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Overview of Florida Agriculture and the Florida Research Program

William F. Brown, Assistant Dean for Research
University of Florida, Institute of Food and Agricultural Sciences

On behalf of Dr. Mike Martin, Vice President for Agriculture and Natural Resources within the Institute of Food and Agricultural Sciences at the University of Florida, I want to welcome you to Florida and to this annual meeting of the Research Center Administrators Society. I recently read an article which indicated that 44 states are currently experiencing budget reductions and many of the university systems within those states have either faced a recession or will be facing a cut in their budget next fiscal year. Like many of your states, Florida is also facing this fiscal reality. Our legislative session started a month early this year and is currently in session. Dr. Martin is in Tallahassee right now attending a Farm Bureau function and sends his regrets for not being able to be with you today.

As a faculty member, I was located at the Range Cattle Research and Education Center in Ona, Florida, and so I know that the leadership each of you provide in directing these important units is essential to the success of the land grant mission in each of your states. Over the next few minutes, I would like to provide you with a snapshot of agriculture in Florida and a brief description of some IFAS programs particularly focused on our Research and Education Centers.

Florida's Demographics and Agricultural Production

Florida is a growing state; the current population is approximately 16 million with estimates of over 20 million by 2025. Not only is the population increasing rapidly, but the demographics are changing. By 2025 it is estimated that over 25% of the population will be greater than 65 years of age. Also, the proportions of Hispanic and African American residents are expected to rise at a rapid rate. Thirty-five of the 67 counties in Florida touch the coastline, and this represents approximately 77% of the residents of the state. Fifty million visitors came to Florida in 2000.

In terms of land use in Florida, there are extensive, open, rural lands. Many people think that Florida is Disney World and Miami Beach, but once you move in from the coast, the land becomes quickly agricultural. Approximately 37% of the state is in commercial forest, most of it privately owned, with an additional 10% in national and state forest. About 22% of the state is urban with the remaining 30% in farm acres. Of this 30%, much of it is in range and woodlands and pasture with the remaining in vegetable fields, citrus groves and field crops.

In terms of farm numbers and farm acreage, the trends in Florida are probably similar to what you are seeing in your states. In 1940, there were approximately 62,000 farms in Florida while today there are approximately 40,000 farms; this number has been somewhat stable since the 1970's. Farm acreage has gone down from a high of approximately 18 million acres in the 1950's to approximately 10 million acres today. Of course, productivity has increased dramatically over this time.

Florida's most populous counties are also some of the most productive from an agricultural sense, and this complicates the mix of urban and agricultural uses with regard to water quantity and quality, natural resource issues, land use, etc. Several of these counties lead the nation in agricultural production. Sugar cane, sweet corn, beans, squash and the environmental horticulture industries are located in Palm Beach and Dade counties. Grapefruit and ferns are grown in heavily populated counties on the mid-Atlantic side of the state. Tropical fish and tomatoes are produced on the Gulf Coast side of the state.

Since the terrorist attacks in September 2001, agriculture has surpassed tourism as the leading economic indicator in the state. And just recently, the environmental horticulture industry has taken over as the state's leading agriculture sector. Florida generally ranks approximately 9th nationally in agricultural sales. Florida leads the nation in the production of 20 commodities. Florida leads the nation in citrus production, producing greater than 75% of the nations oranges and grapefruit. Florida ranks second nationally in vegetable and environmental horticulture production with the state producing approximately 20% of the nations fresh vegetables. Livestock sales account for approximately 20% of the state's farm sales. Florida is the leading milk producing state in the southeast, and there is a very large horse industry. There is also a large poultry industry with both broilers and layers.

Institute of Food & Agricultural Sciences
University of Florida

The Institute of Food and Agricultural Sciences, established in 1964, is the land-grant arm of the University of Florida. IFAS is led by a vice president who reports directly to the president of the University. All three legs of the land-grant mission fall under the IFAS umbrella. In addition, IFAS has partial responsibilities in the College of Veterinary Medicine and in an academic program residing in the College of Natural Resources and the Environment. Each of the three legs of the land-grant mission (teaching, research and extension) is led by a dean. The deans are also the directors, making them both programmatically and fiscally responsible for IFAS programs. There are 16 campus departments and 14 research and education centers located throughout the state.

One aspect of the Florida Research and Education Center (REC) system which may be different than that in many of your states is that teaching, research and extension faculty are located at the Centers. Approximately 40% of IFAS faculty are located at the Centers. Approximately one-half of the support staff is located at the Centers. Research and extension expenditures in terms of state and federal appropriated dollars per faculty FTE are approximately $188,000. Approximately 87% of that amount is faculty and support staff salary. Most of the remaining state and federal appropriated funds are used to keep the doors open (i.e., electricity, phone, diesel fuel, etc.) The Centers have additional expenses such as road maintenance, some building repair, etc. There are 2.8 FTE of support personnel per faculty FTE in research and extension at the Centers. Grant expenditures per faculty FTE were approximately $62,000 in 2000.

In terms of faculty appointments, there are no differences between faculty in departments and at the REC. REC faculty have split appointments in teaching, research and extension. REC faculty are affiliated with the academic department of their appropriate scientific discipline. Search and screen committees for faculty positions at the REC are coordinated between the REC and the academic department. The first line of responsibility for faculty at the REC is the Center Director. Tenure and promotion for REC faculty is through the academic department. In many cases, the annual evaluation for REC faculty includes the Center Director and the appropriate Department Chair.

A relatively new aspect of the REC in Florida is the inclusion of academic programs at some centers. Historically, faculty at the Centers maintained only an official research appointment, although they responded to extension requests from both producers and county agent faculty. In the late-1970's, formal extension appointments were added to some Center faculty. In the 1990's, academic programs were added to some REC's. These academic programs take many forms. Some have resident faculty with teaching appointments who are teaching classes at their Center which, in some cases, include distance capabilities beaming the class to other REC's and even the campus. Some REC's have video conferencing capability to receive classes and will have a faculty coordinator on site. Other REC=s offer less formal arrangements where individual classes are offered perhaps to graduate students.

Currently, resident degree granting academic programs are located at Milton, Apopka, Ft. Pierce, Ft. Lauderdale, Homestead and the newest addition at Hillsborough Plant City Campus. In all cases, programs are coordinated with a local community college. Several locations around the state have video conferencing capability whereby classes can be beamed to the location with a faculty member acting as a coordinator for the location. These sites include Apopka, Bradenton, Ft. Lauderdale, Ft. Pierce, Homestead, Immokalee and Lake Alfred. There are many academic program options including a Masters of Agriculture program using video conferencing and web applications in Agricultural Education and Communication and Food and Resource Economics. There are individual classes offered at REC's and certificate programs under development.

REC Review

In 2001, a team of land-grant personnel and stakeholders were appointed by the Vice President to review the Florida REC system. This included a macro-level analysis of system-wide issues with the following charge:

> Is the REC system positioned relative to the changing role of agriculture and natural resource industries in Florida?
>
> Are the three functions of teaching, research and extension linked between the REC's and the campus departments (is there state-wide programming)?
>
> Are there opportunities for consolidation?

The review team was divided into groups for visits to some of the REC's where they met with faculty, county faculty, clientele and legislative representatives. A framework was developed for the review team in a series of questions for consideration surrounding program evaluation, faculty evaluation, interactions among units and budgetary issues. In summary, the review team was charged with evaluating the strengths and weaknesses of the IFAS REC structure, to evaluate IFAS priorities for investment in the REC and to evaluate REC/campus collaboration for statewide programming.

Briefly, the review team found that there are multi-dimensional complex issues facing Florida's agriculture and natural resource industries, and this has a great impact on the IFAS mission and its goals. Also, the review team found a committed faculty and supportive stakeholders which, in part, is due to the presence of faculty at the REC. The review team felt that Florida FIRST should be a driver for future programming.

The review team also found the following challenges facing the REC system:

(1) A lack of long-range planning. In some cases, REC's have been developed in response to political influences rather than in response to the IFAS mission.
(2) A lack of sustainability. There is a $50 million deferred maintenance bill for IFAS.
(3) A definite need for a reorganization strategy. The current system is not sustainable.
(1) In some cases, there are opportunities for enhanced communication and coordination between campus departments and REC's in some program areas.
(2) In some cases, there was a feeling of competition among the Centers.
(3) Local, state and federal agency relationships should be enhanced.

Agricultural Advisory Committees - Important to Research[1]

Daniel W. Sweeney* and Jeffrey S. Pontius
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ABSTRACT

University faculty located and conducting research at off-campus agricultural research centers often are advised by committees representing agribusiness, producers and extension personnel. A two-page questionnaire was sent in 1996 to the directors, faculty and members of the advisory committees of three research centers each in Arkansas, Florida, Minnesota, Nebraska and Texas and two research centers in Kansas to assess opinions about the composition, structure, goals and effectiveness of agricultural advisory committees. All occupational groups surveyed felt that advisory committees can provide valuable input for agricultural research but were less convinced that they accomplish their goals. In general, research center directors, extension personnel and research faculty tended to be more reserved than agribusiness and producer respondents in their opinions on the performance of advisory committees. Respondents believed agricultural research advisory committees should comprise representatives of agribusiness, area producers, extension personnel and research faculty who are chosen by those groups, although research center directors did not support extension personnel or research faculty having a voice in the selection process. Committee members should serve a term of three to four years. Goals should be more defined and should help to identify needs and guide research by providing direction and focus, being an advocate for the research center and providing input on fund raising and management. Improved communication, more meetings with definite agendas and better attendance were identified to help improve the success of advisory committees. Overall, the potential for benefit is high, but agricultural advisory committees often are perceived as needing to improve their effectiveness. Consumers expect value for goods and services that they buy and expect these items to be relevant to their wants and needs. It is no different for agricultural research performed at university research facilities. "The land-grant university concept is premised on public support of research" (Lund, 1977). The success and continued support of agricultural programs at land-grant institutes may be crucial in avoiding or minimizing potential future budgetary reductions. Perhaps one of the best mechanisms to enhance visibility, relevance and support of agricultural research at land-grant universities, especially at off-campus research centers, is the use of agricultural advisory committees.

INTRODUCTION

In general, research advisory boards should be collaborative, supportive, and ongoing" and should "proactively encourage and foster research" (Aldag and Fuller, 1995). Forestry research advisory committees have been used in Canada to determine priorities and provide a bridge between the private sector, universities, provinces and the federal government (Winget, 1986). These committees provided a mechanism for defining client-user research needs while avoiding duplication of research. Even with some limitations experienced in Canada, such as multiple advisory committees within a province, Winget could not readily identify a valid alternative. Results from a survey by Whaley and Sutphin (1987) indicate that advisory committees for secondary agricultural education in California were regarded by committee chairpersons and the high school principals and teachers as "performing a moderately worthwhile function". More than 20 years ago in Kansas, questionnaires were mailed to county extension agents and their agricultural advisory committees to determine why those committees were not more

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effective (Williams, 1977). Suggestions for improving their utilization and effectiveness included committee member training, greater frequency of meetings and member involvement in program planning and activities.

The majority of the land-grant universities in the USA have off-campus agricultural research centers with the total number of research centers, experiment stations and substations exceeding 200 (CSRS, 1994). These centers conduct much of the applied agricultural research in the USA. Although the number of advisory committees that actually exist for these agricultural research centers is uncertain, the potential number is great. However, literature is lacking regarding the perception of advisory committees for agricultural research at off-campus research centers associated with land-grant universities. The objective of this study was to obtain opinions about the composition, structure, goals and effectiveness of agricultural advisory committees for research conducted at off-campus university research centers.

PROCEDURES

A two-page questionnaire was sent in 1996 to the directors, faculty and members of the advisory committees of three research centers in each of six states, with one exception. The six states were Arkansas, Florida, Kansas, Minnesota, Nebraska and Texas. All of the selected states, except for Kansas which only had two, had at least three research centers with agricultural advisory committees. In states with more than three research centers, the advisory committees used for the survey were selected at random.

The questionnaire consisted of several sections. The first section determined the occupational group of the respondent: agribusiness, producers, extension personnel, research faculty or the center director (i.e., the local representative of the university administration). The second section was designed to gain opinions about advisory committees in general, and the next section focused on opinions regarding the respondent's current advisory committee. The fourth section was aimed at the respondent's view on the types of individuals that should serve on advisory committees and who should choose those representatives. In that section, respondents were asked about internal, external and combined (containing both internal and external members) advisory committees. However, because most advisory committees likely resemble the combined committee, and for brevity, only the results of responses for the combined committee are shown. Furthermore, it may be meaningless to ask, for example, whether producers should be on internal-only committees or whether faculty should be on external-only committees. The last portion of the questionnaire, in contrast to the previous sections that were answered by use of a numerical scale, consisted of several open questions related to areas of improvement, goals and observations about advisory committees. A sample copy of a blank questionnaire can be obtained from the corresponding author.

Before mailing, the questionnaire was reviewed by the Kansas State University Institutional Review Board for compliance with federal policy for the protection of human research subjects. To maintain anonymity, questionnaire sheets were marked with a coded tag that was removed after reminder notices were sent several weeks after the initial mailing to those who had not returned their surveys. A total of 358 surveys were sent, and 151 were returned (42%). Of respondents, 38 were agribusiness representatives, 57 were producers, 12 were research center directors, 32 were from extension personnel and 62 were research faculty. The sum of the responses to occupational categories exceeds the total number of surveys returned because respondents were able to mark more than one occupation. For example, some individuals who were in agribusiness were also producers and some faculty who conducted research also may have had an extension appointment.

The responses for a large portion of the survey were based on a numerical scale from 1 to 5. These were analyzed first to determine the difference in responses to each statement between domain means (i.e., the difference between the average response of producers and the average response of the university research faculty) (Sдrndal et al.,

1992). To test for a significant difference between two domains, a 95% confidence interval was computed that accounted for domain size (i.e., the number of responses for each occupational category). Although this procedure probably gave the better assessment for inferences of differences between domains for a given question, the output was unwieldy and made presentation difficult. As an alternative, a more traditional approach was used employing the GLM procedure from SAS (1990) with means separation of responses from domains using Fisher's protected LSD. Comparisons of the two approaches showed similar statistical differences, and the LSD allowed more reader-friendly presentation.

RESULTS AND DISCUSSION

Opinions about Advisory Committees in General

All polled occupational groups indicated that advisory committees can provide valuable input for agricultural research (Table 1). Responses to this first statement indicate that, regardless of shortcomings identified in the rest of the survey, all groups from the producers to the research faculty felt that the potential for benefit from advisory committees is great. All groups agreed that the goals of advisory committees should be well defined (scores >4) but were less convinced that advisory committees effectively accomplish their goals (3.1 - 3.5). Producers and agribusiness respondents felt that recommendations from advisory committees are based on general needs of the agricultural community (4.1) and not on specific needs of committee members (2.5 - 2.6) and often are implemented (3.7). In contrast, research faculty were not as certain that recommendations are based on general needs (3.5) instead of narrow, specific needs of committee members (3.3). Regardless, all respondent groups agreed that off-campus research centers should have advisory committees (4.3 - 4.6) and that on-campus, agricultural departments should as well (3.9 - 4.1). All groups also felt that advisory committees should not be task- or topic-oriented and disbanded after completion (<3), but should be general and continued on a permanent basis (3.6 to 4.2). The agribusiness and producer respondents felt stronger about this than did extension personnel or research faculty. In contrast to respondents in our survey, Winget (1986) reported that forestry advisory committees in Canada had difficulty dealing with a broad range of research priorities because of an apparent lack of focus.

Opinions about Respondents' Advisory Committees

The agribusiness and producer respondents to our survey felt that it was more true than false that the goals of their advisory committee are clear (scores of 3.7 and 3.6, respectively) and that they effectively accomplish their goals (3.6) (Table 2). However, the research faculty were less convinced (3.0) that the goals were clear and accomplished. Although faculty opinion tended to rank lower than opinions from agribusiness or producer respondents, all responses suggested that recommendations by advisory committees often are implemented (>3.3). Faculty and extension respondents (3.5) did not feel as strongly as agribusiness and producer respondents (>4) that recommendations are based on general needs of the agricultural community. Research center directors and faculty apparently felt that recommendations sometimes may reflect narrow, specific needs of committee members as evidenced by their response score of 3. No statistical differences occurred among respondents' opinions that their advisory committees play an important part in guiding research. However, the scores (3.3 - 3.8) were lower than the scores of 4.2 - 4.7 (Table 1) in response to the statement that, in general, advisory committees can provide valuable input for agricultural research. This indicates that advisory committees are not fulfilling their potential.

Importance of Representation and Who Chooses

Surprisingly, few differences occurred in opinions of respondents about the importance of representation from the different occupational groups on the advisory committees (Table 3). Mean responses were > 4 that agribusiness, area producers, extension personnel and research faculty all should be represented on agricultural

advisory committees. Only agribusiness respondents felt that out-of-state research peers should be included on the committees. Although no significant differences occurred, an average score of 3.1 suggested that many respondents were somewhat undecided as to whether other state and federal collaborative agency personnel should serve on the committees.

Similarly, few statistical differences occurred in opinions as to who should choose members of advisory committees at agricultural research centers (Table 3). All respondents felt that agribusiness (3.5), producers (4.0) and research faculty (3.5) should have a voice in selecting members. Even though it was not significantly different, the opinion of research center directors that research faculty should not contribute to the selection process (2.3) corresponded to their significantly lower opinion (2.7) compared to other respondents (>3.7) regarding whether extension personnel should participate in choosing members. All agreed that out-of-state research peers and other state and federal collaborative agency personnel should not have input into the member selection process. Unexpectedly, the average response of 3.2 suggested that many respondents were undecided whether retiring members of advisory committees should have a voice in selecting replacements. Although our survey failed to address the quality of members serving on an advisory committee, results reported by Williams (1977) suggest that some respondents also may be unsure whether the best people are on the committee.

More than 80% of the respondents in all surveyed groups felt that term of appointments to agricultural advisory committees should be limited (data not shown). Although agribusiness and producer respondents tended to suggest slightly longer service terms than respondents associated with the university, the overall mean of 3.6 years suggests that a term of 3 to 4 years would likely be acceptable to the groups that we surveyed.

Open Opinion Questions

The following discussion attempts to summarize the written responses to five open-opinion questions asked of each occupational group represented in our survey. As expected, responses varied, and it would be impractical to list them in their entirety; however, we present the themes of the most common responses.

List two major goals for advisory committees. Three central themes surfaced in the responses to this query. Perhaps the most repeated and obvious answer was that agricultural advisory committees were to help guide and set research priorities. Advisory committees also can serve in a political sense. Respondents recognized that committees can aid in procurement, prioritization and management of funds for operations at the research center. They also pointed out that advisory committees could help improve public perception and awareness. Even universities are becoming aware that sound marketing strategies are necessary to ensure public support.

List two major areas that need attention to improve the effectiveness of advisory committees. Communication was a frequent response. Agribusiness and producer respondents felt that researchers should listen more to the advisors, whereas research faculty felt that other advisory committee members need a better understanding of the system. Such a lack of understanding of the "system" could have further ramifications as universities attempt to be more responsive to clientele while, at the same time, trying to maintain a sound, unbiased source of agricultural research information. Respondents also felt that more meetings should be held with definite agendas and better attendance by members. Williams (1977) also reported that respondents to his questionnaire suggested more meetings for extension agricultural advisory committees. In our survey, respondents also felt that the goals of the advisory committee should be clear and that the committee chair should provide good leadership.

What do you consider the best structure of advisory committees (i.e., formal with chair, vice-chair, etc; informal with unit head as facilitator; or other models)? As expected, responses were split with more responses indicating a preference for a formal structure. A few respondents suggested an arrangement incorporating components of both a formal and an informal structure.

Given that regular input from the public and program clientele is important, what mechanisms or model, in your opinion, would accomplish this function better than a formal advisory committee? Many responses indicated that a well-functioning advisory committee is likely the best mechanism to obtain input from agricultural clientele. However, focus groups, field days, public forums, suggestion boxes and topic-specific seminars were also mentioned. The suggestion of maintaining an open-door policy emphasizes the need for communication that was pointed out as an area for improvement.

What is the most important observation you can make about advisory committees? As a way of representing the varied responses to this query, we decided to use a direct quote from each occupational group that appears to best summarize their feelings. Agribusiness: "*Used properly, they can be of great value*". Producer: "*Institutions that utilize committees appropriately by active listening and valuing 'outside' perspectives remain in touch with clientele and avoid the tendency toward tunnel vision*". Center directors: "*Reporting to and planning ahead with an advisory committee should improve relevance, application and impact of research or extension efforts at research centers*". Extension personnel: "*Those that are used the most are the best*". Research faculty: "*They are as good as the department makes them*".

SUMMARY

All surveyed occupational groups felt that advisory committees can provide valuable input for agricultural research but were less convinced that they accomplish their goals. In general, center directors, extension personnel and research faculty tended to be more reserved than agribusiness and producer respondents in their opinions on implementation of recommendations and whether those recommendations are based largely on general needs of the agricultural community rather than on specific needs of the members. Agricultural research advisory committees should comprise representatives of agribusiness, area producers, extension personnel and research faculty who are chosen by those groups, even though center directors did not support extension personnel or research faculty having a voice in the selection process. Service on advisory committees probably should be held to a term of three to four years. Goals should be more defined and should include helping to identify needs and guide research by providing direction and focus, being an advocate for the research center and providing input on fund raising and management. Improved communication, more meetings with definite agendas and better attendance were identified to help improve the success of advisory committees. Overall, the potential for benefit is high, but agricultural advisory committees often are perceived as needing to improve their effectiveness.

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REFERENCES

Aldag, R.J. and S.R. Fuller. 1995. Research advisory boards to facilitate organizational research. J. Manag. Inquiry 4(1):41-51.

CSRS Staff. 1994. 1993-1994 Directory of professional workers in state agricultural experiment stations and other cooperating state institutions. USDA-CSRS Agric. Handb. 305. U.S. Gov. Print. Office, Washington, DC.

Lund, H.R. 1977. Research management in the agricultural experiment station, North Dakota State University. North Dakota Farm Res. 34(3):3-6.

Sдrndal, C.-E., B. Swensson, and J. Wretman. 1992. Model assisted survey sampling. Springer-Verlog, New York.

SAS Institute, Inc. 1990. SAS/STAT user's guide. SAS Institute, Inc. Cary, NC.

Whaley, D.C. and H.D. Stuphin. 1987. The status and influence of agricultural advisory committees in California. J. Am. Assoc. Teacher Educ. in Agric. 28(3):37-42, 48.

Williams, H.R. 1977. A comparison of factors involved in utilization of Kansas extension agricultural advisory committees. M.S. thesis. Kansas State Univ., Manhattan.

Winget, C.H. 1986. Research priorities and advisory committees in Canada. p. 31-34. In USDA-FS Northeast. For. Exp. Stn. Gen. Tech. Rep. NE-USDA 111.

Table 1. Survey responses, by occupational grouping, to statements about Agricultural Advisory Committees in general.

Statement	Responses (false to true)†					LSD (0.05)
	AGR‡	PRO	EXT	RCD	FAC	
Advisory Committees can provide valuable input for agricultural research	4.7	4.4	4.3	4.4	4.2	NS
The goals of Advisory Committees should be well defined	4.6	4.3	4.4	4.6	4.5	NS
Advisory Committees effectively accomplish their goals	3.5	3.4	3.2	3.3	3.1	NS
Advisory Committee recommendations often are implemented	3.7	3.7	3.5	3.3	3.3	0.4
Advisory Committee recommendations are based on general needs of the agricultural community	4.1	4.1	3.7	3.6	3.5	0.4
Advisory Committee recommendations often reflect narrow, specific needs of committee members	2.5	2.6	3.2	3.3	3.3	0.6
Off-campus, agricultural research centers should have an Advisory Committee	4.6	4.4	4.4	4.3	4.4	NS
On-campus, agricultural departments should have an Advisory Committee	4.1	4.0	4.1	3.9	4.1	NS
Advisory Committees should be task- or topic-specific and disbanded after task completion	2.2	2.3	2.8	2.6	2.5	NS
Advisory Committees should be general to cover all topics relevant to a research center or department	4.0	4.0	3.2	3.6	3.4	0.6
Advisory Committees should be continued on a permanent basis	4.2	4.0	3.6	3.9	3.6	NS

† Responses are on a scale of 1 to 5, where 1 = definitely false, 2 = more false than true, 3 = in between, 4 = more true than false, and 5 = definitely true.
‡ Occupational grouping of respondents: AGR, agribusiness; PRO, producer; EXT, extension personnel; RCD, research center director; FAC, research faculty.

