28	184	.652 ^a	.000	443

Responding to wildfire on reservations									
Lack of leadership among tribal governments	6	3.92	270	14	3.35	187	.575 ^a	.000	455
Water quality management on reservations	6	3.92	263	4	3.67	184	.255 ^a	.025	445
Availability of loans to American Indians to buy reservation land	7	3.86	266	25	3.00	185	.857 ^a	.000	449
Riparian area management on reservations	9	3.74	259	2	3.72	184	.020	.857	441
Tribal support of individual/family business	8	3.73	260	7	3.49	185	.244 ^a	.030	443
Availability of loans to American Indians to develop/expand reservation farms	10	3.69	267	23	3.04	185	.650 ^a	.000	450
Create sustainable agriculture plan for reservations	10	3.69	264	3	3.69	185	.006	.953	447
Parental support of reservation youth involved in agriculture	11	3.68	266	9	3.46	185	.221 ^a	.045	449
Availability of water for irrigated agriculture	12	3.59	264	13	3.38	184	.212	.090	446
Tribal government support of reservation youth involved in agriculture	13	3.58	266	9	3.46	185	.116	.312	449
Tribal support of agriculture	14	3.56	263	8	3.47	185	.089	.441	446
Increase use of NRCS programs	15	3.53	257	16	3.25	185	.276 ^a	.009	440

Availability of loans to American Indians to buy farm equipment	16	3.52	264	21	3.11	185	.407 ^a	.000	447
Grazing land previously burned by wildfire	17	3.50	266	18	3.22	184	.273 ^a	.013	448
Cost of farm equipment	18	3.49	265	10	3.43	185	.060	.616	448
Livestock herd management practices	18	3.48	264	8	3.47	185	.015	.901	447
Wildlife management on reservation farms	18	3.48	264	17	3.24	184	.236 ^a	.038	446
Ability of reservation farm families to pay bills	19	3.47	263	5	3.56	185	-.085	.454	446
Improve access to agriculture Extension programs	20	3.45	261	17	3.24	185	.210 ^a	.054	444
Marketing American Indian alternative agricultural products	21	3.39	265	22	3.05	185	.338 ^a	.003	448
Marketing American Indian hay crops	22	3.38	262	29	2.82	187	.558 ^a	.000	447
Availability of veterinary services on reservations	23	3.37	263	20	3.12	185	.248 ^a	.036	446
Availability of farm loans for reservation youth	24	3.35	264	26	2.98	185	.370 ^a	.001	447
Marketing American Indian cattle	25	3.32	266	27	2.87	187	.457 ^a	.001	451
Quality of veterinary services on reservations	26	3.30	265	24	3.01	185	.296 ^a	.012	448
	27	3.29	262	12	3.40	185	-.106	.350	445

Time management skills of reservation farm families									
Farm families' abilities to manage finances	28	3.26	265	11	3.42	187	-.161	.149	450
Wild horse herd management on reservations	29	3.22	263	19	3.14	184	.081	.537	445
Costs of grazing (fees) livestock on reservations	30	3.18	265	30	2.71	187	.475 ^a	.000	450
Threat of BSE (Mad Cow) in United States	31	3.12	267	31	2.63	187	.489 ^a	.000	452
Potential for National Animal Identification System	32	3.01	267	28	2.86	187	.156	.148	452
Rating Code: 1 = Not a concern; 2 = Slight Concern; 3 = Neutral; 4 = Concern; 5 = Major concern ^a Statistically significant at p<.05									

The needs assessment included six additional items that measured perceived access to agriculture and natural resource education and information on Indian reservations. Ratings ranged from 1 being *poor* to 5 being *excellent*. In comparing mean scores between the two groups, rankings of access items were identical (Table 2). However, mean scores that Indian respondents assigned to education and information access were *much lower overall* than scores outreach professionals assigned to the same items.

Table 2.

Perceived Access to Extension and Outreach Education and Information on Indian Reservations: Ranked Mean Scores for Reservation Respondents Compared with Outreach Professionals

Access to Education and Information on Reservations	Reservation Respondents			Outreach Professionals			Mean Diff	Prob.	df
	Rank	Mean	N	Rank	Mean	N			
Access to NRCS programs	1	3.14 D ^o	273	1	3.68	213	-.542 ^a	.000	484
Access to University Extension	2	3.09 D ^o	267	2	3.46	213	-.370 ^a	.000	479

programs,									
Access to BIA programs	3	2.96 D°	268	3	3.55	213	-.591 ^a	.000	479
Access to Farm Service Agency programs	3	2.96 D°	268	4	3.36	213	-.398 ^a	.000	479
Access to colleges/vocational schools	4	2.90 ^b	268	5	3.20	213	-.303 ^a	.007	479
Access to state agriculture programs	5	2.76 D°	267	6	3.08	213	-.320 ^a	.001	478
Rating Code: 1 = Poor; 2 = Fair; 3 = Neutral; 4 = Good; 5 = Excellent ^a Statistically significant at p < .05									

Conclusions and Discussion

The research presented here provides important measured insight into agricultural and natural resource issues perceived to be of concern to individuals living on the ten largest American Indian reservations in Idaho, Nevada, Oregon, and Washington. Outreach professionals believed the five most important reservation issues were invasive weed control, riparian area management, planning for sustainable agriculture, water quality, and ability of farm families to pay their bills. These are the most likely issues professionals would invest resources in to provide outreach programs for reservation residents. In contrast, individuals living on reservations were most concerned about preventing wildfire, conflict among tribal officials, invasive weed control, responding to wildfire, and lack of organization and leadership among tribal leaders. Resource investments and outreach programs designed to address these issues are more likely to attract resident participation and result in positive impacts on reservation residents in this four-state area.

In terms of access to agricultural and natural resource programs, reservation residents perceived themselves to have less access overall than the outreach professionals who provide or work through these programs on reservation lands. These results illustrate the need to proactively market outreach programs to American Indians in ways that are more culturally accepted. This effort requires that Extension and other outreach professionals learn about and develop appreciation for the tribal cultures with which they work. It also requires Extension to learn about the social and political environment unique to a particular reservation, in addition to its physical environment, inclusive of agricultural and natural resource issues. The results also indicate the need to redesign outreach programs to facilitate ease of use, thereby increasing population coverage on reservation lands. These combined actions may help to improve perceived access to *and actual use of* Extension programs, federal conservation programs, and financial assistance available to agricultural producers and other land managers living on reservations.

These comparisons are useful to Extension and other outreach providers in planning, implementing, and evaluating agricultural and natural resource management programs on Indian reservations. Seeking to periodically measure and acknowledge that perceptual differences exist with regards to pressing agricultural and natural resource concerns can only serve to help Extension and land-grant universities more effectively prioritize and design educational programs that directly impact American Indians living on reservation lands. For those concerns that both groups ranked similarly, this information may help reservation producers, resource managers, and tribal leaders to approach, communicate, and work more effectively with Extension

in identifying consistent program goals to achieve sustainable agricultural and natural resource practices.

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