Table 2. Survey responses, by occupational grouping, to statements about respondents' Agricultural Advisory Committees.

Statement	Responses (false to true)†					LSD (0.05)
	AGR‡	PRO	EXT	RCD	FAC	
The goals of your Advisory Committee are clear	3.7	3.6	3.5	3.4	3.0	0.6
Your Advisory Committee effectively accomplishes its goals	3.6	3.6	3.2	3.3	3.0	0.5
Recommendations by your Advisory Committee often are implemented	3.8	3.8	3.3	3.7	3.3	NS
Recommendations by your Advisory Committee are based on general needs of the agricultural community	4.3	4.1	3.5	3.9	3.5	0.5
Recommendations by your Advisory Committee often reflect narrow, specific needs of committee members	2.2	2.5	2.9	3.0	3.0	0.6
The Advisory Committee plays an important part in guiding research at the Research Center	3.7	3.8	3.4	3.7	3.3	NS

† Responses are on a scale of 1 to 5, where 1 = definitely false, 2 = more false than true, 3 = in between, 4 = more true than false, and 5 = definitely true.
‡ Occupational grouping of respondents: AGR, agribusiness; PRO, producer; EXT, extension personnel; RCD, research center director; FAC, research faculty.

Table 3. Respondents' opinions about the importance of the representation of the following groups on a combined (internal and external members) Agricultural Advisory Committee, and about who chooses the individual representatives.

Representation questions	Importance†					LSD (0.05)	Overall response mean
	AGR‡	PRO	EXT	RCD	FAC		
Who should be represented?							
Agribusiness	4.4	4.1	4.5	4.4	4.2	NS	4.3
Area producers	4.7	4.5	4.7	5.0	4.7	NS	4.6
Area/Regional Extension faculty	4.6	4.2	4.2	3.8	4.2	NS	4.3
Out-of-state research peers	3.6	2.9	2.5	2.1	2.4	0.7	2.8
State and Federal collaborative agency personnel	3.6	3.1	3.0	3.0	2.9	NS	3.1
University research faculty	4.2	4.1	4.0	4.2	4.1	NS	4.1
Who chooses the representatives?							
Agribusiness	3.7	3.4	3.7	3.3	3.3	NS	3.5
Area producers	4.2	4.2	3.9	4.3	3.7	NS	4.0

Area/Regional Extension faculty	4.2	3.7	3.8	2.7	3.7	0.7	3.8
Out-of-state research peers	2.3	2.0	2.0	1.0	1.9	NS	2.0
Retiring Advisory Committee members	3.7	3.4	2.8	2.9	2.9	NS	3.2
State and Federal collaborative agency personnel	2.6	2.2	2.3	1.1	2.1	NS	2.2
University administrators	2.8	2.7	3.1	2.7	3.3	NS	3.0
University research faculty	3.4	3.5	3.5	2.3	3.7	NS	3.5

† Responses are on a scale of 1 to 5, where 1 = not important and 5 = absolutely needed.

‡ Occupational grouping of respondents: AGR, agribusiness; PRO, producer; EXT, extension personnel; RCD, research center director; FAC, research faculty.

Industry Advisory Committees: Putting Them to Work

Brian Marsh
University of California Shafter Research and Extension Center

To understand where we are at now and to have an idea of where we want to go, it is imperative to understand how we got here. The establishment and function of the Industry Advisory Committee is closely tied to the history of cotton in California.

Cotton had been grown in California around the Spanish missions to clothe the heathen Indians. Several other attempts were made to develop a California cotton industry but it never became firmly established. In 1906, cottonseed was collected around Acala, Mexico. Scientists were searching for germplasm with boll weevil resistance. During the period of 1907 to 1915, United States Department of Agriculture (USDA) breeders in Texas used that material to develop the Acala 8 variety. They didn't find boll weevil resistance but they did develop a high fiber quality variety. In 1916, USDA sent Bill Camp to California to try once again to establish a cotton industry. The first plantings of Acala 8 in California were made in 1919 as part of that effort.

In 1922, the U.S. Cotton Research Station was established. Kern County Land Company donated property to the County of Kern for the station. USDA could not accept the donation; so using the county was an innovative way to accomplish the objectives.

Marketing was the challenge in those early years. Mills in the eastern U.S. were hesitant to purchase California cotton. Communication and transportation between the coasts hampered the efforts. Farmers, the University of California (UC) and USDA administrators developed a novel plan. That plan was, if every grower in California grew the same high quality variety, millers in the east could be assured that no matter whom they bought from they would be assured of getting the same high quality lint year after year. To accomplish this, the one variety law was enacted in 1926. The idea worked. California produced quality cotton fiber and has received premium prices for it.

Cotton variety development work at the research station continued from the 1920's through the 1970's. USDA and the University of California scientists developed new varieties with improved fiber quality and other improved characteristics such as verticillium wilt resistance. The San Joaquin Valley Cotton Board, comprised of farmers, reviewed varietal development data and selected the variety which would be the standard. While the standard variety has changed, it has always been referred to as an Acala variety.

A not-for-profit grower/owner seed company was responsible for seed increase of breeder seed and production of certified planting seed. California Planting Cotton Seed Distributors (CPCSD) was located at the research station. Professional employees ran the company but the Board of Directors was and still is farmers. An annual grant from the CPCSD board paid for the station's operation expenses and built many of the facilities.

USDA got out of the cotton breeding business in California in 1978. At that time, CPCSD established their new facilities across the street. This began what I call the decline of relevance. An engineer became the USDA research leader. The focus of the USDA group shifted from variety development and agronomics to the creation of machinery. . . large machinery and, in particular, the wide frame tractor. All of the USDA resources went into this project. The research leader purported this piece of equipment as the wave of the future. While there was some good research as a part of the project, there was little that was of value to farmers, not the technology or other pertinent information. Some parts from the wide frame tractor were discovered during a tour of the center a couple of years ago, and a committee member said, "I thought we got rid of that thing." During this same time, the

University of California maintained three positions at Shafter. . . the state extension cotton specialist, an extension entomologist and an Ag Experiment Station agronomist who conducted the Cotton Board's variety trials. These three positions developed critical and applicable information used by growers in their farming operations.

In 1992, USDA decided to close the research station. A group of farmers who knew the history of the station and were very well aware of the quality information that had been developed there stepped in. Working through a local U.S. congressman, the group got an assurance from USDA administrators that the group would remain at Shafter. In return, the growers committed to funding operations while the University of California managed the facility.

"WHEREAS the Shafter [Research and Extension Center] has been the center of cotton research for California since 1922 and that, at present, is the center of cotton research in the state,...WHEREAS the California cotton growers have agreed to provide monetary support from fees assessed on certified cotton seed,...WHEREAS the association intends to provide long-term funding for support of the Shafter [Research and Extension Center]" is some of the wording from the memorandum of agreement dated May, 1992.

The new partnership began, or, an old partnership was renewed. The University of California Division of Agriculture and Natural Resources manages the facilities, UC Davis has 3 researchers at the Center, USDA supports a 4 scientist research group, the County of Kern owns the facilities and the growers through California Crop Improvement Association fund the farm operations and facility maintenance.

The memorandum of understanding also called for the formation of an Industry Advisory Committee. They are to provide input into research direction and make recommendations. They have no responsibility for day-to-day management. The committee is composed of 5 farmers, 2 cotton industry people, CEO of the California Cotton Growers and Ginners Association, Kern County Ag Commissioner, a U. S. congressman's aide, Executive Director of California Crop Improvement Association and 4 researchers and administrators from UC and USDA. The grower and industry participants are a group of individuals who believed in the value of the Center. They were the ones who took it upon themselves to find solutions to keep the Center operational.

The areas that the committee is involved in are: 1) Center funding through research fees collected by CCIA. The annual operations expenses have been covered and additional funds for physical plant improvement. 2) The continued presence of the USDA group. The initial "stay" of moving the group from Shafter was not a permanent fix. The committee continued to supply Congressman Bill Thomas of Bakersfield information about the need to keep the group in Shafter rather than move them to the new facility at Parlier, an area where cotton is not grown. That issue has since been permanently addressed. 3) Facilities and program development. The committee has pursued additional avenues of funding. The newest of the facilities is 30 years old, and most of the buildings are 40 to 50 years old. Facility upgrades are needed and coming to pass.

Not everything rolls along smoothly. There are several areas of frustration, growers with the University and with USDA and us with them. Growers and industry people get very frustrated with the slow pace of change or implementation. To help them understand the University processes, we have included them in researcher selection committees, the Research Advisory Committee, as stakeholders on the USDA Program Review and on the UC President's Council on Agriculture. They may not like the slow pace but now have a better understanding.

Another area is basic versus applied research. Our cotton growers prefer applied research, but they do understand the need for basic research. Through Cotton Inc. State Support Committee, Pest Control Board and San Joaquin Valley Cotton Board research activities, they have approved funding for basic research but it is areas that provide results that would be helpful to their operations. There are high expectations that the basic research will provide answers to production questions not just knowledge for knowledge sake. They have lots of experience in reviewing

research results and evaluating proposals.

Academic freedom is another area. The ability of researchers to go a different direction from what was initially proposed is a very sore area. California cotton growers have funded a position that is now not working the area that it was designed for. Another program has shifted from a specific goal of germplasm development to a more basic genome mapping type research.

On the other side, we can have some frustration also. Meddling is usually not a problem but it does come up from time to time. Private industry has the ability to make quick changes in direction. Change within the University environment takes time. Impatience can result. There can also be some shortsightedness when one has the ability to change quickly. Even with the experience they have with research, there is not a complete understanding of the scientific process and the time involved, repeating the experiment to be sure of the answers and wanting a high degree of certainty before releasing results.

The committee meets annually. Through joint planning, a direction of action is decided upon. The committee can pursue avenues that we cannot. They can assist us in ways not open to us. They are great supporters of our endeavor. All in all, it has been a very beneficial process.

Design and Construction of a Pesticide Storage and Handling Facility for a Small Research Station

Ned Edwards, Superintendent, South Mississippi Experiment Station
David Howell, MAFES Engineer
Mississippi Agricultural and Forestry Experiment Station

Introduction

Proper storage and handling of agricultural chemicals has always been important in the protection of people and the environment. Research centers should provide an example for proper storage and handling of agricultural pesticides.

The South Mississippi Experiment Station is a small facility with four scientists working with horticulture and beef cattle. Our goal was to build a low-budget facility where agricultural chemicals could be safely stored and handled. Once we made the decision to build the facility, we started looking for plans that would fit our needs. It became evident that there were limited plans available. We visited facilities in Louisiana, Alabama, Tennessee, Kentucky and other locations in Mississippi, and we had telephone conversations with a number of other people. Although a number of the facilities we visited were well designed, some did not appear to be functional while others probably would not meet current guidelines for storage and for rinsate containment.

Design criteria

After a search of literature, we decided to use AOn-farm Agrichemical Handling Facilities@ by David Ross and John Bartok as our guideline in designing our facility. According to their plans, a well-designed facility should have four components: 1) storage room, 2) mixing room, 3) safety/equipment room and 4) an equipment loading/rinsing area that would contain any spills during equipment loading and rinsing.

The storage area needs to meet several requirements. It should be large enough to store the pesticides in a well-ventilated room where the temperature can be maintained between 40 and 100 degrees F. Pesticides should be separated by types with insecticides and herbicides being stored in separate rooms, if possible, to prevent contamination. The storage area should have metal shelves with pesticide containers stored in leak-proof plastic trays.

The mixing room should contain a work surface with scales, measuring cups and buckets. This room requires a water supply and sink for chemical preparation and clean up and the means to contain the water from the sink. This room would also have a hood over the mixing table to draw fumes and dust away from workers. The safety/equipment room should be a clean room for storing safety equipment, clean personal clothes, gloves, coveralls and respirators. This room should also have an area to keep spray records and MSDS sheets. This room should have an outside door.

The equipment loading/rinsing area should provide for containment of any spill or rinsate from cleaning the equipment. According to Ross and Bartok, the containment area should be able to accommodate 125% of the largest spray tank. The containment pad should have a sump area where the rinsate can be pumped into a holding tank until the rinsate can be properly disposed.

Our Facility

Once we had an idea about what we wanted in our pesticide storage facility, we started making sketches of floor plans and had some of our agricultural engineers and the Mississippi Department of Agriculture and Commerce, Division of Plant Industry (the state agency in charge of pesticides regulations) review the plans. The local fire department also reviewed the plans. After many revisions, we had an architect redraw our plans.

Our facility is housed in a 30-foot-wide by 42-foot-long by 13-foot-tall metal building (Figure 1). The roof and exterior walls are 26-gauge painted metal panels with the enclosed portion of the building insulated. The roof has gutters and downspouts and a 6-foot overhang on three sides of the building. The structural framing for the metal building is hot-dipped galvanized.

The roof-only portion of the metal building covers the 24-foot by 30-foot loading/rinsing area. After reviewing the literature and visiting several pesticide storage facilities, we discovered that the major problem with most facilities was the loading/rinsing area, containment pad and proper handling of the rinsate. This area should be large enough to permit a spray rig to be rinsed and to contain the rinsate for proper disposal. Most facilities had a pad with a sump and pump to allow the rinsate to be moved to a storage tank, allowing the rinsate to be applied as part of the water the next time a sprayer was filled. The practical problem with recycling the rinsate is that trash and dirt on the pad will contaminate the sprayer and cause problems. A more practical solution is to rinse the sprayer in the field and only use the pad to contain occasional spills. A tank for rinsate and an emergency shower and eyewash station are also located on the pad (Figure 2). The containment pad has a 3-inch-high curb around the perimeter, and the floor slopes toward a 2-foot square sump in the center of the pad. A pump located at the bottom of the tank can be used to move the rinsate from the sump to the storage tank and from the storage tank to a sprayer tank. The containment pad is covered to reduce the amount of rain being blown onto the containment pad. Once rain water is contaminated from the containment pad, it becomes a product that must be properly disposed.

The storage area is designed with two rooms, one for herbicides and one for insecticides. The walls of the rooms are built on 3-inch-high curbs to contain any spill that may occur. The interior walls are constructed with 2 x 4 studs, covered with 2-inch OSB board and then covered with fiberglass reinforced panels (FRP) for moisture resistance. The concrete floor is coated with an epoxy sealer. This room provides metal shelves used for storage with all pesticide containers being placed in plastic tubs to contain any leaking packages. The area is ventilated with air being forced in from the ceiling and removed by exhaust fans approximately 12 inches off the floor to remove heavier fumes and has electric heat controlled by a thermostat. The ventilation system is designed to give at least six air exchanges per hour. The system is controlled with a thermostat and an override switch outside near the entrance door so that if the fan is not running, it can be started and allowed to run before anyone enters the room. Since the rooms are not designed to store flammable materials, any flammable pesticides are stored in a safety cabinet for flammable materials outside on the rinse pad (Figure 3).

The mixing room has doors opening to the storage area, the loading area, records area and restroom. The interior walls of the mixing room are constructed similar to the storage area. The area contains a stainless steel table with a hood and a stainless steel sink. Water from the sink goes to a sump pump and then into the rinsate tank outside. This area has the same type of ventilation system as the storage area (Figure 4).

The safety/equipment room is accessed from the mixing room but also has an outside door for emergency use. This room contains a small desk, filing cabinets to store MSDS sheets and application records and a cabinet to store safety equipment. The interior walls are gypsum board construction.

After some debate, we decided to include a restroom with a shower in this facility. The sewer line from the restroom is the only water that is piped from this building. The interior walls are gypsum board construction.

Cost

The facility cost approximately $45,000. We served as the contractor for this project and hired sub-contractors to complete different jobs.

Metal building 30 x 42	$12,800
Labor to erect and finish	$14,080
Concrete	$ 4,200
Labor for plumbing and electrical	$ 5,400
Supplies for plumbing, electrical and lumber	$ 8,520
Total cost	$45,000

Summary

We have used the pesticide facility for approximately six months. The major problem so far has been with blowing rains resulting in too much rain water on the containment pad. The other small problem is storage space for empty containers. We are currently storing the empty containers in the storage room, a plan that works well as long as we dispose of the emptied containers quickly.

References

Ross, David. S., and John W. Bartok, Jr. 1995. AOn Farm Agrichemical Handling Facilities.@ NRAES-78 Northeast Regional Agricultural Engineering Service, Ithaca, New York

Wilkinson, Robert H., 1992. AOn-Farm Agrichemical Storage and Handling.@ Cooperative Extension Service, Michigan State University. Extension Bulletin E-2335.

Unknown, 1984. Military Handbook 1028/8

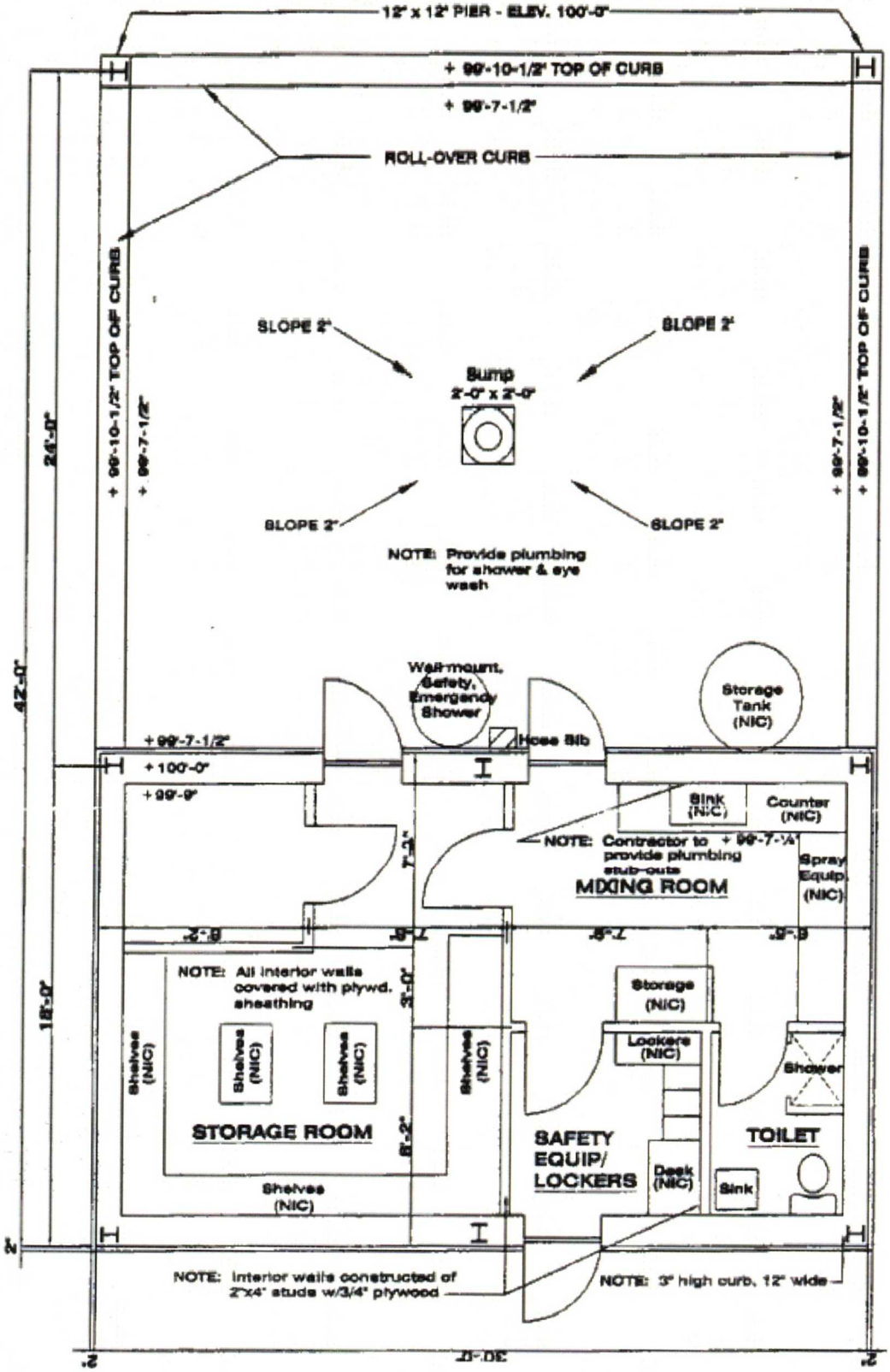
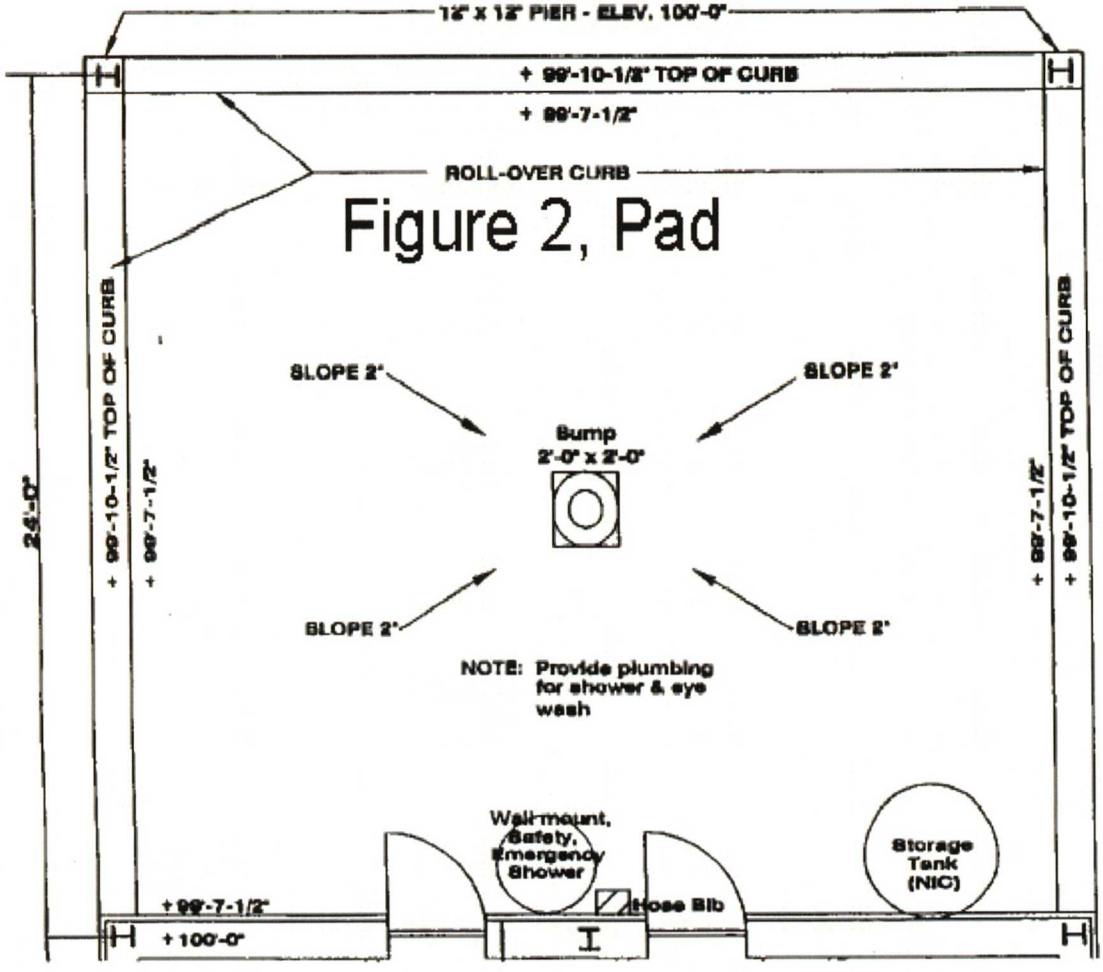


Figure 1, Floor plan


12" x 12" PIER - ELEV. 100'-0"
+ 99'-10-1/2" TOP OF CURB
+ 99'-7-1/2"
ROLL-OVER CURB
Figure 2, Pad
24'-0"
+ 99'-10-1/2" TOP OF CURB
+ 99'-7-1/2"
SLOPE 2"
SLOPE 2"
Bump
2'-0" x 2'-0"
SLOPE 2"
SLOPE 2"
NOTE: Provide plumbing for shower & eye wash
Wall-mount, Safety, Emergency Shower
Hose Bib
Storage Tank (NIC)
+ 99'-7-1/2"
+ 100'-0"

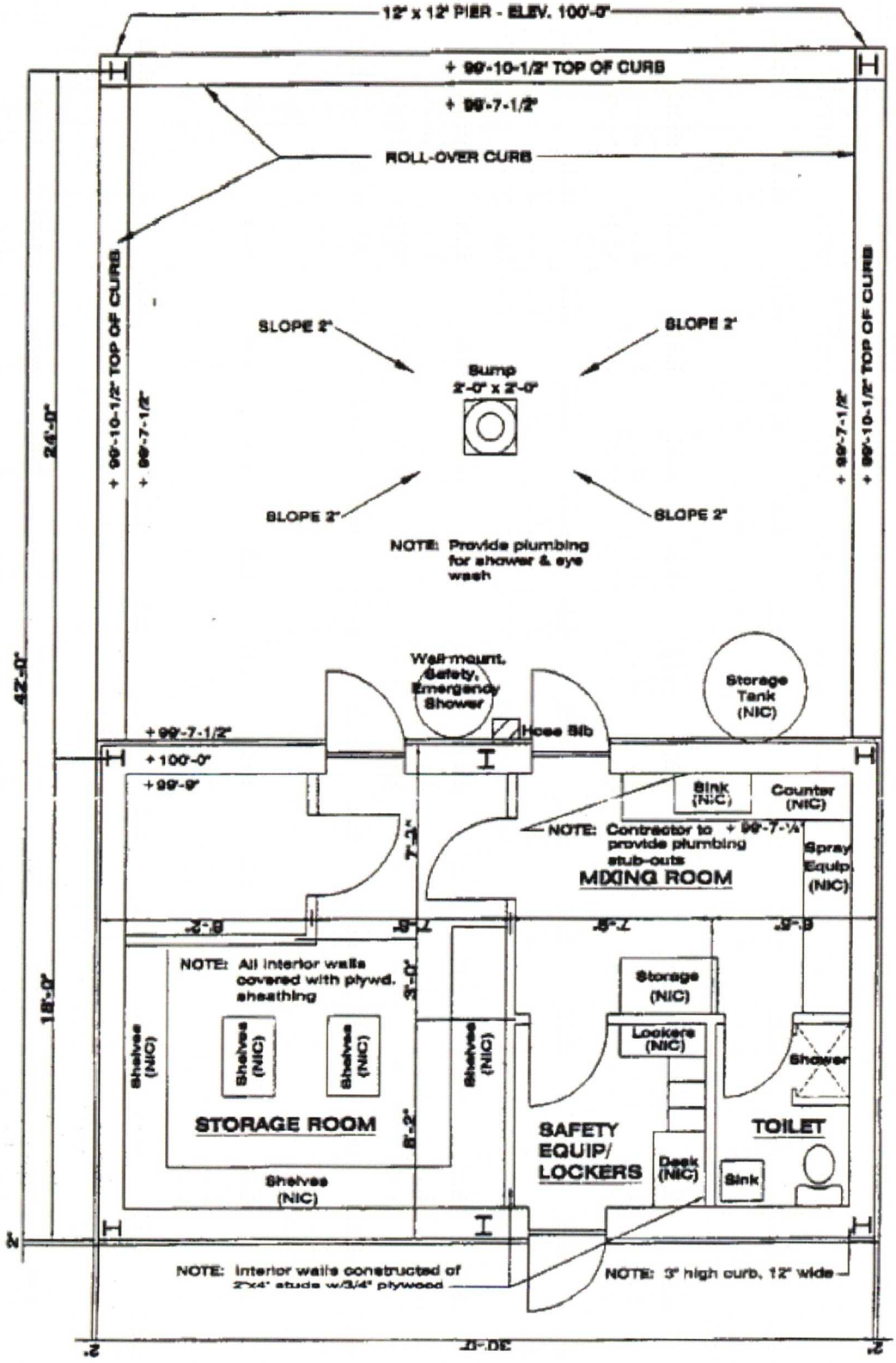
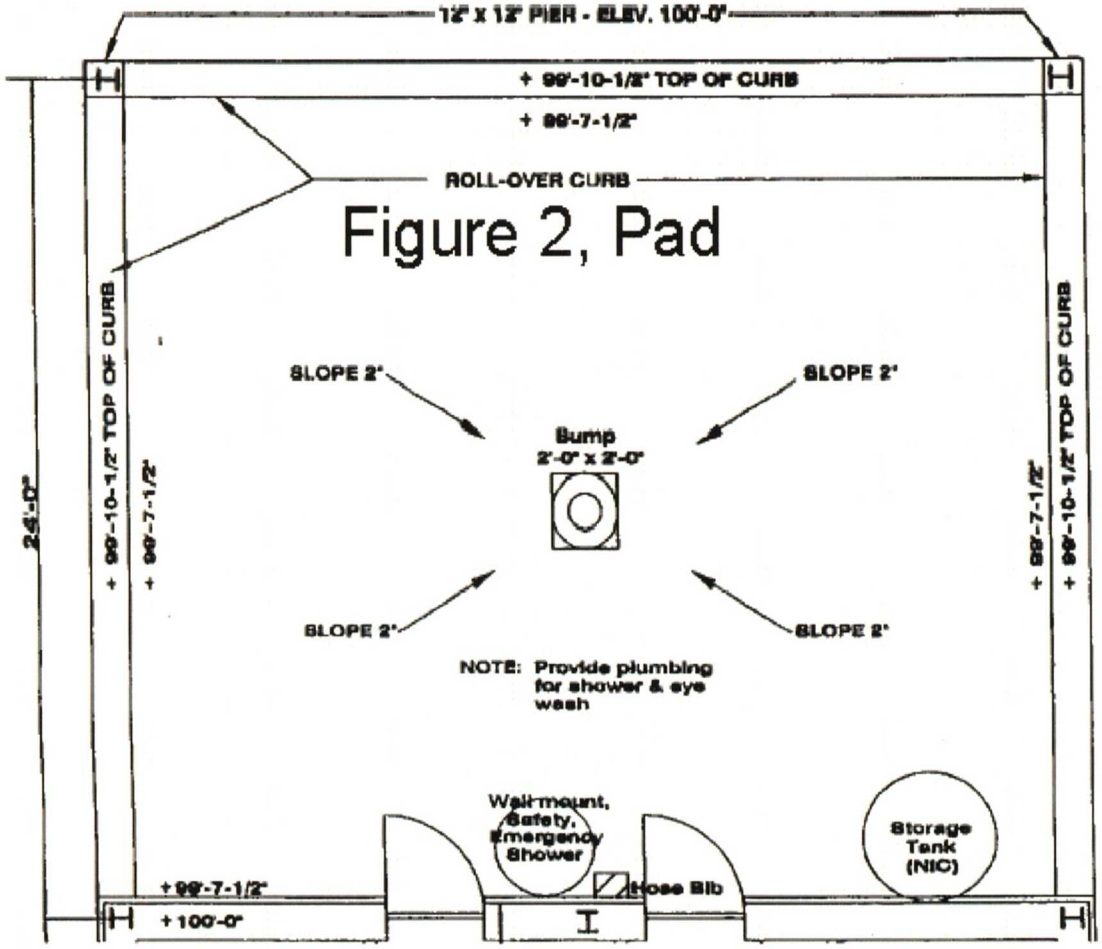


Figure 1, Floor plan


12" x 12" PIER - ELEV. 100'-0"
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ROLL-OVER CURB
Figure 2, Pad
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SLOPE 2"
SLOPE 2"
Bump
2'-0" x 2'-0"
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NOTE: Provide plumbing for shower & eye wash
Wall-mount, Safety, Emergency Shower
Hose Bib
Storage Tank (NIC)
+ 99'-7-1/2"
+ 100'-0"

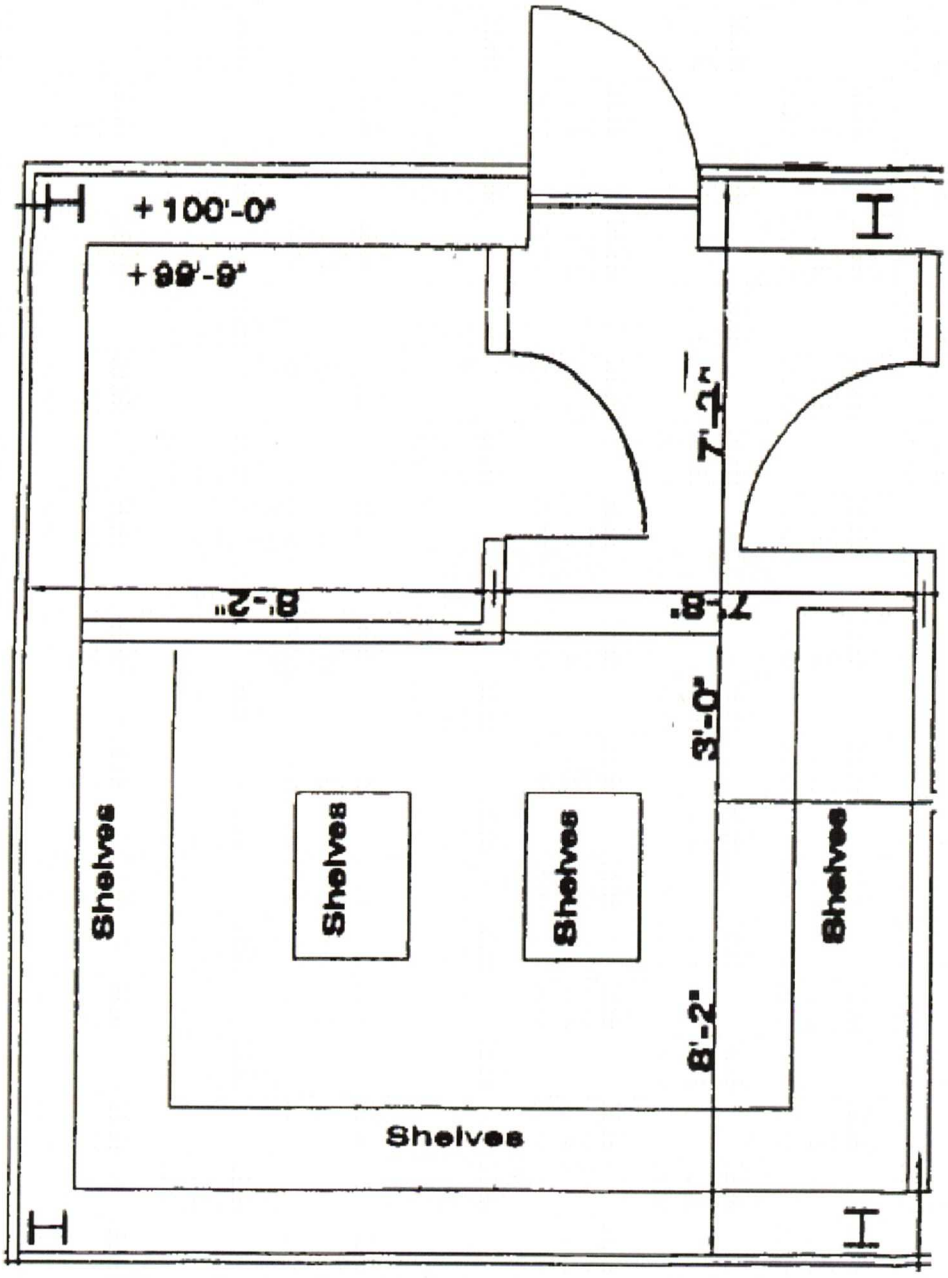


Figure 3, Storage room

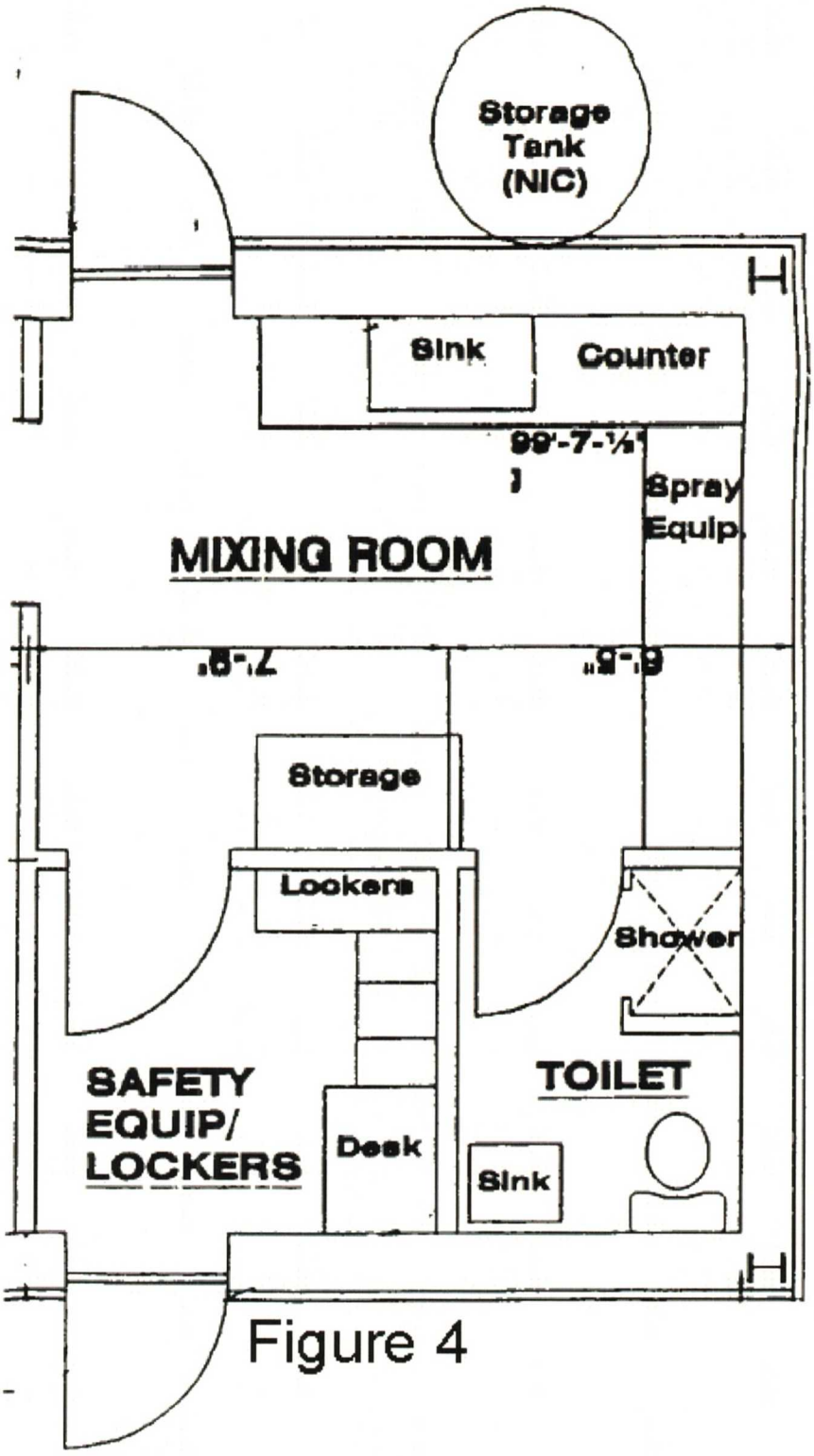

Storage
Tank
(NIC)
H
Sink
Counter
Spray
Equip.
MIXING ROOM
Storage
Lockers
Shower
SAFETY
EQUIP/
LOCKERS
Desk
TOILET
Sink
H

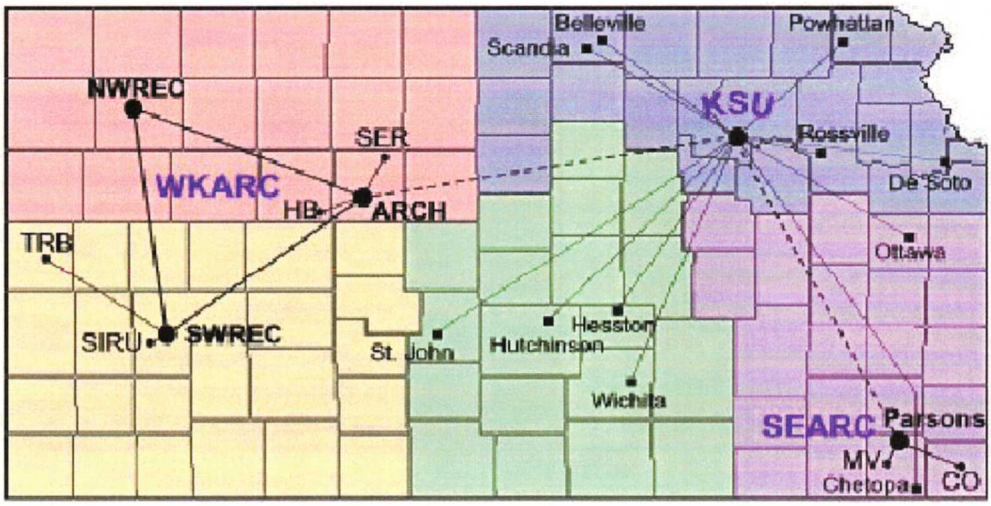
Figure 4

Portable, Pre-cast Concrete Buildings for Pesticide Storage at Research Sites

Patrick I. Coyne, Head
Kansas State University
Western Kansas Agricultural Research Centers

The Kansas Agricultural Experiment Station (KAES), like other states and field-oriented agricultural research organizations, whether public or private, has had to implement long-term solutions for dealing with compliance issues related to the storage of agricultural chemicals, both on and off the main campus. These solutions never come cheaply and much thought and discussion generally go into optimizing up-front costs against operating and maintenance costs over the life of a structure. Decisions on whether to fabricate structures in-house or purchase commercial units are always part of the debate.

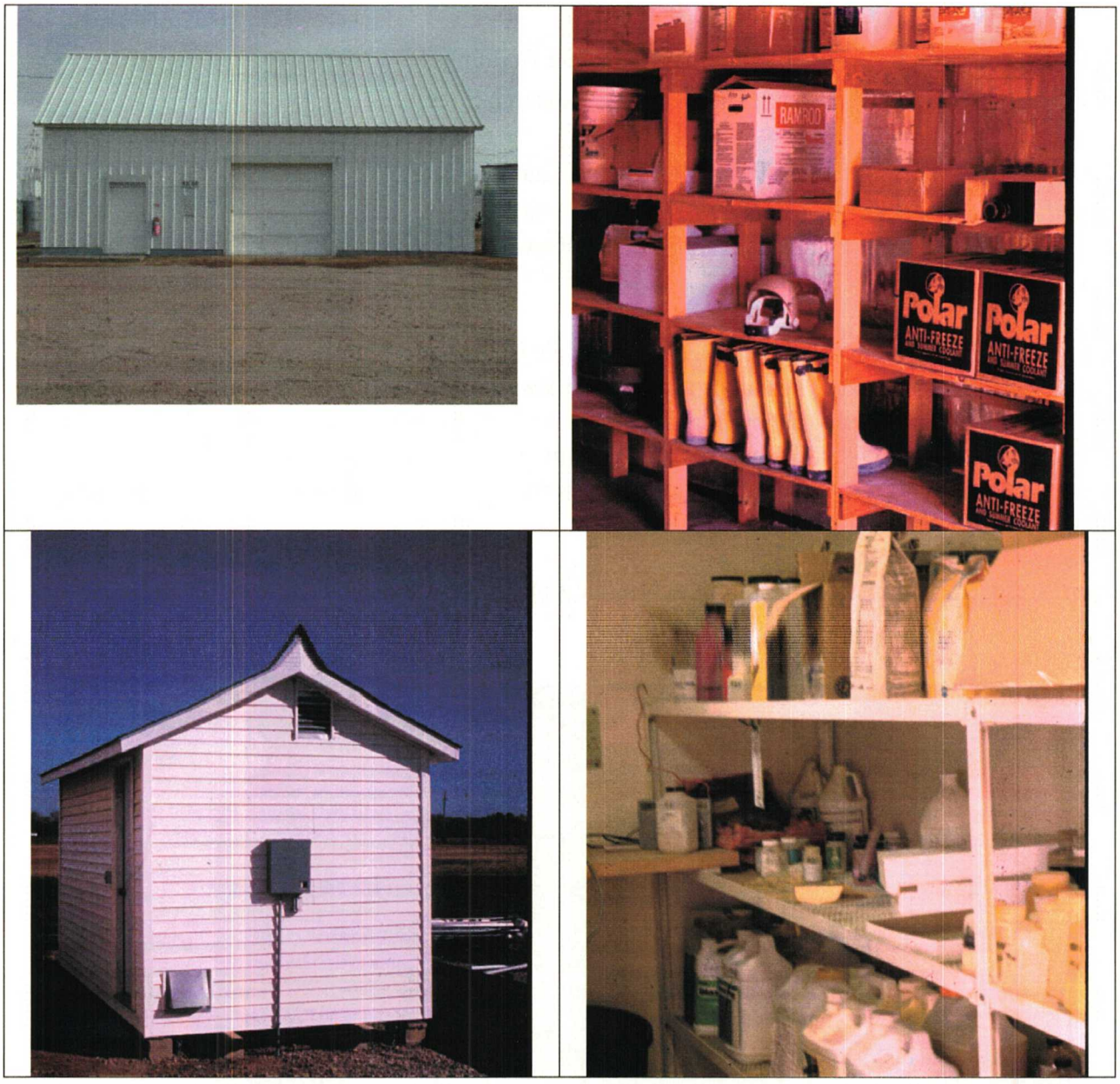
The KAES supports research at numerous locations across the state as shown in the following map.



Each location has common as well as specific requirements for pesticide storage. The units discussed in this presentation are located at the Agricultural Research Center--Hays (ARCH), the Northwest Research-Extension Center (NWREC, Colby), the Southeast Agricultural Research Center (SEARC, Parsons), and the Department of Agronomy (Manhattan).

In 1993, the KAES was in search of new technology to upgrade pesticide storage facilities at several locations around the state. While several vendors offered "turn-key" storage containers manufactured from steel, the optimum solution ultimately favored pre-cast concrete buildings. This paper describes the specifications and features for five different structures installed at four locations. Four units were acquired during 1994, the fifth unit was acquired in 1999 and added to the storage capacity at Colby.

A variety of in-house solutions to chemical storage has been used over the years as shown in these photographs.



In the first example (top photos), pesticides were stored in one room of a wood-frame building used for equipment and oil storage. In the second example (bottom photos), pesticides were stored in a dedicated wood structure designed and built in-house specifically for that purpose. While ventilation and heat to prevent freezing were provided in both cases, these structures lacked spill-containment sumps and shelves and the wood surfaces were prone to absorb odors and retain residues from any spills.

While these structures have served the need in times of less stringent regulation, we opted for commercial, pre-fabricated containers for the current cycle and the Director's office provided partial funding to address the needs at five separate locations (Hays, Colby, Parsons, Wichita, Manhattan). At the time we began the specification-writing phase in 1991, commercial units were constructed of steel. By the time we obtained legislative approval and began the purchasing process in 1993, a local firm (Waffle-Crete International, Inc., Hays) had developed a unit made of pre-cast concrete that was cost-competitive with steel units, yet offered additional value with respect to longevity, fire rating, and low maintenance. "Waffle-Crete®" has a density of about 110-115 lbs/cu-ft compared to a normal concrete density of about 150 lbs/cu-ft. The lower density is achieved by using expanded shale aggregate, which has a specific gravity less than one.

Specifications were written to allow steel or concrete with the stipulation that either type of construction had to meet Factory Mutual System requirements, be turn-key upon delivery, and be re-locatable. Four units were included on the first purchase order and the concrete units were low bid in all cases. A subsequent order, some 6 months later for our horticultural field at Wichita, was awarded to a manufacturer of steel structures (Safety Storage). Only the concrete units are described here.

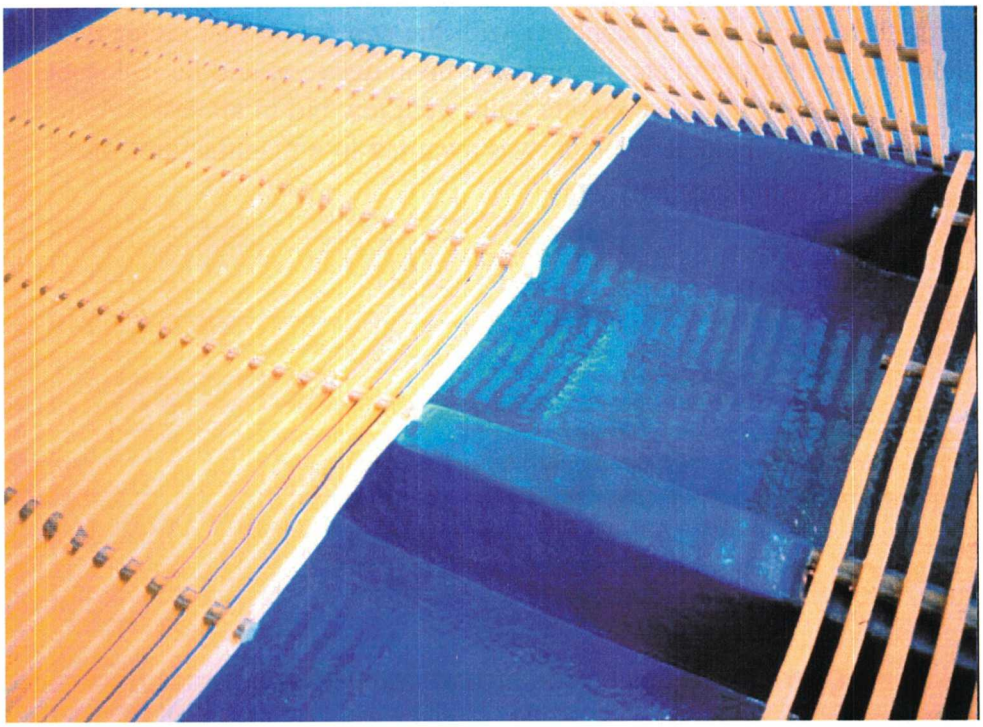
General features required included:

- Cost-competitive alternative to steel construction.
- Commercially manufactured.
- Concrete construction for durability and fire resistance.
- Suitable for storing flammable, reactive, toxic, and corrosive materials.
- Low maintenance.
- Flexible dimensions, floor plans, and options.
- Re-locatable.
- No concrete foundation required; gravel pad recommended; no tie-downs needed.

Construction details included:

- Walls: 4" lightweight structural concrete with bristle rake exterior and smooth interior.
- Roof: 4" lightweight structural concrete with built-in slope and 2" overhang.
- Segmented, epoxy-coated sump (holds 25% of liquid storage capacity).
- Grated floor: epoxy-coated steel or Fiberglas.
- Doors: Double or single, heavy-duty steel, insulated (1.5-3 hour fire rating).
- Heated and/or air-conditioned.
- Forced ventilation.

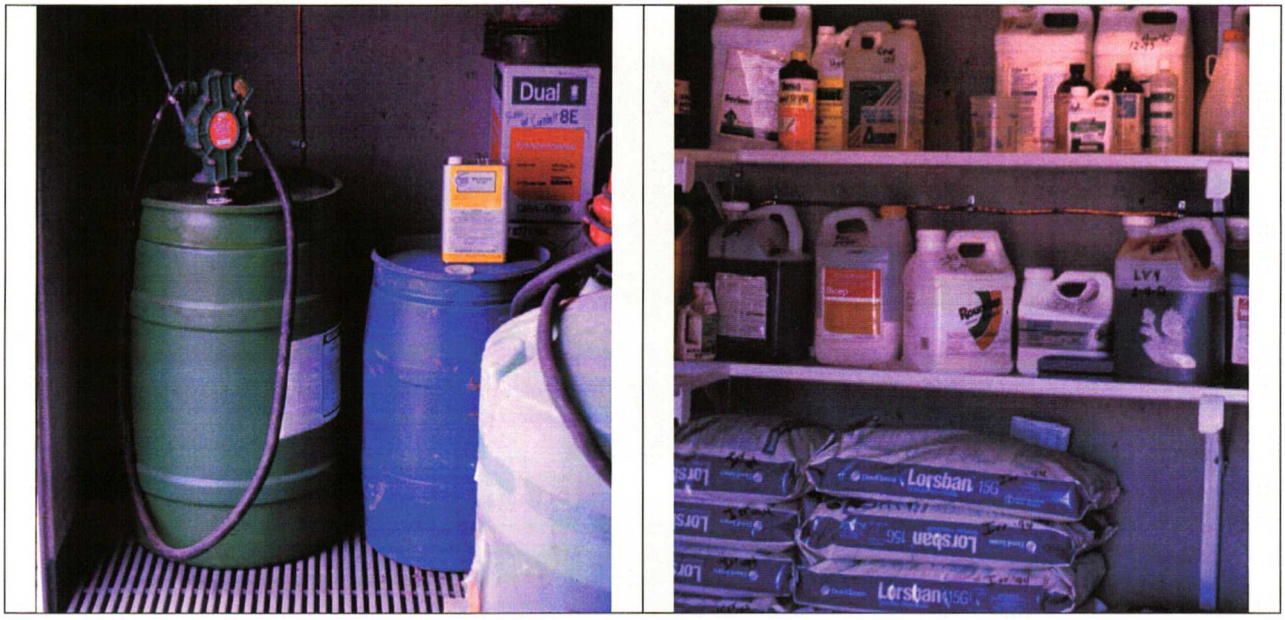
The segmented sump is a particularly nice feature in that smaller spills are contained in a limited area. The floor grates can be easily removed to access the sump for clean up as shown in the following photo.



Available options included:

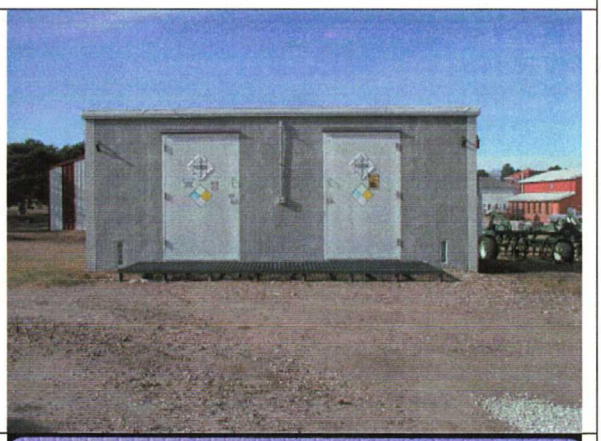
- Two-hour fire rating.
- Explosion relief panels.
- Explosion proof fixtures.
- Dry or wet fire suppression.
- Eye wash / shower station.
- Concrete divider walls.
- Canopy between two buildings.
- Shelving.
- Insulated walls / roof.
- Numerous safety features and alarms.

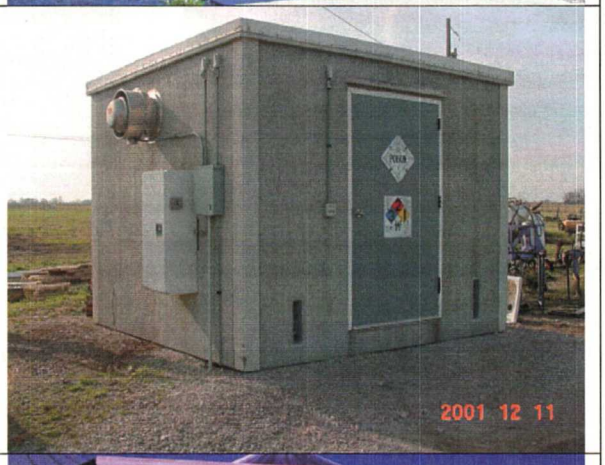
These units offer sufficiently wide doors to achieve considerable flexibility in sizes of containers that can be accommodated as shown below.



Note the 1-inch lips on the 16 gauge steel shelves in the lower-right photograph. These serve to contain any chemicals that might leak from a small container.

Structures acquired by the KAES in 1994 (4) or 1999 (1) include:

Location	Attributes	Photograph
ARCH Hays 1994	12' x 22' Two side doors 48,000 lbs. Cost: $27,227 Cost/sq-ft: $103 *All costs include freight.*	
NWREC Colby Unit 1 1994	12' x 14' One end door 32,000 lbs. Cost: $22,871 Cost/sq-ft: $136	

NWREC Colby Unit 2 1999	8' x 10' One end door 16,000 lbs. Cost: $3,700+$1,700 Cost/sq-ft: $68	
SEARC Parsons 1994	12' x 12' One door 30,000 lbs. Cost: $21,360 Cost/sq-ft: $148	
Agronomy Manhattan 1994	12 x 18 Two side doors 40,000 lbs. Cost: $27,257 Cost/sq-ft: $126	

Unit 2 at Colby was manufactured for a different purpose than pesticide storage and had been used as a demo unit at trade shows. When we expanded the weeds research project at Colby in 1998, additional capacity was required. We were able to purchase this container at a reduced price. We specified retrofitting of a containment sump. Our own maintenance staff added the lights, heating, ventilation, and shelves after delivery. The purchase price of this unit was the first figure in the table above. The second value was the cost of materials only to bring it up to code.

All units are set on gravel pads [actually preferred over concrete pads] and because of their weight, do not require tie downs.

Summary

Four of the five concrete chemical-storage buildings have now been in service about 7 years. We remain quite satisfied with regard to quality of construction and features and expect them to provide many years of maintenance-free service as well as compliance with regulations pertaining to the storage of agricultural chemicals.

Foreign Animal Disease & Bioterrorism Response in North Carolina

Tom McGinn, State Veterinarian
North Carolina Department of Agriculture

FOREIGN ANIMAL DISEASE OPERATIONS PLAN

1. Purpose. This operations plan supports the North Carolina Emergency Operations Plan (NCEOP) and outlines actions and procedures the State Emergency Operations Center (EOC), the State Emergency Response Team (SERT), and the State Animal Response Team (SART) take when a Foreign Animal Disease (FAD) threatens susceptible animals in North Carolina. North Carolina will seek the assistance of and cooperate with the United States Department of Agriculture (USDA) on a local and national level in accordance with their FAD Plan.

2. Situation.

   a. Background. Within the State of North Carolina are a number of facilities and population groups that are vulnerable to naturally occurring FADs, and potential targets for biological terrorist attacks. Response to both of these events may involve Local, State, Federal and private agencies. Agribusinesses that breed and produce susceptible animals in the hundreds or thousands within the confines of a single operation make an attractive target for such events. A major outbreak of an FAD could cripple for years the affected industry and those businesses that depend on it. Export and production would decrease. Businesses would fail. Tax revenue generated directly and indirectly would diminish dramatically. North Carolina's ability to export that type of susceptible animals would virtually end for three to five years. And, if the disease spread to other states, it could have a devastating impact on the United States' ability to compete in the global marketplace. In the case of FADs with significant human health effects, the response urgency and economic impact may be much greater.

   b. Current. This operations plan will be activated when there is a credible FAD threat to North Carolina. Activation will be a result of notification of the North Carolina Division of Emergency Management (NCOEM) through the State Emergency Response Team (SERT) by the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), which will likely be the first state agency to detect a potential for FAD. The State Veterinarian (SV) is the responsible individual within NCDA&CS for FADs and coordination with the SERT.

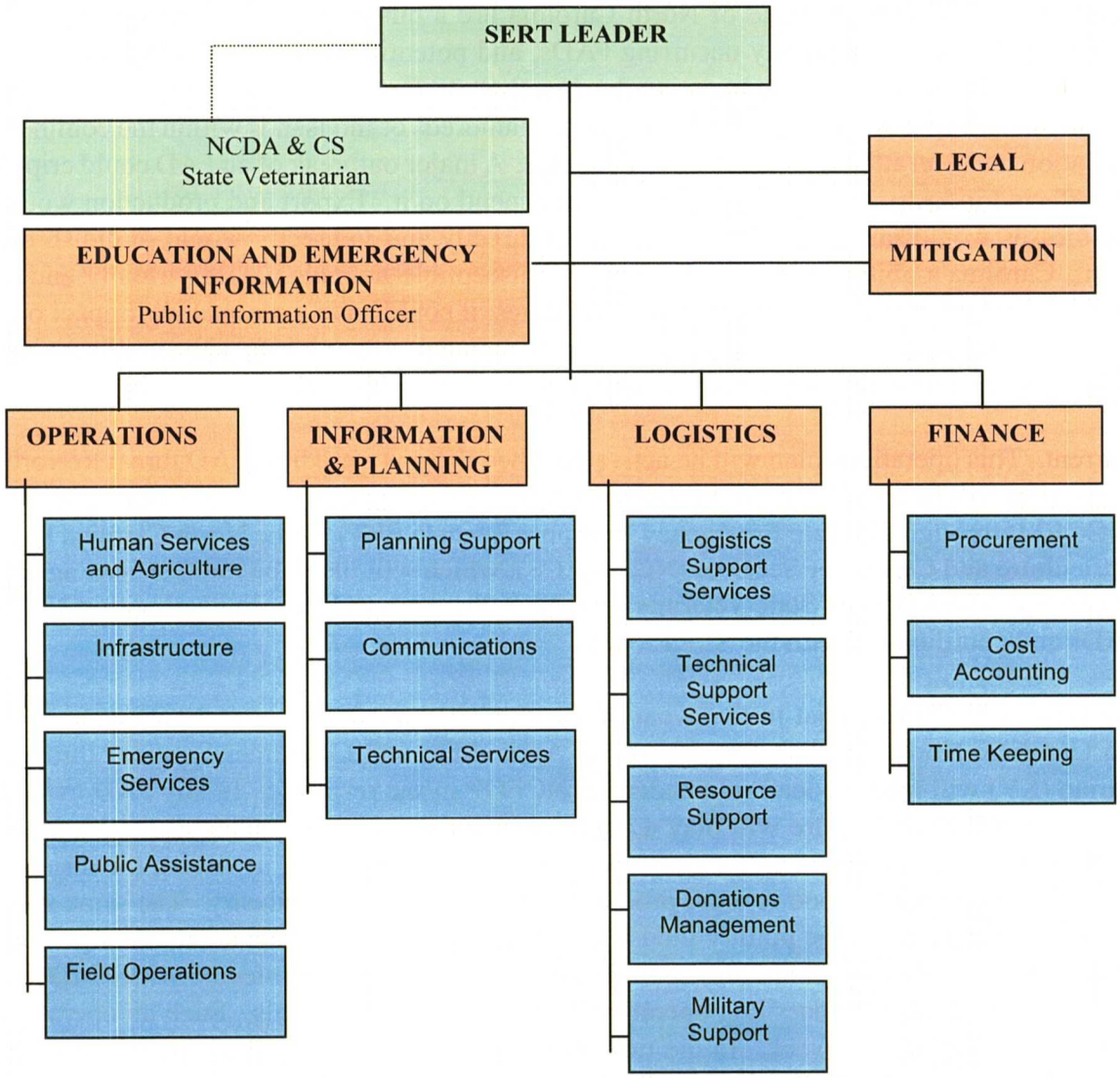
3. Assumptions. It is assumed that in the event of a naturally occurring or terrorist initiated FAD outbreak in North Carolina, North Carolina Department of Agriculture and Consumer Services through the State Veterinarian (SV) will take the lead role under the NCEOP in the response. In any FAD event the United States Department of Agriculture will play a major role in the State and will lead the National response. For the purpose of plan development, a worst-case scenario was assumed, involving the discovery of Foot and Mouth Disease (FMD) at one or more production sites in the swine industry. The same scenario could be applied for other FADs in the poultry industry, or any susceptible animals raised in large quantities in a concentrated area. In this scenario a few animals are suspected of being infected with FMD are identified in an integrated, multiple premises hog operation of several million animals. Such an operation may ship more than 100,000 animals a week. In the time necessary to confirm diagnosis of infection and institute quarantine, the disease will likely have spread throughout the original swine operation and even into surrounding counties. Because animals are exported out of the state and out of the country, an infection could rapidly become a national or multinational event. The costs associated with the loss of animals, production, exports, and indirect items may be in the billions of dollars. Any delay in detection of an FAD

and implementation of this plan may increase these costs.

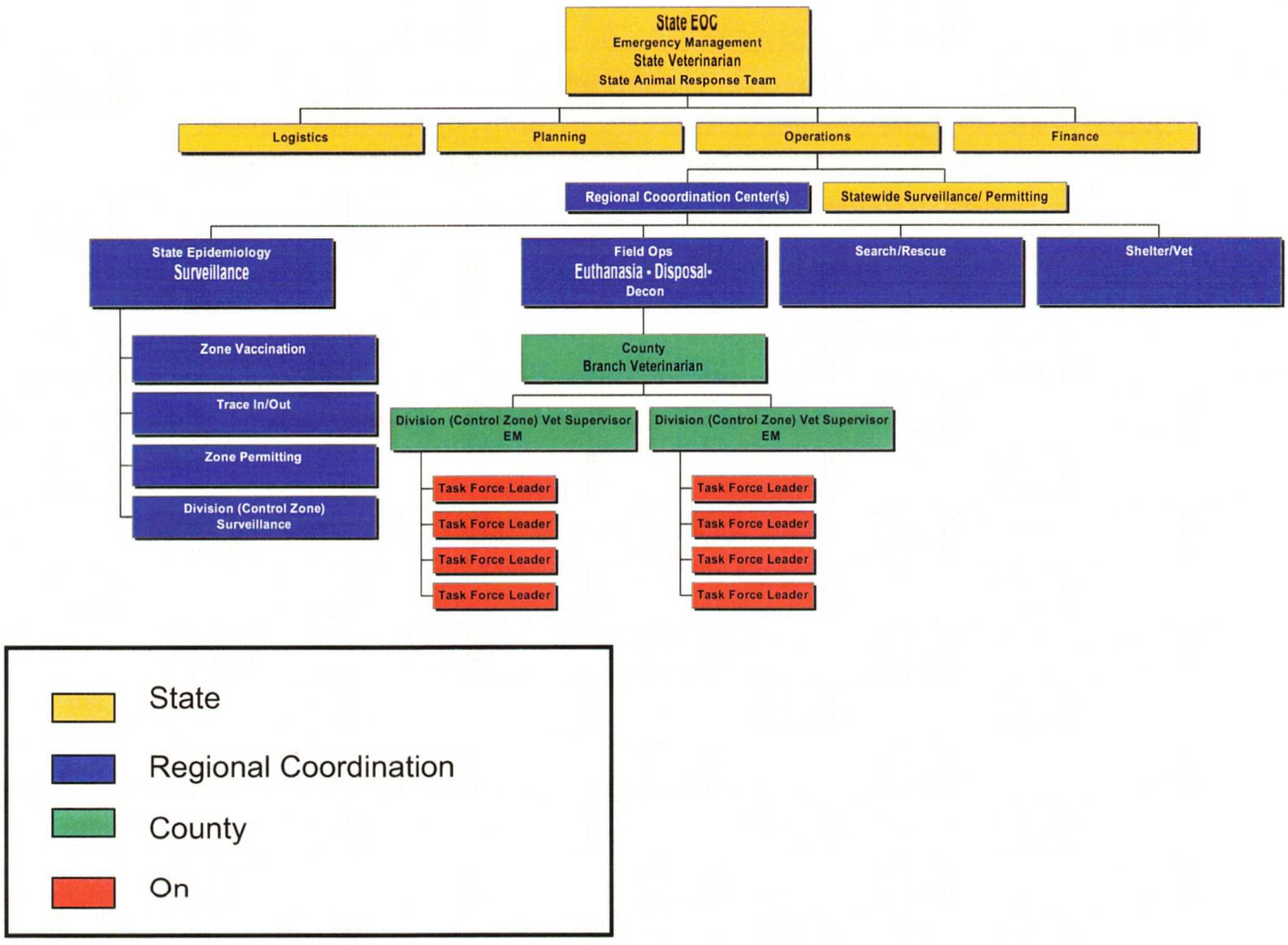
4. Mission. The mission of the Division of Emergency Management, SERT, and SART is to support the NCDA&CS efforts to identify, contain, and eliminate the spread of the infectious disease, and to minimize human health and economic impact.

5. Organization.

   a. For FAD emergencies, the SERT is organized as detailed below and in the NCEOP (Basic Plan). Its organization may be modified or expanded as necessary to deal with events as they unfold. The NCDA&CS through the State Veterinarian (SV) is the lead state agency for FAD events. Official communication and documentation for FAD events will be through the EM 2000 System and supplemented by radio, telephone, and written memo where necessary.



b. Foreign Animal Disease Emergency Organization



(1) These adjustments to the classic SERT organization occur during a FAD incident. At this time, the Department of Agriculture and Consumer Services, through the State Veterinarian (SV) requests the activation of the State Emergency Response Team (SERT) and the State Animal Response Team (SART). SART integrates into Operations, Information and Planning, Logistics, and Finance to provide expertise in animal and agriculture related activities. In addition, SART provides special expertise within Operations for:

- Veterinary Resource Management
- Epidemiology
- Surveillance
- Euthanasia, Decontamination, and Disposal
- Search and Rescue
- Shelter Operations

(2) SART is designed to operate under the direction of the SV to respond to natural disasters and infectious disease incidents involving animals or the protection thereof. SART provides a system by which the SV activates or notifies officials within local, State, and Federal government, as well as private animal health professionals and volunteers to respond to emergencies.

(3) SART operates under the principles of the Unified Incident Command System. As such only those sections and divisions needed to respond to a specific emergency are activated.

(4) In the case of a FAD incident, the SV and primary section leaders are located with the SERT.

(5) The Statewide Surveillance Division operates under the Operations Section and is also located with the SERT. This division coordinates border surveillance as well as surveillance at other points of potential disease entry, such as airports, port, rail, and mail facilities.

(6) At the Regional and County Operational Centers members of SART manage the veterinary and animal related activities while the members of SERT manage the responsibilities of SERT.

(7) The head of Epidemiology is located at the Regional Command Center (RCC) and coordinates all disease spread detection and prevention efforts such as Trace In/Out, Permitting and Vaccination control. This division remains the disease free section of investigations of all exposed and susceptible premises within the Control Zones.

(8) Investigators who are on newly infected premises will work in the Field Operations Section (infected section) or remain out of the Regional Command Center for 3 days.

(9) The Field Operations Division is responsible for veterinary activities to include management of Control Zones and all on farm procedures for infected and exposed premises to include the euthanasia, burial and decontamination.

(10) Division Veterinary Supervisors are assigned to the RCC and manage the Quarantine Areas within their regions and the Task Force Leaders on each infected and exposed premises.

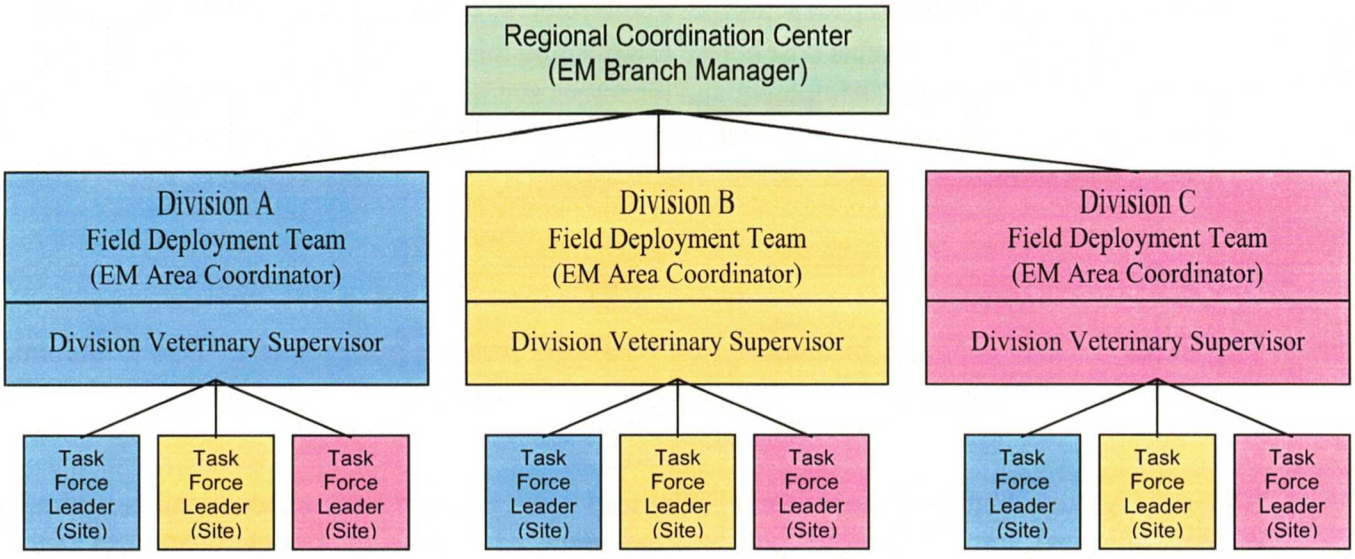
(11) County Branch Veterinarians will be established as the number of infected premises expands beyond the number manageable on the Regional level.

(12) The Task Force Leaders manage all Hot Premises tasks; including dealing with the owner, task force and the media.

(13) Search and Rescue will be responsible for assisting in animal containment and movement in and out of quarantined areas, as well as dealing with animals unable to be moved through interstate travel.

(14) Veterinary Services and Sheltering will deal with the animals provided by Search and Rescue, animals needing their assistance, or animals needing sheltering for persons activated.

c. Emergency Management field organization for FAD is shown below.



(1) The Regional Coordination Center (RCC) is normally located at an EM Branch Office in order to provide ready access to the EM 2000 system. The RCC oversees activities in multiple counties. The capacity of Foot and Mouth Disease to spread suggests that numerous Regional Coordination Centers may be necessary early on in an outbreak. An Emergency Management Branch Manager normally leads a RCC, but rapid spread and the establishment of multiple RCCs may require individuals other than branch managers to step into these leadership positions. The State Veterinarian (SV) will provide the mission statement for each RCC and will assign, based on availability, a Senior Division Veterinary Supervisor (SDVS) or other qualified veterinarian to each RCC to provide liaison with the EOC on veterinary issues.

(2) Divisions (Incident Command Posts (ICPs) manned by NCEM Field Deployment Teams (See Tab E)) are bound to decisions made by veterinary authorities in concert with appropriate operational emergency managers. Divisions (ICPs) will be located at county EOCs or elsewhere as necessary to accomplish their missions. Access to the EM 2000 is important to the operation of the ICP. Division boundaries may cross county lines. These divisions (Field Deployment Teams (FDT)) oversee FMD activities at multiple sites and are normally led by Emergency Management Area Coordinators. As with RCCs, rapid spread of FMD may require qualified individual resources other than EM Area Coordinators. Division Veterinary Supervisors (DVSs) are key members of FDT who oversee veterinary activities (quarantine, euthanasia, disposal, and decontamination) at multiple infected sites. These DVSs are assigned by the DVS at the RCC or the SV from the EOC. Non-veterinary personnel may be asked to carry out some of these tasks following appropriate instruction and equipping by the DVS or other qualified veterinary personnel.

(3) Task Force Leaders (TFL) or Site Coordinators serve as eyes and ears for DVS on individual infected or exposed sites. TFLs will be assigned by the SV or DVS and will be generally familiar with FMD and the procedures for dealing with it. Once an FAD has been confirmed and multiple sites are involved, the TFL may not be veterinarians or veterinary technicians. DVS retain supervisory responsibilities for activities on all sites under their purview.

(4) Should the outbreak spread sufficiently to make span of control from the RCCs reach unacceptable levels, the NCEM Operations Chief may direct insertion of an additional management echelon (called a branch in ICS lexicon) between the RCC and the several divisions (FDTs). Should this occur, incident command post activities would relocate to the branch locations. Benefits should be weighed carefully against cost before establishing this new echelon. The number of qualified personnel and amount of equipment and resources available limits implementation of additional echelon structures. Access to the EM 2000 system is important to the successful operation of a branch location.

6. Responsibilities:

a. **The SERT Leader** approves Incident Action Plans and resolves policy issues. Due to the unique nature of FAD emergencies and the action decisions required, there will be more direction to the ICPs and RCCs from the SERT, and specifically from the SV, than with other types of SERT Operations.

b. NCDA&CS State Veterinarian's Office is the lead agency in any FAD incident and is responsible for assigning task force leaders to each infected premises to coordinate identification of diseased animals, testing animals, tagging and isolating animals that test positive. When the RCCs and ICPs are established the SV assigns the SDVS and DVS as appropriate. The State Veterinarian is responsible for assigning appropriate resources for quarantining affected premises, euthanizing designated animals, disposing of euthanized animals, and coordinating with SERT and USDA. The State Animal Response Team (SART) is responsible to develop and implement procedures and train participants to facilitate a safe, environmentally sound and efficient response to animal emergencies on the local, county (CARTs), and federal levels. These teams (SART and CARTs) are organized and operate under the auspices of the SERT using broad principles of the Incident Command System appropriate to FAD incident response.

c. Operations is responsible for the delivery of assistance and services in support of local government operations. Four branches comprise the Operations Section: Emergency Services, Human Services, Infrastructure Support, and Field Services. The State Animal Response Team will integrate into this organization with four similar branches during FAD incidents. Operations will establish an Incident Command Post at the nearest County Emergency Operations Center to the quarantine area(s) and eliminate the FAD disease with minimum human and economic impact in accordance with the laws of North Carolina.

d. **Information and Planning** is responsible for collecting, processing, and disseminating information to support event planning and decision making, and for coordinating post impact planning activities at the field operations level. The following three branches comprise the Information and Planning Section: EOC Communications Center, Planning Support, and Technical Services. The Planning Support Branch, working with SART personnel, will prepare an FAD planning document to include this appendix; specific procedures for containment, euthanasia, disposal, and decontamination; and other material that may be useful in response to an FAD outbreak. When an outbreak occurs and the EOC is activated, Information and Planning will establish a 24-hour situation room for tracking and reporting. When necessary, Information and Planning will provide a representative at the ICP or RCC.

e. **Logistics** is responsible for planning, organizing, coordinating, and directing logistic operations that includes the following: control of donations, industry liaison, supplies, and equipment; distribution and delivery of supplies, equipment, and support services. Logistics will track and manage resource requests at the State EOC. Logistics will also establish an Identification Office in the vicinity of

the Incident Command Post to provide identification badges to all persons authorized entry into the Incident Command Post, affiliated activity locations, and the quarantined area. There will be close coordination by Logistics with the industry, the NCDA&CS Consumer Geographical Information System CGIS, and other organizations such as the Employment Security Commission to identify and document the impact of an FAD event.

f. **Finance** is responsible for coordinating all financial activities during a disaster event, which includes internal cost tracking and status of disaster event operating budget(s). Finance will establish financial accounts to support the operation and to track all expenses and federal monies provided. Finance will provide a representative at the Incident Command Post to coordinate financial matters.

g. **Education and Emergency Information** is responsible for dissemination of emergency public information and family safety information before, during, and after a disaster event. The Education and Emergency Information office will establish a 24-hour Joint Information Center (JIC) to manage all information released to the public. Close coordination with the NCDA&CS for this activity is important.

h. **Mitigation** is responsible for conducting and maintaining statewide vulnerability assessments for all natural hazards and developing mitigation policies, programs and strategies that will lessen both current and future vulnerability. They prioritize mitigation strategies after each major disaster and administer post-disaster hazard mitigation grant programs. They administer pre-disaster mitigation grant programs and support the development of local mitigation plans.

i. **Legal** is responsible for providing regulatory review and legal advice to the SERT in all aspects of their response to FAD events. They will assure that all contracts, operational agreements, and letters or memos of understanding are proper and appropriate under State Law.

j. **Federal Agency Involvement** is expected in any FAD Incident. Their involvement is expected to include FAD event verification through initial site investigation and laboratory analysis. Additional support may be provided through a wide variety of services including, but not limited to the United States Department of Agriculture and the Department of Defense. Federal agencies will work in conjunction with the NCDA&CS and North Carolina Division of Emergency Management and the Department of Crime Control and Public Safety. The SV and SERT must be prepared to proceed with FAD incident response independent of Federal Agency participation.

k. **Local Emergency Management** will be requested to provide general support to State Veterinarian's Office in response to Foreign Animal Diseases. Any Foreign Animal Disease outbreak is expected to require response on a statewide basis. Local emergency managers are expected to provide such support as their resources allow and as may be required by the SV. County Animal Response Teams (CARTs) may develop procedures and train personnel to respond to FAD incidents and other animal related emergencies. The SV and SERT must be prepared to conduct an FAD incident response with limited or no Local Emergency Response.

7. Concept of Operations.

a. Levels of Activation.

The North Carolina Department of Agriculture and Consumer Services receives a report of an illness in susceptible animals at a producer in North Carolina that appears to be an FAD. The State Veterinarian or designee (SV) requests the USDA assign a Foreign Animal Disease Diagnostician (FADD) to the

premises to investigate the report. The SV will assign appropriate State veterinary personnel to assist the USDA. Following an initial investigation, the event will be classified as Not Likely, Suspect, or Highly Suspicious. In the case of "Not Likely" no notification outside of the NCDA will be made.

Activation Level	Description
4	When the USDA notifies the SV than an FAD event is Suspect, the SV notifies the North Carolina Division of Emergency Management (NCEM). The NCEM Duty Officer will notify their senior management and the entire Operations Branch. Otherwise, NCEM will continue normal daily activities. This constitutes **Level 4 activation** or normal operational readiness status for SERT. The SV may request SERT to notify the SART of the event for awareness purposes. SV will notify NCEM should the event be determined not to involve an FAD.
3	When SV notifies NCEM that an FADD has been classified the event as Highly Suspicious or that an FAD event has been confirmed in the United States outside of North Carolina, or in other countries that may directly affect North Carolina, the SERT will be elevated to **Level 3 activation**. This level activation requires assembly of appropriate SERT and SART members at the EOC, including the SV. The SV will identify the Taskforce Leader (TL) to the SERT. The North Carolina Highway Patrol will be placed on alert to impose a quarantine area around the designated premises in accordance with instructions from the SV and TL. Local law enforcement will be requested to assist in these quarantine efforts. NCEM branch managers and area coordinators will assist in briefing Highway Patrol and local law enforcement operations. Should the SV determine that an FAD threat does not exist, the SERT will return to Level 4 and the Highway Patrol and Local Law Enforcement assets will be taken off alert.
2	When the USDA notifies the SV that quarantined or other susceptible animals have FAD, the SV will notify the SERT of the Confirmed classification. The SERT will be elevated to **Level 2 activation**. The SV through the DVS and TL will establish Quarantine Areas consisting of the Hot Premises, the Exclusion Zone, and the Control Zone. Examination and testing of susceptible animals will be expanded beyond the initial Hot Premises to other operations within the Quarantine Area. NCEM and NCDA&CS will brief the Secretaries of Crime Control and Public Safety and Agriculture and Consumer Services, and, with their approval, ask the Governor to declare a State of Emergency and request a similar declaration from the US Secretary of Agriculture. The Highway Patrol and local law enforcement will continue enforcing the quarantine on the original site and within the expanded quarantine area.

1	When SV determines the FAD has spread beyond the original Hot Premises, NCEM will order **Level 1 activation** to increase support to the response effort.
Return to 4	Deactivation of the SERT will occur when the SV, the SART and the SERT members agree that the threat to the public health and susceptible animal population has been reduced to a level that can be efficiently addressed by routine assets of the NCDA&CS, the USDA, local governments, and the animal owners. Once this determination is made, the EOC will return to a Level 4 Operations Status. The SV may continue the alert status of SART in dealing with the closure, debriefing, cleanup, documentation of the FAD event.

b. SERT FAD Response Actions.

When an FAD event is classified as Highly Suspicious or Confirmed, at a SERT Level 3 or higher activation, the following SERT and SART activities may be required by the SV, the DVS, or the TL, or as conditions dictate. Refer to the NCEOP, the Tabs to this Section, and SERT and SART Procedures for details on implementing such activities.

(1) Introduction/ Definitions and Abbreviations

(2) Investigation and Case Characterization

(3) Epidemiology: Surveillance/ Geographical Information System (GIS)

(4) Establish Incident Command Organization and Facilities

(5) Protection, Decontamination, Bio-Security, and Safety

(6) Containment, Quarantine, Traffic Control, and Scene Security

(7) Permits, Finance, Procurement, and Legal Support

(8) Euthanasia and Disposal (Burial, etc.)

(9) Interagency Liaison and Coordination (i.e. Wildlife Resource Commission)

(10) Public Affairs and Media Management

(11) Logistics, Supply, Transportation, Human Services, and Sheltering

(12) Medical Support and Human Factors

(13) Business and Industry Liaison

(14) Research and Laboratory Support

(15) History, Forms, and Reporting (EM2000, etc.)

As the FAD event progresses, the number of Hot Premises or Quarantine Areas may increase requiring implementation of Regional Command structures under the ICS. All of these groups will remain under the direction of the SV and the SERT through out the event.

Bioterrorism Risk Management at Agricultural Experiment Stations

Gary Lemme, Associate Director
Michigan Agricultural Experiment Station
Michigan State University

Unfortunately, bioterrorism is a component of modern agricultural research administration. Most research center administrators are not well prepared to address bioterrorism. Developing safeguards against bioterrorists will not guarantee that your research center will not be a victim of bioterrorism; however, a risk management approach that respects your research center's mission and culture will help prevent bioterrorist incidents and minimize potential research losses.

Animal rights terrorism started to occur at research laboratories in the United States during the past decade. Threats to animal science research at livestock and small animal facilities have accelerated. Recent advances in animal biotechnology and cloning have increased the threat of terrorist incidents at animal science research centers.

Biotechnology terrorism has become common at many agricultural research facilities. Terrorists have targeted greenhouses, field plots, research laboratories (both existing structures and those under construction) and administrative offices.

Threats of political bioterrorism at agricultural research centers have become a reality since September 11, 2001. Agricultural research centers can be a material source of infectious disease agents for plants, livestock, and humans; agrochemicals; and dispersal equipment. In addition, the large number of international and domestic visitors at our research centers makes them vulnerable to both the introduction and spread of infectious diseases to our agricultural industries.

A survey of agricultural research facilities struck by bioterrorists since the change of the millennium demonstrates the vulnerability of our agricultural research system. Facilities that are public and private, large and small, situated throughout the United States, located in historical buildings or those under new construction as well as agricultural projects involving field crops, floriculture, fruit, vegetables, animal science and forestry have been victims of bioterrorism. Collectively, over $40 million in direct damage to agricultural research facilities has occurred in the last 25 months. If the cost of additional security is included, these costs are much larger. The greatest cost to agricultural research may be "opportunity" costs — costs from research that was not conducted because of pressure from terrorist groups or not funded because resources were redirected to security measures.

Agricultural Research Facilities Damaged by Bioterrorists*

DATE	LOCATION	INCIDENT
12/31/99	Michigan State University	Arson fire to administration building
1/10/00	USDA-ARS (CA)	Damage to wheat greenhouses
2/9/00	University of Minnesota	Damage to oat greenhouses
5/9/00	Novartis (HI)	Damage to corn, fruit, flower plots
6/4/00	Pure Seed Testing (OR)	Damage to grass plots
7/13/00	Cold Spring Harbor Lab (NY)	Damage to corn plots, greenhouses
7/20/00	USFS (WI)	Damage to 500 trees and 10 trucks
7/22/00	MEAD Corp (ME)	Damage to 2,000 trees
8/1/00	UC Davis	Damage to corn plots
8/10 & 26/00	UC Davis	Damage to corn plots, greenhouses
10/9/00	UC Berkeley	Damage to corn plots
3/mid/01	Oregon State University	Damage to 800 trees
4/5/01	Huntingdon Life Sciences	Research animals removed
5/16/01	DNA Plant Tech. Corp. (CA)	Damage to strawberry & onion plots
5/21/01	University of Washington	Arson fire to research building
5/21/01	Jefferson Poplar Farms	Arson fire to research buildings & vehicles
6/10/01	University of Idaho	Damage to newly built Ag Biotechnology Laboratory
11/12/01	Sierra Biomedical	Damage to equipment & files destroyed
12/05/01	Marshal Farms (NY)	Research animals removed
1/29/02	University of Minnesota	Arson fire to research building construction site & adjacent Crops Research Building

**Science*, June 1, 2001, Volume 292, No. 5522; *Farm Journal*, December 2001, pp. 14-15; and news releases.

*Many groups have claimed responsibility for these and other acts of bioterrorism, referred to by most groups as "ecoterrorism. " Some of these groups are Earth Liberation Front (ELF), Seeds of Resistance, Reclaim the Seeds, Nighttime Gardeners, Bioengineering Action Network (BAN) and Animal Liberation Front (ALF). Many groups communicate to the public through a clearinghouse called Genetix Alert. Many of these organizations are loosely connected and communicate among their members through the World Wide Web. Their websites (i.e., www.infoshop.org/biotechwatch.html, www.tao.ca/~ban, and www.earthliberationfront.com) provide interested people a "How to Guide" for conducting terrorist acts at agricultural research facilities, a "What to do Guide" if questioned by authorities, "Research Links" that identify potential targets which include many agricultural research centers associated with land-grant universities and a "Calendar of Events" of public meetings that are potential targets for disruption. These meetings run the full gamut from large national scientific symposia to field days held at agricultural research centers across the nation. One website advises that

ffi*niversities can be one of the best* targets with *accessible greenhouses and farms, search university websites, visit campus farms, and ask student workers to explain the research.*"

Agriculture Hall at Michigan State University (MSU) was damaged on the night of December 31, 1999, as a result of a bioterrorist attack that was set to coincide with the change of the millennium. The Agricultural Biotechnology Support Project (ABSP) was targeted with an incendiary devise. The office of the project manager was the epicenter of the fire. Initial estimates of damage to the historical building were $400,000; however, final repair costs totaled around $1,000,000. The greatest cost of the arson fire was not to the physical structure but to the faculty, staff and students who worked and studied in the building. All of a sudden, people questioned their safety in the building, both during normal work hours and in the evenings. However, I feel that the greatest cost was to the culture of research freedom. This terrorist attack was motivated by the desires of a few radicals to impose their political agenda upon the culture of academic freedom and the pursuit of knowledge by agricultural researchers.

The Environmental Liberation Front (ELF) claimed credit for the fire three weeks later. The following fax was received.

> "*On the eve of the new millennium, the ELF struck back at one of the many threats to the natural world as we know it. On December 31, 1999 at approximately 9:00 pm, the ELF entered the Agricultural Hall at Michigan State University in Lansing, Michigan. Our destination was room 324, the Offices of Catherine Ives et al. The project being conducted through this office is funded by Monsanto and USAID and was designed to not only pursue research concerning genetically engineered sweet potatoes, corn and other crop vegetables, but to lobby developing countries to abandon their current agricultural practices and to rely on genetically engineered plants and thus, corporations like Monsanto. Local newspapers have put the damage done to the building at $400,000 with documents and equipment totally destroyed. Cremate Monsanto! And G. E. (Genetic Engineering).*"

The communqué indicates that the terrorists had entered into the building, knew where in the building the ABSP offices were located, knew the name of the project manager and on what crops the ABSP program worked. All of this information was available on the ABSP website and in public information literature distributed by ABSP. The terrorists used the University's educational culture and material against itself, thus threatening the core mission of Michigan State University to conduct research and provide unbiased information to the public.

Michigan State University reacted to this incident utilizing a system-wide response that involved a campus coordinating committee comprised of representatives from researchers, department chairs, campus police, media specialists from University Relations, Land Management Office (LMO) which is responsible for research center facilities across the state and on campus, Office of Biological Safety and the Michigan Agricultural Experiment Station (MAES). This committee coordinates information and responses. The MSU Police assigned a detective to bioterrorism and has served as a source of information concerning training and security needs. An information listserv was established that included key deans, the MAES director, department chairs, LMO and facility managers. The listserv permits rapid distribution of information concerning potential threats. Those on the listserv are charged the appropriate individuals in their units. Security professionals provided training and informational meetings for faculty, staff and students. The dissemination of factual information in a timely manner quelled rumors and fears among employees. All media responses were directed through a University Relations spokesperson.

Bioterrorism risk management involves a cultural shift by the institution and its members. Within the Michigan Agricultural Experiment Station, we have increased security through several means. A MSU police detective

has been assigned as a liaison to MAES. It is critical that campus police network with law enforcement units on other campuses, in the local community and with state and federal agencies. Research facility managers have hosted police tours of their facilities to help increase police awareness of the facility, solicit ideas for security improvements and to coordinate security efforts. Mock incident training activities should be included in any security plan. We have increased facility security in our research laboratories through training, encouraging the identification of a spokesperson for each laboratory and restricting access and signage. Greenhouse security measures have included computer-monitored access with pass cards and video cameras, the location of genetically modified plants is not identified through signage, and, generally, projects that might be targets of bioterrorism are not placed in exterior greenhouses. Great strides in data security and backup have been made among all researchers and staff. People are much better at making copies of data files on a daily basis and storing those files at multiple locations (both on and off campus) than before the Agriculture Hall fire. Security concerns are now considered when responding to media requests and in reviewing staff and student employment applications. All media requests are channeled through the Office of University Relations. Everyone has been encouraged to review the information on their websites to maintain their usefulness to the public while not providing laboratory or greenhouse locations, eliminating plot maps highlighting genetically engineered treatments, avoiding personal information such as home addresses and not having pictures that link staff and students with biotechnology equipment or genetically engineered field plots or cloned animals. All of these provisions involve a shift in institutional culture and relies upon the vigilance of all members of the research community. Without this cultural shift in people's attitudes and attentiveness, the improvements in security will not be successful in reducing the risk from bioterrorism.

Public education is an essential component of a public educational institution's bioterrorism risk management plan. At MSU, a communications taskforce was established to coordinate information exchange. A media website was created (www.biotech.msu.edu) to assist in responding to general media requests without placing unreasonable time demands on researchers. The website includes answers to common questions plus provides photos and quotes from individuals that have agreed to be spokespersons. Media specialists from the Office of University Relations offered training sessions to all spokespersons and the communications taskforce. Briefing sessions have been held by faculty spokespersons for Michigan's federal delegation and the MSU Board of Trustees. A campus brown-bag seminar series, designed to stimulate open dialog among students and faculty concerning biotechnology issues, is now more widely advertised. Employee training and information awareness has been increased in many research units. Efforts were made to coordinate information among Michigan State University, state agencies and agricultural organizations. Attempts have been made to include biotechnology issues into conferences with diverse audiences without holding conferences exclusively around biotechnology that may become a target for bioterrorists.

Bioterrorism risk management at agricultural research centers offers some unique challenges. However, risk management efforts should not detract from your mission of research and public education. Staff education is critical for research centers so employees are comfortable with the research protocols used at the center. The rural nature of many agricultural research centers results in every employee being a potential ambassador of research information in their community. Our research center managers are encouraged to locate plots with genetically-engineered treatments away from exterior roads, to separate public education plots involving approved genetically-engineered plants (such as variety plots) away from plots containing high-value early-generation genetically-engineered treatments and to clearly label approved biotechnology plots while using standard research-coded plot labels for biotechnology research plots. It is essential that all products from biotechnology research plots be disposed of according to protocols required by federal and state regulatory agencies. Concerns with political bioterrorist and the use of agricultural products in the manufacturing of illegal drugs have resulted in research center administrators needing to provide secure storage for fertilizer, pesticides, disease agents and sprayers.

In livestock research facilities, it has become necessary to limit access to sensitive research areas while maintaining areas for public viewing of general livestock. Public postings of research protocols must be made in compliance

with federal, state and university regulations. The location of livestock research facilities, especially those that may be targets of animal welfare or biotechnology terrorists, should be selected carefully. The signage on livestock research facilities should be generic in nature and not counter to your bioterrorism risk management plan. Those livestock units that are conducting research with disease agents must have a secure storage area and accurate inventory protocols. In addition, it is critical that research center administrators coordinate with local law enforcement agencies and media as part of their bioterrorism risk management plan.

In summary, bioterrorism is a reality in modern agricultural research center management. Bioterrorism is a threat to the scientific process and a threat to scientists. Risk management plans must be developed by research center administrators that implement the necessary security measures to provide employees a safe working environment while engaging the public in an open educational dialogue about research programs.

Getting The Right People In The Right Niche or "What Makes A Good Hotdog?"

Ben U. Kittrell, Director
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Why are we here? No, this does not mean here at Orlando! Why are we at the various stations and centers? Our mission should be our guide as to what our program will be. Most of us, probably all of us, are there to see that relevant research and extension programs are accomplished. These programs are accomplished through projects conducted by University faculty scientists. Some of you do not have faculty that reside at your center. For those of you that do have faculty, my prayers go out to you! But, without the faculty and the projects, there would be no need for the center or us!

What is required of the faculty? These days it may seem that they must obtain financial grants and publish papers. Most faculty need help of some sort for them to complete a successful project. Different faculty need different kinds of help. Good tractor operators don't necessarily make good lab workers or secretaries. Therefore, our objective is to assign the best qualified person for the job.

All centers are organized and operated differently; and rightly so, because their missions are different. Some of you have a "pool" of technicians and some of you have technicians assigned to specific faculty. Some may have a secretarial pool. We had that once and I hated it! I believe a secretary can be the most helpful if they work with the same individuals so they will better know the faculty member's program and become an integral part of it. They need to know the terminology and be able to read the hand writing, etc. I believe the same philosophy holds true with technicians assigned to resident faculty. They should be integral parts of the faculty's program and assist them in all ways possible to make the faculty more efficient and effective.

However, there is a negative side to technicians assigned to specific faculty. There becomes a "feeling" of an ownership problem by the faculty. You know, faculty can be the most selfish people about their work! But, that is what makes them good! However, there are times when help is needed by others and some faculty will not allow them to help, even when the technician is not that busy. The same feeling is developed by the technicians who feel they are not supposed to help others when it could be a sign of laziness. On the other side of the coin, some technicians may impose on other technicians to get help when it could be done without additional help.

The pool concept also has advantages. I personally do not like the term "pool". I guess I tend to remember my Army National Guard days and the motor pool. Individuals should not be considered a jeep or an Army mule. I like to call it the Ag Support Team. This concept is best when no faculty are stationed at the center or when a center is small enough to have a manageable team. Communication and control are certainly easier under this concept, and there are fewer tendencies for "kingdoms" to be built. A good, strong, fair-minded manager is needed to build the team concept and to keep morale high so as to keep the team members thinking they are more than just common laborers.

Most of us are "managers-in-time". We are hired with personnel already in place that may have worked a certain way for many years. These are not political appointees that we can clean house and hire who we want. We have to do the best we can with the cards dealt to us. We end up inheriting what the previous administrator set up. This may or may not be the way we think is best. I have been fortunate to have had the opportunity to start a new station. I had only a farm foreman and a laborer. Boy. . . talk about the simple days! I also took my present position as the fourth director of this center with about 50 people. After a few years and with much thought, I made a decision to move some personnel to obtain better efficiency. I was not a popular person! I was accused of racial discrimination and had to answer the charges which, of course, were not correct. On top of that, someone at the center (I think) called OSHA to make me look bad, and we ended up paying a lot of fines. But, we learned

to be more aware of safety in the long run. We have continued with the changes that were made and have made others, but I have not been subject to that again. . . thank the Lord!!

Someone once said, "The future is not like it used to be"! Things change faster now. It used to be that we would hire someone to keep the same job for 30 years. No job now stays the same for 30 years. When we hire someone to fill a vacancy, do we try to ascertain the needs that have occurred in the past and for changes in the future, or do we try to just get a "clone" to replace the past? Should we be thinking of needed characteristics of people that can adapt to other jobs at the center in the future? What do we do with a technician when the faculty member leaves and that project is ended? What happens when a new faculty member is hired and the present technician is not suitable for the new project?

One important task that the director is responsible for is infrastructure. Faculty members are not usually interested in infrastructure and, really, they should not be since they must concentrate on their research projects. But, it is still important. Who will fix the roads? Mow the grass? Fix the leak in the water system? Get the air conditioner running? Look out for safety? The list goes on and on. At one time, the farm manager at Pee Dee was responsible for maintaining all infrastructure, providing assistance to faculty from main campus and planting, as well as harvesting, all rotational crops not in research! In addition, if the resident faculty needed extra help, they expected the farm manager to drop everything and help them! But no faculty members were interested in their technicians helping the farm manager. I now have a buildings and grounds manager with an assistant to maintain his area of responsibility. I formed a Research Technical Team (RTT) with a manager and three technicians to assist all main campus faculty with their research and provide assistance to resident faculty when the workload is beyond the requirements of the faculty technicians. The farm manager can now concentrate on the rotational crops, roads, ditches, etc. By reassigning several people, we were able to make this change with only one new employee. We are now getting more done in less time than ever before. One important thing that causes this change to be more effective is because the RTT and the farm manager are willing to work together much better than the faculty technicians.

Supervision is a very important part of management of personnel. I have observed that the poorest supervisors, as a whole, are faculty. They concentrate more on their projects and writing their publications and, therefore many times, do not keep up with their technicians on a day-to-day basis. To some extent, this is understandable and is as it should be. However, it is imperative that technicians are chosen for faculty that do not require close supervision. They must be people that can find things that need doing instead of waiting to be told every move. It is also imperative that the faculty member makes sure that the technician knows what the project is all about and why and when certain things are needed to be done. The technician should know what preparations must be made and prepare ahead with little supervision. A poor technician can be a hindrance rather than an asset to the faculty. Hiring the right person is the key. The chemistry of the technician and the faculty must be compatible.

I know all of you are wondering about the hotdog part of this presentation. For some of you that did not hear my "violin speech" in Memphis, that was tacked on, and I never got to explain it. It is really tacked on to this talk because the program chairman wanted to tack it on, and he did! But, it goes along with the philosophy of the main emphasis of this talk, and here it is!!!!

A good hotdog provides nourishment. You get meat, bread and vegetables. So, a good hotdog is a complete meal. This is similar to a center with a director, faculty and staff. It's a complete working family.

A hotdog can be a person that shows off. He tries to be a little better than the rest and lives for praise. A good worker should be praised when he strives to be better than the rest and that may help him be a good hotdog.

A good hotdog is an expression when you feel good, like "HOTDOG! I FOUND SOME MONEY! " But, a good hotdog is an expression to me that says, "HOTDOG! I HAVE FINISHED THIS SPEECH!!!!"

Spatial Technologies for Agricultural Research

Jim Smith
Mississippi State University

Precision farming or site specific management is an area that I am quite excited about because it involves technology. There are a lot of people out there selling things to farmers that the farmers do not need or that are being over priced to the farmers. Our research has two focuses; one, investigating these new technologies and making them work, and two, making them affordable and determining if we really need them.

We are talking about global positioning systems, GIS, variable rate technologies, and remote sensing, etc. This is an area that I have been excited about for years. Twenty-five years ago I dreamed of these types of things. When I came to Stoneville in 1994, I set up a group to be a GIS laboratory to help everybody get involved in these types of technologies. If I have any claim on any of this technology, it goes back to being in the boll weevil research laboratory at Mississippi State where I helped develop GIS for boll weevil eradication. We started from scratch and developed some GIS systems that were very valuable for us and are still being used today. When you put GIS and GPS together, your research can benefit considerably from the joined technologies.

Remote sensing is something that is coming into its own. We have a big NASA space center in Mississippi. Because it is in Mississippi, NASA depends on Mississippi senators and other politicians for their support, so NASA has gotten very involved with agricultural research. Because of NASA, we are seeing a lot of remote sensing efforts in our research in Mississippi. Types of sensors include aerial cameras, video recorders, multi-spectral scanners, hyper spectral scanners, different types of sensors and different platforms. I got these slides from the people that work for me, and I had to ask questions about some of them such as, "What is a flying wing? " They said it is something that they proposed in California that is going to be stationary in the upper atmosphere and will look down on the San Joaquin Valley and give continuous remote sensing capabilities.

I want to talk about some projects at Stoneville and use them as examples. One of the things I first wanted to do in Stoneville was to get a historical base for our cropland. We've got about 2,500 acres in research fields, and research has been done on about 500 of those acres for nearly 100 years. It would have been great if we could have had historical data with an aerial map of our research centers with GPS coordinates and grids of all of our plots. We could set these up so we could collect data from exact locations of historical research at that location. Our researchers started working approximately eight to ten years ago on research that would be able to fit into that kind of procedure. This scientist was always working toward using GPS systems and GIS systems when he was collecting data. He wanted this data to fit into a program that would measure the implication of research at one spot over a long period of time. He expected that this type of data collection would provide considerable useful data.

Then, yield monitors come along. Most of you know about yield monitors. The ones with grain came first, especially on soybeans. Collecting this type of data has been very valuable to use with our GIS systems. Also, it is one of those types of things that can be used to correlate with our research and analyze what we are doing with the cotton yield monitoring system. We have several different cotton monitors. Actually, one of our scientists in Stoneville developed a cotton yield monitor over twelve years ago that was very valuable in our research.

One of the tools that is more controversial is the electron conductivity of various systems. In fact, when I first heard scientists talk about electron conductivity in soils, it was with a very negative connotation. But, what we have learned is that there are very few methods of getting information on the variability of soils. This is a tool that will provide information on the variability of soils. Once you learn what the variability is in the soil, you are

then able to correlate data to the real world or working world. We are doing some things that are pretty exciting that involves looking at electron conductivity.

Aerial chemical application uses GPS a great deal. I work with the boll weevil eradication program, and I think that the aerial application industry probably has used this technology more than anybody else and to greater benefit. Putting out agricultural chemicals is a very serious business. There are a lot of hazards involved with it and a high probability of lawsuits. Having permanent records using a GPS with aerial application is very important. Any time you have a big program, like boll weevil eradication, it is very important.

This is an example of using GPS flight records showing some of the faulty patterns that indicate the fact that they were not turning off the spray when they should have, and that they went over areas that shouldn't have been sprayed.

This is another example of using a geographical information system in boll weevil eradication. This shows all of the different cotton farms in the area. This type of mapping is essential in any type of large area pest management program. It allows you to get to the detail where you can identify the producers and have numbers and information about each unit. Some of the interesting things that you can have, for example, is location of bee hives in the area. A program that involves spraying insecticides is of great interest to beekeepers. They are very interested in your not spraying their beehives. The GIS provided information for locating beehives where they would not be sprayed.

Another type of technology that I think is real exciting is bar code reading. All of our boll weevil traps and entomologists all over the country use bar code readers so they know exactly where the traps are located. The bar code reader also records the exact time when you read the trap. This can fit right in with a GIS mapping system. You can put GPS systems over the bar code readers. That way you know that your employee was at the location he said he was.

NASA has worked very closely with Mississippi State, and being an entomologist myself, I've been very interested in IPM systems especially in cotton and working with things you could do to control pests. An example of some of the technology we have developed is that of a post doc that has been using remote sensing in pest management. I worked on spider mites in graduate school, and my early work was on spider mites on cotton so I felt the GPS and GIS programs should start with spider mites. We knew that the spider mite was one of those insects that you could see visually. We knew that if you could see them in the field or see them from the highway, then you could see them with remote sensing. My early work showed how you could use insect information or mite information in correlation with damage and treatment. Two other of my colleagues whom I worked with at ARS are also working on using plant bug research in remote sensing. One of the big things in plant bug research are wild host plants. Using remote sensing as an aid in controlling wild host plants has been found to be an excellent tool for site-specific management and control of plant insects. We are also looking at crop vigor for site-specific management in controlling plant bugs. Several of our researchers are looking at how we can look at fields, look at the plant vigor and look at the crop situation for site specific treatment. We have some real tools to be able to use site specific management on stink bugs. Stink bugs are kind of the reverse of plant bugs. Plant bugs are found in the most vigorous areas of the field. Stink bugs are found in the most stressed area of the field. It gives you a real idea that not every insect has the same type of information.

This is research of Kenneth Hood's farm. Kenneth is one of the most innovative farmers in Mississippi and probably one of the most innovative in the nation. He is going to be the new president of the National Cotton Council. He and Jeff Withers do a lot of work on spatial variability and using insecticides on a prescription basis on his fields. This shows some of the research fields highlighting the vigor of the cotton. They can correspond that or correlate that to the insect damage.
Another research program is using types of remote sensing, GPS and GIS technologies to do the actual scouting

of the crop. The next step is to determine how to input and utilize all of that scouting information for variable rate management. Variable rate technology is something we will see more and more of. There are several groups at Stoneville working on variable rate technology. The first group you will see is using it with herbicides because weed technology lends itself to remote sensing and using variable rate technology. It is probably the easiest. James Hanks is an agricultural engineer at Stoneville. He is not only doing variable rate technology for herbicides, but he is also doing variable rate seeding. When you look at our variable soils, you know that we need seeds at different depths and different rates of seeding. This is some of Gene Widows work using variable rates for PIX applications looking at the soil analysis and looking at the plant growth realizing that you need to make prescription application of PIX in a field.

An area that I think is a frontier-type breakthrough is using videography or using cameras right aboard crop application planes or crop dusters. Dr. Steve Thompson at USDA in Stoneville is working with using these type sensors. They can give you real-time information because every time an airplane flies over a field they can collect data that can be used in the management of this crop.

Irrigation research is another of those areas. We collect a lot of irrigation data and being able to use remote sensing, GIS, GPS and all this new technology in irrigation research has given us a lot of valuable information. One of the things that we have found out is that we do not know how to irrigate cotton. Cotton is one of those plants that you would think it would be simple to irrigate, but it isn't. We are finding out more and more that we can use remote sensing and this type of new technology to help us in irrigation research.

This is an example of the cotton/corn rotation that we are doing and looking at how the remote sensing information looks at that.

Catfish is an area where you would not think that you could use remote sensing. But, each catfish pond, when looked at from an airplane, has a different signature, and each pond has a different color or different reflectancy. Each has a different health to them. We are trying to look at how we can use remote sensing to be something that we can use to monitor the health of these ponds.

Nematode is the big pest in cotton right now in the mid-South and especially in Mississippi. Everything that we do with nematode research is tied to our GPS, GIS technologies. We know right where the samples came from. We keep a historical database, and we look at the different practices and how they affect the nematode populations. This is our nematode laboratory where we do our samples and some of the infra-red reflectivity looking at nematodes.

A lot of times when you have the type of technology that we have and you have the lab set up, people will come asking us to do something for them. An example of that was when the Delta Council, which is a big organization in the delta, was very interested in flood control. They came to us asking if we could help them. They asked if we could use our technology to help the Delta Council promote their flood control project. One of the things that they had were maps of elevations. What we did was take the elevation and look at the flood potential in that area. If you went to 85 feet per section, you got a particular type of flood pattern. If you went down to 80 feet, you get a different type of flooding. This type of information enables people to go to their legislators and their congressmen and explain why we need flood protection. This is an example of when you've got the capability, you can serve a lot of different people with the information that you've got.

The key to understanding all of these new technologies is that they are powerful tools, but they are only as good as the people that use them. If you've got the right people that can use this technology, they can help you with your research and your efforts. They will be very valuable.

Land Management Record Keeping for Agricultural Research Centers

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Crops Use Online System

North Carolina State University (NCSU) researchers have field projects on 15 different research stations scattered from the coast to the mountains. Managing and overseeing the land assignment of these projects generated a large amount of paper forms and a bureaucratic burden to our superintendents and administrators. NCSU and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) decided 7 years ago to move the management of these land assignments from paper forms to the Internet and the storage of related information to a Microsoft web server. The decision to transform from paper to "bits and bytes" was based on the following reasons.

(1) Recognition of the management cost of using paper forms. At NCSU, it occupied 4-6 weeks of a college administrator's year to oversee the assignment process.
(2) Acknowledgment of the frustration generated when paper forms are lost.
(3) Noting the difficulty in generating summary reports on broad areas of research by culling through the detail on paper forms.
(4) Consideration of the value gained in making easy enhancements for new requirements.
(5) Agreement between NCSU and NCDA&CS that electronic signatures on the World Wide Web would suffice for form approval.

The development of the online forms was based on the information carried on the paper forms. Key web pages are included below, and referred to in the text, to illustrate how the assignment and approval process steps and the information management needs were translated to the web-based system. The first step was to secure the site with differentiated password protection for the various system users up and down the approval chain (Figure 1). Subsequent development included the following actions.

(1) Review all types of paper forms currently used. Some sites or locations may require different forms or unique information. Gather an example of all unique forms. Use completed forms that have been approved at all levels. Pay particular attention to forms which have penciled notations.

What looks like scribbles or notes may be a vital piece of information.

(2) Post an HTML list of all the form information on the WWW. Email the URL (online address of the html page) to all people involved in the form completion and approval. Ask for comments on the form information items. Modify the information as new information requests are heard.

(3) Design and program a form which could gather all the desired information. Post the URL of this newly designed form. Notify all interested parties. Gather comments on the appearance and function of the new online form. Revise the online form to reflect the comments and suggestions. (Figure 2)

(4) Identify information that can be grouped separately. (Normalize your data). NCSU keeps stations definitions and superintendents' names and email addresses in a table. Large approval groups, such as Department Heads's names and email addresses, are in a separate table. (Figures 3 and 4)

(5) Design and program a concise format for displaying the form information after it has been inputted by the project investigator, edited and written to a database. Post this format on the WWW and ask for comments from all approval parties. Revise format to incorporate comments and suggestions. (Figures 5)

(6) Write a script which can generate email requesting that a form be reviewed. Test the approval chain by generating email. (Figure 6)

(7) Encourage a feedback loop between users of the system and developers of the system. The best systems are improved based on a cooperative effort.

A healthy computer system is similar to a healthy plant. . . it keeps growing. Over the past three years, the Crops Use system has grown to include new computer screens to handle new functions.

(1) A detailed menu description is basic to any online system. (Figure 7)

(2) A procedures guideline which allows support personal who are unfamiliar with the forms to answer questions about the preliminary forms. (Figure 8)

(3) A procedures guideline which allows support personal who are unfamiliar with the forms to answer questions about the annual forms. (Figure 9)

(4) A quick overview by station or field laboratory of spring or fall crops has been useful. (Figure 10)

(5) Our system "locks" the data after a form has been approved. However, the need occasionally arises to modify data, so a revision option is available. (Figure 11)

(6) Termination of a project is possible through a special "deny" feature. (Figure 12)

(7) All projects approved on a particular date can be checked. (Figure 13)

(8) An automatically-generated email can notify researchers of due dates or missing forms. (Figure 14)

The NCSU/NCDA Crops Use system has been actively used for three years. Over this time, a number of advantages have become apparent.

(1) Many online forms can be approved in just a few days as contrasted to the week to ten days approval track of the paper forms.

(2) Filing cabinets have been replaced by archives on the file server. This is a tremendous asset for groups where physical space is at a premium. (Figure 15)

(3) Information contained by the online forms can be easily retrieved.

(4) New administrative requirements can be quickly reflected on the online forms. For example, the recent federal genetically-modified organisms requirements were fully implemented into the online system in just two days.

(5) Data stored on a file server can be gathered and reported with just a few clicks of the keyboard. (Figure 16)

(6) People who are better informed can make better decisions. Better decisions generate cost savings for the organization. Over the past three years, we estimate that the online system has saved us $10,000.

Field Activity Recording System and Animal Resources Project Tracking

The accurate recording of all activities performed in a research station field is an absolute necessity in the planning and implementation of research involving plants. These records have to be used in the planning of the types of plants that can be grown on a section of land. They are also used in determining if specific research variables can be effectively evaluated when used in a research project on an area of land. These records may be referred to for this type of information for many years. Therefore, they need to be kept in a condensed format which is readily accessible to the research station personnel and the scientist.

In North Carolina, we used to manually complete our land use activity code sheets which were keyed into a mainframe computer system. Hard copies of the report were printed for each research station. In the mid 1980's, we developed a mainframe computer program with online screens in which the stations could enter this data directly into the program. While this system was more efficient in the data entry process, it was very complex and user-unfriendly. This motivated us to continue to explore a simpler way of recording and storing this information. One of our station office assistants developed an Excel spreadsheet on which we could record all of the needed information in relation to the activities performed in any given field.

With this idea, a computer programmer at NCSU developed an online field activities recording system which can be accessed on the Internet (Figures 17-19). This program feeds off of the online crops use and land resource request database. Through this system, the superintendents can access all of the approved annual resource requests for each station (Figure 20). The field activity information can be completed by research station staff. They can query any and all activity information pertaining to that field and research project during any desired time frame within the duration of the project and can generate a report online, print a hard copy or convert data as an Excel spreadsheet (Figures 21-24). With the field activities being frequently updated, the project leader can also access this information and stay informed on the status of those activities by using one of the query screens (Figures 25 and 26).

All land use and field activities performed on fields not being used for research projects can also be recorded and corrected if needed (Figure 27). The station staff creates the header use information from which all activities

performed on the field can be recorded and retrieved. When the same activity has been preformed in several fields, this information can be recorded by using one entry (Figure 28).

For long-term storage and access to the research project request and field activity information, we are developing an archive function in the computer program. This information will automatically go to the archives approximately one year after the project is completed. These archives can be accessed to obtain any information needed in the development and planning of a research project on any given field.

In addition to the plant related resource request and field activity recording system, we have developed an Animal Resources Project tracking system (Figure 29). This system provides online forms for beef cattle, dairy cattle, sheep, swine, poultry and aquaculture research projects (Figure 30). If the information needed for the implementation of the research project is too extensive to fit on the form, the project leader provides a protocol to the research station staff.

NOTE: The above presentation was made using the Internet; therefore, the illustrations and figures referenced by this report could not be duplicated in this book. For more information, contact the Division of Research Stations, NC Department of Agriculture & Consumer Services, in Raleigh, North Carolina, at (919) 733-3236.

Transition to the 21st Century
Sustainable Agriculture Research at the Center for Environmental Farming Systems

Eddie Pitzer
Center for Environmental Farming Systems
Goldsboro, North Carolina

I appreciate the opportunity to be here today to inform you about some of the work that is being done at the Center for Environmental Farming Systems located at the Cherry Research Farm in Goldsboro. We are part of the North Carolina Department of Agriculture & Consumer Services (NCDA&CS) in the Research Station Division. Change is something that we have become accustom to in the history of our operation. To understand the changes we have overcome, you have to look at where we have come from and the history of the operation.

This facility has been a part of Cherry Hospital which has been in existence since 1880. Cherry Hospital is one of five mental institutions in the state of North Carolina. The farm was part of that facility, providing not only the food used for the institution but a part of the physical therapy program for the patients. The farm provided commodities such as milk, beef, pork, poultry, eggs, vegetables and field crops for livestock production. The hospital was dependent on the farm for the food it needed for its clients. This operation continued up until 1974 when the North Carolina Department of Human Resource decided they did not want to continue to manage a farming operation. The farm was transferred to the NCDA&CS under the Food Distribution Division as the State Farms Operation where we continued to produce pork, beef and milk products for the institutions as a cash receipt. In 1985, the farm was transferred within NCDA from the Food Distribution Division to the Research Station Division where we are today. Applied research in a production type operation had been our research effort up until this time.

In 1994, we were dedicated as the Center for Environmental Farming Systems (CEFS), a systems approach to sustainable agriculture. Some terms defy definition; "sustainable agriculture" is one of those terms. In such a quickly changing world can anything be sustainable? What do we want to sustain? If nothing else, the term "sustainable agriculture" has provided talking points that has sparked much excitement and innovative thinking in the agriculture world. We start asking a different question, same practices, different approach. Congress, in the 1990 "Farm Bill", addressed "sustainable agriculture". Under that law, the term "sustainable agriculture" means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

(1) satisfy human and food needs;
(2) enhance environmental quality and the natural resource base upon which the agriculture economy depends;
(3) make the most efficient use on nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
(4) sustain the economic viability of farm operations; and,
(5) enhance the quality of life for the farmer and society as a whole.

As more sign onto the sustainable agriculture effort, the perception about what defines sustainability in agriculture continues to multiply. Sustainable agriculture depends on adaptability and flexibility over time. Sustainable agriculture is not linked to any particular production practice. Organic farming, for example, is not the exclusive domain of sustainable agriculture. These definitions require the development of technologies and production practices that are supportive of sustainable agriculture.

The CEFS was established in 1994 as a unique partnership with the NCDA&CS, NCSU and NC A&T University to develop farming systems that are environmentally, economically and socially sustainable. The facility serves, and is accessible to, faculty, students, extension workers, farmers and citizens. The Center for Environmental Farming Systems is a component of the Cherry Research Farm which consists of 2,200 acres of cropland, pastures and woodland. Of that, 1,100 acres is in cultivation. We operate a dairy and beef facility. We have recently closed a confinement swine facility but are considering an alternative swine production system. The farm is located in the Neuse River Basin. The Neuse River Basin is the third largest river basin in North Carolina covering 6,000 square miles. It is also one of the most important rivers in the state. Water quality in the basin is under stress from industrial, municipal and agricultural sources. The soil and the environment at the Center are typical of farms bordering other major coastal plain river systems in our state.

The Center's location in the Neuse River Basin provides an excellent opportunity for evaluates the impact of diverse farming systems on water quality. The research goal is to identify productive, profitable farming systems that will benefit water quality, reduce soil erosion, improve soil quality, enhance wildlife populations and help support rural communities. The approach to research is long-term, large-scale systems research and demonstration with interdisciplinary team approach with stakeholder involvement. Stakeholders consist of research faculty from several departments in the CALS at NCSU, NCA&T and NCDA&CS; extension agents; individuals from North Carolina agricultural-based, non-profit organizations and farmer groups; farmers in conventional and organic operations; and staff in state and federal agencies involved in agriculture.

There are four major areas of research being conducted at CEFS. They are:

(1) Conservation Tillage
(2) Integrated Farming Systems
(3) Organic Agriculture Systems
(4) Animal Systems

Conservation Tillage

Conservation tillage, or no-till farming, has become increasingly popular as a way to reduce soil erosion, increase organic matter and enhance soil physical properties. The effect of no-till versus conventional production practices on soil ecology is being studied. A long-term experiment, begun in 1996 on 200 acres, includes many major North Carolina crops in rotation (corn, soybeans, cotton, peanuts, wheat). Researchers are monitoring yield and economics, soil quality, surface and ground water for nutrients and pesticides, and the effect on wildlife.

Integrated Farming Systems

Integrated farming systems is a long-term, large-scale cropping system that integrates a broad range of factors involving different agriculture systems. Approximately 200 acres have been divided based upon intensive soil mapping into five treatments with three replications. Systems to be compared include:

(1) Successional Ecosystems
(2) Plantation Forestry/Wood lot
(3) Integrated Crop/Animal Production System
(4) Organic Production System
(5) Conventional Best Management Practices (cash-grain cropping system)

Data collection will cover soil and water quality, pest and predators (weeds, insect, disease), crop factors (growth, yield, and quality), economic factors (viability, on/off farm impact, community) and energy issues. Special attention

will be paid to how most effectively and economically to make the transition to these alternative systems.

Successional ecosystems represent a control for the comparison of environmental impacts among the different farming systems. Areas have been selected to succeed naturally. Sampling sites have been located in each of the replications; intensive measurement are being taken. In addition to studying the direct effect of succession on agriculture land, the edge or border effects of successional areas where they contact agricultural land and forests may provide insight to the interaction and importance of different habitats on the ecology of pests and beneficial organisms.

Plantation forestry/woodlot is an important industry to the southeast and is represented on many farms. Forestry systems sequester nutrients and energy in long-term perennial cycles and offer the possibility for intriguing comparison with other farming systems. Species included in this system are cherrybark oak, bald cypress, green ash, and longleaf pine. Inclusion of several species affords the opportunity for comparison of multiple rotation lengths and silvicultural systems (clear-cut, shelterwood, strip and selection systems).

Integrated crop/animal systems represent a long-term rotation of annual field crops, cover crops and perennial pastures. Another feature of this system is a relatively low cost fencing and drinking water supply for livestock in order to assure that plant nutrients are efficiently recycled through the grazing animals.

Organic production systems employ unique approach to nutrient availability, pest control and soil management. The focus of this system is to evaluate various strategies of transitioning to organic production from a conventional system. The goal is to provide critical information that will ease the transition period of three years to certified organic.

Conventional best management systems represent a standard for comparison in the sense of a positive control. It is characterized by using management practices commonly used by producers. Crops are monitored on a regular basis for pests, and pesticides are used only when economically justified. The system represents conventional till and no-till in a three-year rotation of corn, peanuts and cotton.

Organic Agriculture Systems

Organic agriculture systems production represents one of the largest growth segments in agriculture today. USDA estimates that the value of retail sales of organic foods in 1999 was approximately $6 billion and has grown at a rate of 24% per year for the last eight years. According to a recent USDA study, certified organic cropland more than doubled from 1992 to 1997. Two livestock sectors, eggs and dairy, grew even faster. Consumer demand for organic food has increased the need for more research and education in this area. The organic systems unit with approximately 80 acres is one of the largest land-grant research facilities of its kind. The site is used for research and demonstrations and serves as a focal point for students, growers and extension agent training. Organic agriculture bars the use of synthetic pesticides and artificial fertilizers, and instead relies on ecological interactions to raise yields, reduce pest and build soil fertility. Diverse planting patterns, frequent rotations and attraction of beneficial insects, for instance, would all be organic means of pest control.

Animal Systems

Beef Cattle Project. The goal is to develop a cow/calf system for eastern North Carolina. Approximately 125 medium-frame, cross-bred cows will be stocked on 175 acres of intensively managed pastures. The system continues to evolve as we identify and reject different production practices. Long-term evaluations of nutrients in pasture soils, ground and surface water quality, forage quality and stand life of pasture plantings, usage of by-product feeding supplements and long-term profitability.

Dairy Project. We have seen a decline in the number of dairy farms and an increase in forage production in eastern North Carolina. Feed cost consumes about 50% of the dairy farm gross income. New grazing techniques allow pastures to reduce the amount of stored forages, thus, reducing feed cost. The goal is to establish an innovative dairy farm to examine grazing and herd management techniques that will be environmentally sound, have an economical level of milk production, provide adequate level of family income and quality of life, and have a lower investment and operating cost. We dedicated a new dairy facility in 1998 with a rapid milking New Zealand swing-type parlor on 200 acres divided into paddocks from 5 to 7 acres in size with a series of lanes and a watering system.

In 2000, we hosted our first annual intensive summer internship program in Sustainable Agriculture with 16 students enrolled. In this past year's program, we had 18 students in attendance. Funded by USDA Higher Education Challenge Grant Program and the Z Smith Reynolds Foundation, this program includes production, research, marketing and extension components in sustainable agriculture. The eight-week program draws students from all over the country to attend. Students live in a dormitory directly in front of the Organic Unit. Interns will rotate through each of the projects at CEFS, becoming familiar with production practices and principles and participating in unit activities. Each student will also select a personal research or demonstration project which they will present at the annual Organic Field Day at CEFS. In addition to exposure of production principles, interns will receive curriculum in relevant subject matter from faculty. The curriculum will include weekly lectures, seminars and field trips.

As I have mentioned earlier, we are located in the Neuse River Basin. The Neuse River has a documented history of water quality problems. With the "Nutrient Sensitive Waters Management Strategy" interim plan by the Department of Environmental Management being reviewed and debated, it was important that information was needed to determine what controls and regulations were needed to meet these goals. The new rule (Neuse Rule .0238 For Agriculture) regarding nutrient management for all agriculture requires a 30% reduction in agricultural nitrogen loading into the Neuse River by April 1, 2003. Riparian buffers and drainage structures are two ways being considered to comply with the regulations. Goals are to implement, demonstrate and evaluate the controlled drainage and riparian buffers to reduce the amount of nutrients, sediments and bacteria entering the Neuse River. The width requirements and design of buffers are being debated. Two intermittent blue line streams that discharge directly into the Neuse River drain the crop and livestock production areas of CEFS. A variety of Riparian vegetative buffers would be established along the stream to include planted forest buffer, mature forest buffer, pasture type grass buffer, deep rooted grass and natural vegetation at 25' and 50' widths to evaluate the most effective BMP. Shallow ground water samples are collected and sampled for ammonia, nitrate and TKN at well nests located adjacent to the stream bank at 25'and 50'. Currently, there is over 600 wells located at CEFS.

Governor Easley just reported that North Carolina faces a budget shortfall between $600 million and $900 million this year; the main causes having been an unexpected increase in program cost and lower sales tax revenues. This is not a North Carolina problem, but a problem across the country. The challenge for us is how to do more with less. In the State Farms budget, our current operating budget is tied directly to receipts. It has been increasingly difficult to meet our receipt goals with an increasing amount of research and declining production operations. Since 1997, the University has received $3.2 million in grant to support sustainable agriculture at CEFS. Some of this funding has been used to build the infrastructure need at the Center, but the majority has been used in the design, installation and evaluation the projects.

We intend for the Center to be accessible not only to faculty but to individuals in the industry and the general public. We offer several educational opportunities and demonstration programs during the year. We had 25 group tours/workshops and 2 field days last year with 800 people visiting our research facility. We also provided livestock facilities for NCSU College of Veterinary Medicine students during routine visits to receive training and to practice veterinary medicine with our dairy and beef cattle. The student intern program hopes to accept 20 applicants this year. One annual program held in the spring is "Agriculture Awareness Days" which is open to

the local school system for kindergarten through the third grade to introduce youth to agriculture. The program includes livestock exhibits and crop production equipment. During the two-day event, we will have 1200 kids and adults attend. It's entertainment for the kids and education for the adults. We believe that our Center for Environmental Farming Systems will help us develop profitable agricultural systems that will satisfy two of our essential needs: a clean environment and a safe supply of food. As an educational facility, gathering place and focal point, the Center will also increase public understanding of agriculture and its relationship with the environment.

Ecotourism and Ecotours in Florida

Taylor Stein, Assistant Professor
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It is said that ecotourism is responsible travel to natural areas which conserves the environment and improves the welfare of local people. Why I like this definition so much is that it is just filled with ambiguity, and I can read whatever I want into it.

"Responsible travel". I like that because it actually does say something. Disney doesn't say that you have to be responsible to go to its areas. In the past, mass tourism programs didn't emphasize having to be responsible. But now, we are saying that visitors have to be a little more knowledgeable and a little more careful and a little more ethical when they go into sensitive areas.

"Conserves the environment". It doesn't say it protects the environment or saves the environment. It says it conserves the environment. I think we can use this concept in rural America more than we do. Let me define what "conserves the environment" means. Rural qualities of life are very important and very valuable and very threatened. We can use tourism to conserve those areas. We can also use ecotourism to conserve the obvious places like Yellowstone, the Everglades and other sensitive resources. We are trying to define what we are attempting to conserve and also trying to improve the welfare of local people. This does not mean provide income and jobs to local people; however, it is inferred in the statement Aimproves the welfare". This also says that there are other benefits that can come to local people. Ecotourism is a mix of three things: visitors, local people and the environment.

Visitors. We want visitors to learn while they are out there to be with friends, to bond with family members, to get physical fitness. Whatever is motivating them to be out there, we want them to get it. And why? So they'll come back. It's not good tourism if you're not doing what your customers want. So you want to fulfill their expectations.

Local people. This state knows how to destroy a small community with tourism better than any state in the country. Orlando was not always a Disney attraction. It used to be a citrus farming town. Not any more! We've changed that. Even though we can bring in thousands of jobs and a lot of money, we are losing something. There are costs associated with that. I've talked to extension agents in a lot of rural towns, and while they want the jobs and income, they often ask, "How do we keep the Wal-Mart's out"? For some reason, Wal-Mart is an example of something we do not want in our communities. Uncontrolled development is what people are asking about. How do we get control over and maintain the quality of life which is the reason why people live there in the first place?

The environment. How do we shape this so we can increase biodiversity or maintain productive agricultural lands out there and not have our lands turn into development? We are asking a lot. We are trying to provide benefits to local people that are economic and non-economic. We are trying to provide benefits to the environment that could be biodivergent while also protecting our agricultural lands. We are trying to provide benefits to visitors so we can keep them coming back.

The problem is . . . is this possible? Am I trying to do too much? And if I want to try to do this, how do I start researching this issue? Because this is talking about rural sociology at the top, it is ecology in the middle, and it is psychology on the bottom. And I try to do it all. I'll talk about how I try to do that right now.

For the communities, I try to organize the focus of the research in one or two areas. The first one is how to make it happen. Although I'm not an economist, I realize that a lot of the things that are stopping ecotourism are the economic aspects of it. It is just not economically feasible right now. The economic benefits aren't well enough known on a specific scale for the individual business or on community or regional levels. We do not have enough feasibility analyses stating what are our benefits and what are our costs. Following up through feasibility models will help to see how we decide on how many people to hire and how many buildings to put in to ensure stable economics.

Marketing Studies. We never know who our visitors are. Almost all of the ecotourism, or nature-based tourism operations, that I've seen just go for it. They don't do research. They are just going for it. What research is done is based on whether they fail or not. Most new tourism businesses fail in this state. I've only been in Florida for four years, and during that time, I've seen five or six not succeed. It is usually because they think too big. Their costs always outweigh their benefits, and they can't go more than a year on what they are costing themselves. We can't forget these important things.

Sustainable Community Development. I try to define it as the identification of the benefits of community development. It is just not just jobs and income. It includes other indicators. But, how do we go about getting these benefits? What we are finding now are partnerships and collaborative planning. These bring in people that know agriculture, that know tourism, that know natural resource management and have them all get together to talk about how to make a nature-based tourism operation work on a regional level. We're also looking at social indicators. We're trying not to say that all our success is based on the number of jobs and the amount of income coming into a county. It includes other indicators like education and crime. I do surveys all the time, and I ask people what their quality of life is like. Do they have friends in this community? Do they feel proud of their community? We have a lot of ways to measure these non-economic benefits.

Visitors. For visitors, I want to stress marketing studies again. Once again, new ecotourism operations rarely do marketing studies. They do not know who their visitors are, where they are coming from or how much money they are going to spend. They just pick a charge or fee and say, "I think people will pay $20 to come to my area", and then cross their fingers. What happens is that, if they are lucky, they are low and can alter their fee a little bit. Usually, they don't get enough people paying the amount they need, and they fail. A little bit of research could help understand how to make a better tourism business. It is just like starting any other business.

The Forest Service has moved in a different direction. They traditionally didn't have to worry about making money. They do now. They are trying to get a little more understanding on who their visitors are and what their desires are. The Forest Service and other federal agencies have wasted a lot of money building things that they thought people wanted, but they didn't do marketing studies. Getting a new state park? What do you do? You put a new campground in it. You put a few trails in it. You do whatever every state park looks like. Maybe people will come use it. With government, it was not a big cost. It was public money, and we had plenty of that. You can't do that any more. So, now we're seeing that people don't want to camp if there is a private campground just five miles away. Why would this state park or why would this Forest Service District put in a campground? We can offer other things. We might offer a primitive experience or different type of experience to the visitor. So, they are trying to get a better idea of what these people want and then determine how best to provide those things.

There are a lot of different kinds of visitors out there. There are young girls from Ft. Myers who had been out in primitive areas maybe once in their life. I met two who had not seen a cow before their first trip. They were off on an organized tour. We didn't just dump them out into a wilderness area and say, "Go look at gators." We took them on a nice bus with a nice tour guide and led them around to look at animals they otherwise would never get to look at. From that extreme, we go to the other extreme. This is Forest Service land actually just a quarter of a mile west of Orlando. It is a great wilderness area and great for hiking. However, many people don't care much about

wilderness. They really don't care much about the natural aspects of it. It is just a place for them to get together and party. What has happened is that the agencies in control of the public resources, public water and federal forests didn't plan for these visitors being here. They didn't have any good management practices in place. What happened was that, by word of mouth, it became the biggest party spot in northern Florida. And now the people are coming in. They had to go to heavy-handed management. They've had to bring in police. They have now restricted alcohol, and they've got all this heavy-handed enforcement because they never really understood their visitors. They didn't manage for people in this area, and the people took it over. Basically, that is what we are seeing with our recreational areas in this country. It is reacting to our visitor's wants and not planning for them.

This is really a problem for the environment because there are a lot of impacts associated with recreation from vegetation and wildlife to soil and water. A little bit of use can destroy a lot of vegetation. It is symbolic of all impacts. We can destroy wildlife quickly and send them out of an area even quicker. If you look at agriculture production areas, one or two people walking around areas on a farm are going to do a lot of damage. It is going to impact that area more than you want. It is not going to take a hundred people going off into a cattle herd to disrupt things, just a few people.

So, we know that very few people can cause a lot of damage, and in terms of vegetation cover loss, it levels out pretty quickly because you can't go over 100%. That means that we need to go ahead and do management. Usually, the management decision is to close areas down and stop it, but we can get more creative than that. We've done a lot of work to figure out how to do better visitor management. Usually, it starts with zoning and planning and trying to protect our sensitive areas. We start by determining areas that might not be as resistant to or might be more resistant to vegetation cover loss or something. Upland areas, not wetland areas, are where we have recreation, and we keep people away from the more wetland sensitive areas. That's what we are trying to do. The following is what we know and what we are trying to find out.

In terms of private tourism, we know that in order to be successful, you have to start small. In Florida, even the big ranches that developed an agritourist business that had a lot of buildings and hired a lot of people didn't succeed. The people didn't come or they didn't pay the amount that was needed to keep that business going. There are a few still going on. The J.P. Starky Ranch is a ranch that is traditionally cattle and timber. I think they are doing well even after September 11th, but, I think, they are one of the few. What we find is that starting out small and organized with planned tours, usually by reservation, is a key to success. You can't expect to come in and save all your income and double or triple it. Usually, the secret is to start small at the beginning, and if you've really got something to offer, then the business can grow. Initially, work with local groups. Educational groups and the local Audubon Society chapter are usually easy ones to work with. While everybody talks about the Internet savings, we found that the Internet might attract a few tourists, but it does not attract enough to keep your business going. Word of mouth is always the thing that keeps businesses going, and if you can get it locally, you have a better chance of keeping your business going.

Sell related products. Some agritourist businesses sell products related to the experience. There is an herb farm up in Swanni County that is right next to the Georgia border. They don't make a huge amount of money from tourists. They charge people a small fee to tour their herb farm, but they have a great gift shop. They make their money from herbs and mushrooms harvested right from that farm.

No small landowner or even a large landowner should attempt agritourism on their own. People that are involved with agriculture or natural resources are not tourism people. There is no reason why they should assume that they should know how to be tourism business people. But, there are tourism organizations available to assist such as chambers of commerce, tourism development councils and visitor convention bureaus. They know the tourism industry. Their reason to exist is to market their county's tourism potential. They will be glad to help these land owners. Also, work with neighboring public land management agencies. Do you have a state park close by? How do you work with that state park to maybe have some of their visitors come by your land? Maybe use the

existing tourists already in an area.

Public tourism. Pubic tourism is where most of the current ecotourism is located. We need to understand the customers better. Most people working for public land management agencies did not get into those public land agencies to work with the people. They got into it to work with the trees and the wildlife, and in fact, to probably get away from people! I try to figure out how to get the natural resources (the natural sciences) better interconnected with the social sciences; so, I focus more on the social part. When I write my final report, it always brings up the integration and the inter-disciplinary aspect. What I find is that my results usually show we have to educate and communicate better with our visitors. We have to understand our ecological impacts. We need to use a variety of management techniques to deal with impacts.

And finally, once again. . . collaboration. Traditional management was by an individual district ranger or the state park manager, and they did just whatever they wanted in their park and didn't talk to local businesses or communities outside their borders. Now, we are using terms like "ecosystem management" which is forcing these agency managers to look outside their areas and work better with businesses and stake Service has gotten sued so many times because they ignored their stake holders, so now they are finally figuring out how to better collaborate with these people.

Generally, what we're talking about is a really difficult animal. Ecotourism is not something that you just do. I try to tell people that it is very hard to do. Getting people into natural areas is hard. But, it is worth it. It is extremely inter-disciplinary. We don't provide training for natural resource managers or agricultural students to work in inter-disciplinary situations. How do you become good communicators and good scientists? In most cases, the students receive one communications class, and everything else is science.

We are trying to get people into the agritourism setting. The thing about agritourism is that we are trying to get them somewhere where they really shouldn't be. If it is truly authentic, then it is not tourists. It should be at Disney, and you know we designed Disney for tourism. We did not design a river area for a lot of canoeists to go into. It is the same with agritourism. To experience a good, true farming operation, if it is all tourism, it is not going to give people what they really want. They are not going to want the plastic cows that won't get bothered by the tourists. So, really it's not designed for them. But, what they want is for it to be authentic. The more authentic we can make it means the harder it is going to be but also the more memorable it is going to be. When I talked to those two girls about the Croc Ranch, I knew that I was on a day that they were going to remember for the rest of their lives. It really wasn't that special of a day for me because I was out working, but it was neat to be out with a lot of kids on that bus who are always going to remember seeing that gator and seeing that cow. It is a neat thing, and that is really why I got into this kind of job. It is fun to learn how to do it. The hard part is how do we make it happen.

Center-wide Weed Control Plan Utilized for Research

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Abstract

We took advantage of an existing research center-wide rangeland weed control plan to scientifically test the effectiveness of a recommended chemical in a field scale setting under typical livestock grazing. The chemical had previously been tested only in a small plot setting without normal grazing. We also examined the integration of prescribed burning into a multiple year control program. Three years of clopyralid (trade name, Transline) treatment, applied by commercial applicator at the lowest registered rate, successfully controlled yellow starthistle in a field scale setting on oak woodland range. Prescribed burning was substituted for clopyralid during the first or second year of the treatment program with no reduction in yellow starthistle control. Three years of clopyralid did not result in an increase in medusahead, but substituting one year of prescribed burning caused a marked decrease in medusahead. Legume composition was not consistently reduced by clopyralid application. Replacement of chemical by prescribed burning did not lower costs.

Introduction

Yellow starthistle, the most common weed pest in California, currently infests more than 15% of the state's land area including rangeland, cropland, roadsides and recreation areas. The University of California Sierra Foothill Research and Extension Center is located on 5,721 acres typical of 10 million acres of the state's hardwood annual grass rangeland. Yellow starthistle (*Centaurea solstitialis*) has invaded approximately 900 acres of the Center to the extent that field-wide treatment is necessary for control. A Center weed management plan was developed in 1998 which called for multiple years of treatment for yellow starthistle (YST) on approximately one-half of the affected area. For fiscal and research reasons, the remainder of the 900 acres was left uncontrolled. In addition, fields that are less seriously affected are treated by spot spraying only small, infested sites occupied by a relatively few scattered plants. Treatment methods were those whose effectiveness has been demonstrated by recent research.

The selective pre- and post-emergence herbicide clopyralid has been effective at controlling yellow starthistle in small plot trials at several locations (Connor, 2001; DiTomaso, 1999a). Clopyralid does not harm grasses and many broadleaf plants including filarees (*Erodium* spp.), but it does effectively control legumes. Because of the seed bank present in the soil in an established YST stand, a successful control effort must continue over several years. It is possible that multiple years of clopyralid application will cause a long-term reduction in legume populations. Long-term clopyralid use also has the potential to result in replacement of YST by other undesirable annual weedy grasses such as medusahead (*Taeniatherum caput-medusae*).

Three years of prescribed burning, timed for approximately 2% to 5% bloom on yellow starthistle plants, achieved 97% control in field trials (DiTomaso, 1999b). Fire is also effective in reducing medusahead levels, at least in the short term.

The objectives of the study are to take advantage of the planned Center weed control program to scientifically test at the field-scale level under typical livestock grazing management (1) the effectiveness of three years of clopyralid application for YST control and (2) whether prescribed fire, substituted for one year of a multi-year chemical control program, can provide advantages over three consecutive years of clopyralid treatment.

Methods

Field scale trials were initiated in Spring, 1999 in Yuba County in northern California. Eight fields targeted for YST control, ranging in size from 15 to 140 acres, were selected for the study because of their relatively uniform, moderately dense (20 to 31% composition) stands of yellow starthistle. Four treatments were randomly assigned among the eight fields. The treatments are as follows: prescribed early summer burning in 1999 followed by late winter applications of clopyralid (trade name Transline) in 2000 and 2001 (BTT); clopyralid application in 1999, prescribed burn in 2000, and clopyralid again in 2001 (TBT); clopyralid application in each of the three years, 1999 through 2001 (TTT); and control or no treatment (C).

Prescribed burns occurred on June 12 and 17, 1999 and July 2, 2000. Fire breaks and other preparation was made by Center staff. Firing and fire control was conducted by California Department of Forestry and Fire Protection (CDF) units with the assistance of Research Center staff. Timing of burns was targeted for 2% to 5% bloom of YST. Clopyralid was applied by a commercially-operated helicopter at the lowest registered rate for California which is 1/4 pt/acre of product (1.5 oz ae/acre) in 10 gallons/acre of water. Applications were made on March 12, 1999, March 11, 2000 and February 23, 2001.

Study fields were grazed by cattle twice a year, once in late summer or fall and again during the late winter or early spring. Stocking rate ranged from 0.5 to 1.2 animal unit months per acre per year.
Ten 200-foot-long transects were permanently established in open grasslands in each of the eight treatment fields. Composition of important species or classes of species was determined by step-point observations at six-foot intervals along each transect (33 points per transect). Composition was estimated each year in winter prior to clopyralid application and in late spring at maturity of annual grasses but prior to prescribed burning.

Yellow Starthistle Control

Prescribed fire successfully replaced chemical treatment in one year of a three-year treatment program for yellow starthistle control. As seen in Table 1, all three treatment regimes reduced yellow starthistle composition after three years of treatment to 1% or less, significantly less than in the untreated control fields.

TABLE 1. Control of yellow starthistle by clopyralid applications, burning or combinations of clopyralid and burning.

		1999		2000		2001	
Treatment	Start of Study	Treat.[1] Applied	Composition %	Treat.[1] Applied		Treat.[1] Applied	Composition %
C	26 ab	C	16 b	C	21 c	C	7.8 b
BTT	31 b	C	24 c	BT	11 b	BTT	1.2 a
TBT	20 a	T	0.3 a	TO	3.8 a	TBT	0.0 a
TTT	28 ab	T	0.0 a	TT	0.7 a	TTT	0.0 a

Treatment means followed by different letters are significantly different at $P < 0.05$
[1] Procedure actually applied prior to date of observation

Medusahead Control

Prescribed burning, integrated with clopyralid application, significantly reduced medusahead composition (Table 2). Part of the reduction was reversed in the fields burned in 1999 as medusahead made a partial comeback in 2001, but over the length of the study, medusahead reduction was substantial.

TABLE 2. Effect on medusahead of clopyralid applications, burning or combinations of clopyralid and burning.

	1999		2000		2001		1999 vs. 2001
Treatment	Treat.[1] Applied	Composition %	Treat.[1] Applied	Composition %	Treat.[1] Applied	Composition %	Change Percentage Unit
C	C	6 a	C	5 a	C	8 a	2
BTT	C	25 b	BT	1 a	BTT	10 a	-14*
TBT	T	25 b	TO	19 b	TBT	6 a	-18*
TTT	T	23 b	TT	31 c	TTT	28 b	5

Treatment means followed by different letters are significantly different at P < 0.05

[1] Procedures that had been applied prior to date of observation

** Change from 1999 to 2001 significant at P < 0.05*

Effects on Legumes

The legume component in this study was predominantly rose clover. Clopyralid application in 1999 reduced legume composition to zero, and a repeated application in 2000 also resulted in low legume populations (Table 3). Burning in 1999 caused an increase in legumes the following year even following clopyralid treatment, but burning in 2000 did not stimulate a similar effect. Legumes in the TBT treatment appeared to recover in 2000 from clopyralid treatment the previous year. By 2001, we did not demonstrate a consistent change in legume composition due to treatment.

TABLE 3. Effect on legumes of clopyralid applications, burning or combinations of clopyralid and burning.

		1999		2000		2001	
Treatment	Start of Study	Treat.[1] Applied	Composition %	Treat.[1] Applied	Composition %	Treat.[1] Applied	Composition %
C	18 b	C	15 c	C	17 b	C	12 c
BTT	7 a	C	5 b	BT	20 b	BTT	1.8 a
TBT	8 a	T	0 a	TO	13 b	TBT	8 bc
TTT	11 ab	T	0 a	TT	3.5 a	TTT	5.5 ab

Treatment means followed by different letters are significantly different at P < 0.05

[1] Procedures that had been applied prior to date of observation

Treatment Costs

We anticipated that burning may be a less expensive control method, but in this study, that was not true. Material and application costs for Transline were $22 to $26 per acre per year with 250 to 400 acres sprayed each year. Costs of burning including labor and out-of-pocket costs for operating equipment for building fire breaks, fire control and re-seeding fire breaks averaged $23 per acre. We were assisted in the burns by CDF units, and the costs incurred by that agency are not included. Burning occurred in approximately 200-acre blocks. Per acre expenses may be reduced if fires are conducted over larger areas.

In addition to direct burning and fire control costs, the value of reduced forage production in years subsequent to the fire must be considered. McDougald and Frost (1989) indicate a forage loss of 30% to 50% in the first year following a fire and 20% the year following that. In the current study, stocking rates were reduced an average of 52% in the year following burning. We have not had time to determine any reduction in forage availability the second year after the burn.

References

Connor, J. Michael, Glenn A. Nader, Tammy Karnow, and Dustin K. Flavell. 2001. Effects of Clopyralid Treatment on Annual Legume and Medusahead Composition. Proc., Soc. For Range Mgmt. 54th Annual Mtg., Feb.17-24, 2001. (Abstr.) p. 27.

DiTomaso, J.M., G.B. Kyser, S.B. Orloff, S.F. Enloe and G.A. Nader. 1999a. New growth regulator herbicide provides excellent control of yellow starthistle. California Agriculture 53(2):12-16.

DiTomaso, J.M., M.S. Hastings, and G.B. Kyser. 1999b. Prescribed burning for control of yellow starthistle (*Centaurea solstitialis*) and enhanced native plant diversity. Weed Science, 47:233-242.

McDougald, N.K. and W.E. Frost. 1989. Effect of burning on seasonal forage composition and production on hardwood rangeland. Proc., 42nd Annual Meeting, Society for Range Management. (Abstr.) No. 234.

Research Center Administrators Society

Fall Executive Board Meeting
September 16, 2001

Holiday Inn SunSpree Resort
Virginia Beach, Virginia

Attendance: Attendance was very limited due to the occurrence of the hurricane on the East Coast the week prior to the scheduled conference. No actual attendance roster could be found, but there were approximately 25 in attendance.

Opening Remarks

The meeting was called to order by President Carl Tart at 1:00 p.m. on Sunday, September 16 in the False Cape Room. President Tart gave an overview of the board meeting for the day. He stressed the primary purpose of the meeting would be to develop a program of activities for the upcoming meeting in Orlando, Florida.

Welcome

Mr. Jim Jones, host for the conference, welcomed everyone to the state of Virginia and provided an overview of the planned activities for the entire week. This included a most informative tour of the agriculture industry of the Eastern Shore of Virginia. He introduced Dr. Gerald L. "Skip" Jubb, Jr. and Dr. Steven H. Umberger who gave an overview of research and extension programs and activities in the state of Virginia.

Minutes

Paul Sebesta provided the minutes from the Fort Worth, Texas Annual Executive Committee Meeting. Clyde Bogle moved the minutes be accepted, Ben Kittrell seconded the motion, and the motion passed.

Treasurer's Report

Dr. Jere McBride provided a ledger showing fiscal activity. The balance to date in the society account is $6,503.84.

Committee Reports

Financial
Jim Jones provided the financial report. He stated he would develop a set of guidelines to be considered for future meetings. This would be presented at the February meeting in Orlando.

Proceedings
Carl Tart stated that Merritt Taylor and Dennis Onks would work together on proceedings beginning with the Orlando meeting. Merritt would try to get a disk or hard copy of each presentation prior to the Orlando meeting. He would also tape the conference to have a record of presentations. Dennis would take this information, assimilate it, and present it to Carl.

Newsletter, Membership Internet Service, and Expansion
Jim Smith and Ben Kittrell are committee chairmen. It was stated that we needed to give thanks to Elizabeth Cooke at the Delta Research and Extension Center in Stoneville, Mississippi for all the time and effort she

puts into keeping the RCAS website up-to-date. It was asked that anybody provide suggestions or links that should be added to the website for use by the membership. Elizabeth Cooke wanted to remind everyone that advertisements for positions at research stations can be listed on the RCAS website. She will be more than happy to do this.

Awards

The Awards Committee headed by John Hodges nominated John Robinson for the 2001 Distinguished Service Award. John Hodges was also nominated. Randall Rawls moved that both nominees be given the Distinguished Service Award. Ben Kittrell seconded the motion. The vote was a unanimous "yes".

Nominations

Denny Thompson provided the proposed slate of officers to be considered at the Annual Business Meeting in Orlando for next year. They are as follows:
Past President Carl Tart
President Lyle Lomas
Vice President Bill Peterson
Secretary Paul Sebesta
Executive Treasurer Jere McBride
Internet/Membership Jim Smith

Orlando, FL Meeting Arrangements

The Annual Meeting will be held February 3-6, 2002 in Orlando, Florida. The meeting will consist of presentations, tour, and annual banquet as in past years. Findlay Pate and Ed Hanlon, Jr. will take care of local arrangements.

At 3:00 a break was taken. The Executive Committee resumed in the False Cape Room at 3:15 to discuss the program for the winter meeting. A round table discussion was held with everyone providing input regarding presentations they feel would enhance their management roles at their research centers. Lyle Lomas will be provided a list of these suggestions for preparation in planning.

New Business

Jim Jones gave an overview of the evening activities as well as schedules for the tour to be held Monday and Tuesday.

Old Business

A brief discussion was held on ways to attract membership. Ben Kittrell noted that we had done pretty well at expanding in the West and Midwest, and certainly we need to continue looking for new states. However, he reminded us that we need to look within our own states to see if we could expand membership there as well.

The meeting was adjourned at 5:00 p.m.

Research Center Administrators Society
Executive Committee Meeting
February 3, 2002
Orlando Florida

The meeting was called to order by President Carl Tart (North Carolina). President Tart welcomed everyone to Florida and indicated that this meeting was held under happier conditions than the last time the Executive Committee met just after September 11, 2001. President Tart went on to congratulate Jim Jones (Virginia), host of the summer, 2001 meeting, for a job well done in light of the difficult circumstances brought on by September 11th.

President Tart concluded his opening remarks by saying that all of the states seem to be in budget straights with agriculture taking hits across the board

Minutes of the last Executive Committee Meeting were distributed and discussed.
Motion to approve was made by Ray Cartee (Utah), seconded by Mike Phillips (Arkansas) and approved unanimously.

Minutes of the last General Session were distributed for consideration.
Denny Thompson (North Carolina) had a question about officer changes in Bylaws. Bill Peterson (Kentucky) responded that the bylaws were already approved and Denny's question was satisfactorily addressed. Motion was made by Ed Hanlon (Florida) to approve the minutes as distributed. Motion was seconded by Ben Kittrell (South Carolina) and approved unanimously.

COMMITTEE REPORTS

Membership

Jim Smith (Mississippi) reported that the RCAS web site is going well. Elizabeth Cook of the Stoneville REC is doing a good job with the RCAS web site. She would welcome any requests, comments or suggestions to improve the web site. Some of the members indicated that they access the site regularly.

Ben Kittrell noted that 25% of the current RCAS membership is from non-traditional states (states other than the original Southeast states). RCAS members are encouraged to contact private sector research managers within their respective states to become involved in RCAS.

Treasurers Report

Denny Thompson indicated that Jere McBride (Louisiana) will be stepping down as Executive Business Manager due to new duties with LSU. Denny Thompson will serve as interim Executive Business Manager. A general discussion was held concerning keeping meeting costs in line. Jim Jones mentioned that the secret to controlling meeting finances is for the Society and the local organizing committee to work together to set a budget and stick to it.

Proceedings

Merritt Taylor (Oklahoma) reported that Carl Tart continues to take care of publishing the proceedings. This year the proceedings will be mailed to all the members. Also this year Merritt will audio tape all of the presentations? Dennis Onks (Tennessee) expressed thanks to Carl for his continued support to the Society by publishing the proceedings.

Financial

Jim Jones gave the financial report. Finances of the Society are sound but this could naturally change depending on annual meeting expenses and attendance. Any questions or concerns should be directed to Jim. Carl Tart suggested that with the impending changes in the Executive Business Manager position an audit would be in order.

Nominations

Denny Thompson indicated that the nominations for the upcoming year include:

President:	Lyle Lomas (Kansas)
Vice President:	Bill Peterson (Kentucky)
Secretary:	Paul Sebesta (California)

NEW BUSINESS

Executive Business Manager

Because Jere McBride is stepping down as Executive Business Manager, Denny Thompson was nominated to assume that position. Question was asked if Jere could serve through June. Jere would be glad to assist with the transition and could serve as a resource. Motion was made by Bill Peterson to accept nomination of Denny Thompson as Executive Business Manager. Motion was seconded by Jim Jones and approved unanimously.

Directory

Dennis Onks raised some issues about the cost of the membership directory. Phil Hunter (Tennessee) is absorbing the cost from his Station budget (about $700-$800) for the reproduction and mailing. While Phil is glad to do it we may want to look at other ways of disseminating the directory such as posting it on the web or producing it on CD to eliminate the paper copy. Since Phil was not present it was suggested that Dennis talk further with Phil. In general the Executive Committee likes the current format. No motion was made.

Annual Meeting Program

Program Chair Lyle Lomas gave a brief run down of this year's program. Findlay Pate (Florida) gave a general description of the tour indicating that stops were planned at a new research station, a nursery and a tissue culture facility.

Meeting Site Selection

There was a general discussion about meeting site selection and the RCAS relationship with SAAS. It was agreed that we should maintain our general relationship with SAAS but we should also explore other winter meeting venues on a case-by-case basis. The location for the next summer meeting was also discussed and the Executive Committee voiced a desire to meet in the upper Midwest. Robert Dunker (Illinois) provided information on possible summer meeting venues in Illinois and Indiana. Ben Kittrell made a motion to hold the summer, 2002 meeting in the upper Midwest. Second from Bob Roth (Arizona). The motion passed unanimously. Possible venues for the summer, 2003 meeting were also discussed. The Executive Committee expressed an interest in holding that meeting in the Sacramento, California area. A motion to that effect was made by Jim Jones and seconded by Ray Cartee. It passed unanimously.

The Executive Committee was adjourned.

RCAS Annual Business Meeting

February 5, 2002

Orlando, Florida

President Carl Tart (North Carolina) called the business meeting of the general session to order at 10:30 AM on the above referenced date.

Treasurer's Report

Denny Thompson (North Carolina) reviewed the past budget and the budget for this current RCAS Annual meeting. A copy of the Society's current balance sheet was provided the membership. Denny also reviewed the current attendance for this meeting. Total attendance was 93 with 20 states represented. The next effort for attracting new members should be directed toward the Northeast.

Expansion

Ben Kittrell (South Carolina) gave a quick run down on expansion efforts and suggested that more efforts be made to attract managers of private sector research facilities.

Membership/Internet

Jim Smith (Mississippi) mentioned that the web site was going good and the Elizabeth Cook, of the Delta REC, was doing an excellent job serving as our site coordinator. The suggestion was made that we make an effort to update the pictures of the individual members.

Proceedings

Carl Tart indicated that he was unable to bring the proceedings of last year's meeting with him (as normal) due to technical difficulties. The proceedings would be mailed at a later date.

Dennis Onks (Tennessee) asked that we forward the names and addresses of potential members to him and he will mail them a copy of the proceedings as they make excellent recruitment tools.

Merritt Taylor (Oklahoma) asked those that gave presentations at this year's meeting to make sure they give him a copy of their presentations for inclusion in the proceedings.

Financial

With the resignation of Jere McBride (Louisiana) as the Executive Business Manager the Society is in a transition period. As the Society transitions to a new Executive Business Manager it would be appropriate to conduct an audit.

Awards

John Hodges (Tennessee) and John Robinson (Arkansas) were recognized by the Society for their special service to RCAS.

Program

This year we had an especially good program and have received a number of good comments about the program.

Findlay Pate (Florida) also expressed his thanks for a great meeting in Orlando.

Directory

There was a general discussion about the membership directory and the Society would like to keep receiving a paper copy. The suggestion was made that it also be posted on the Society's web site.

There was also a general discussion about personnel changes in some states including Kansas, Alabama, Kentucky, Utah, California, Mississippi, Tennessee, Virginia, North Carolina, Georgia and Louisiana.

Bylaws

The members were once again informed about the recent bylaws changes and that the bylaws are posted on the web site. Specific mention was made of the changes in officer positions.

Nominations

The membership was informed that the following nominations were made:

President:	Lyle Lomas (Kansas)
Vice President:	Bill Peterson (Kentucky)
Secretary:	Paul Sebesta (California)

Nominations were also sought from the floor. There were none.

The motion was made by Ben Kittrell to accept the slate of officers as nominated by the nominating committee. Findlay Pate seconded the motion and it passed unanimously.

Ben Kittrell also made a motion to name Denny Thompson as the new Executive Business Manager. It was seconded by Bill Peterson and approved unanimously. It was suggested that the summer meeting of 2002 be held in the Midwest. Bob Dunker (Illinois) gave a brief overview of their preliminary plans for the summer, 2002 meeting. Chuck Reid (Michigan) discussed holding part of the tour in Michigan. Motion was made by Reuben Moore (Mississippi) to hold the summer, 2002 meeting in the Midwest. It was seconded by Paul Nyren (North Dakota). The motion was approved unanimously.

Site Selection

A discussion was held about the location for the summer, 2003 meeting. Motion was made and seconded to hold that meeting in California. The motion passes unanimously.

A discussion was also held about the site for the winter meeting of 2004. The site selected by SAAS will be Tulsa Oklahoma. While the membership would like to retain the close linkage with SAAS, they would also like to have the opportunity to select alternative sites as the need arises. A suggestion was made to forego meeting in Tulsa and meet instead in Phoenix, Arizona. The Arizona members gave a brief description of the Phoenix area as a meeting venue. Motion was made by Ray Cartee (Utah) to hold the winter, 2004 meeting in the Phoenix area. The second was by Ed Hanlon (Florida) and it passed unanimously.

CAST Membership

The final item of business was a brief discussion on the need to renew our CAST Membership with Ed Hanlon serving as our representative. Motion was made by Clyde Bogel (North Carolina) and seconded by Bill Peterson. It was approved unanimously.

Meeting was then adjourned.

RESEARCH CENTER ADMINISTRATORS SOCIETY

BYLAWS

Article I

Name

The name of this organization shall be "Research Center Administrators Society" and for the purpose of this document shall be frequently referred to as "Society."

Article II

Objectives

The objectives of the Research Center Administrators Society shall be to hold educational meetings; to provide opportunities for interaction with colleagues; and to enhance the profession within the scientific community.

Article III

Members

Section 1

The membership shall include superintendents, resident directors, center directors, and other individuals with various titles having administrative responsibilities involving a field station, branch station, research station, research center, or other branch research facility of a state agricultural experiment station or any other public or private agricultural research organization.

Section 2

The membership shall be composed of regular and active members. Any unit head of a branch research facility in any participating state shall be considered a regular member and shall be eligible for active membership. Any individual, with administrative responsibilities involving a satellite research facility in any participating state who attends a meeting and pays the designated registration fees shall be considered an active member for three years with all rights and privileges afforded by the Society.

Article IV

Officers

Section 1

The officers of the Society shall be a President, a Vice-President, a Secretary, an Executive Business Manager, a Society Proceedings Editor, a Communications Officer, and a Newsletter Editor. These officers shall perform the duties prescribed by these bylaws and by the parliamentary authority adopted by the Society.

Section 2

The officers shall be elected by the membership to serve for one year or until their successors are elected, and their term of office shall begin at the close of the winter meeting at which they are elected. The Executive Business Manager, the Society Proceedings Editor, the Communications Officer, and the Newsletter Editor shall serve at the pleasure of the Executive Committee and the Society for a specified term announced upon the election of the officer. Additional terms may be served if deemed in the best interest of the Society.

Section 3

No member shall hold more than one office at a time, and no member shall be eligible to serve consecutive terms in the same office. An officer may move into an office through the departure of another officer, completing the existing term and then be elected to serve a full term in that office. The Executive Business Manager, the Society Proceeding Editor, the Communications Officer, and the Newsletter Editor may serve more than one term upon recommendation of the Executive Committee and approval of the Society.

Section 4

Duties of the President shall include:

- Serve as overall coordinator of Society activities;
- Preside at all Society meetings.
- Appoint Nominating Committee in accordance with Article VII, Section 1 of these bylaws;
- Appoint Local Arrangements Committee Chair for the winter and summer meetings;
- Appoint all other committees as needed.

Section 5

Duties of the Vice-President shall include:

- Serve as Chair of the Program Committee;
- Coordinate program costs with the Executive Business Officer in order to establish appropriate registration fees;
- When meeting with the Southern Association of Agricultural Scientists (SAAS) provide a copy of the winter program to SAAS Secretary-Treasurer at the designated time if appropriate;
- Mail copy of program to all Society officers and state representatives;
- Provide Communications Officer with copy of program to place on the website;
- Serve as member of the Executive Committee.

Section 6

Duties of the Secretary shall include:

- Responsible for registration at all meetings and provide President and Executive Business Manager with final registration list;
- Collect fees at all meetings and turn the monies over to the Executive Business Manager for deposit in the Society's bank account;
- Prepare minutes of all winter and summer meeting business sessions;
- Provide Communications Officer with unofficial copy of the minutes for each meeting for the website for membership review;
- Provide the Proceedings Editor and Communications Officer with official approved copy of minutes for publication in the Proceedings and on the website;
- Mail programs of all meetings and other appropriate information to membership;
- Serve as a member of the Executive Committee;
- Serve as recording secretary for Executive Committee meetings;

- Maintain contact with SAAS Secretary-Treasurer throughout the year as appropriate.

Section 7

- Duties of the Executive Business Manager shall include:
- Maintain the Societies' banking accounts, fiscal records, prepare financial statements and provide such statements to the Executive Committee and the membership at the winter and summer meetings;
- Issue checks for payment of invoices as submitted by the Executive Committee or program committee chair of any Society sponsored event;
- Work with local arrangement committee in establishing appropriate registration fees for all meetings, to establish credit accounts, and other business matters related to any Society sponsored meeting;
- Represent the Society when designated by the President;
- Maintain current Membership List;
- Revise as appropriate and maintain official copy of bylaws;
- Provide Society Proceedings Editor with official copy of bylaws for publication in the Proceedings;
- Maintain liaison with SAAS Secretary-Treasurer on matters relating to the business of SAAS and the Society;
- Serve as a member Executive Committee;
- Maintain past and current copies of Society Proceedings and provide copies to libraries, new members, and other individuals as requested;
- Following the winter meeting, report new officers to SAAS Secretary-Treasurer and pay SAAS dues if appropriate;
- Serve as a member of the Executive Committee.

Section 8

- Duties of the Society Proceedings Editor shall include:
- In association with the Vice-President, assemble all program presentations of the annual meeting and edit for publication;
- Publish approved minutes of annual meeting and Executive Committee Meeting as provided by the secretary;
- Procure all needed publishing materials and report cost to the Executive Committee for approval;
- Serve as a member of the Executive Committee.

Section 9

Duties of the Communications Officer shall include:

- Shall be responsible for maintaining the Society website.

Section 10

- Duties of the Newsletter Editor shall include:
- Shall be responsible for publishing and distribution of the Societies' newsletter;
- Newsletter will be placed on the website at designated times as required by the Executive Committee;
- Serve as a member of the Executive Committee;
- Mechanism and dates of distribution of the newsletter to be determined by the Executive Committee.

Section 11

Duties of the Local Arrangements Representative:

- A Local Arrangements Representative will be appointed for each of the winter and summer meetings;
- The Representative will visit the meeting site in advance of the meeting to determine if the meeting room and other facilities assigned the Society are adequate;
- Meet with hotel sales person or other appropriate businesses to make arrangements for the winter meeting including, coffee breaks, tour buses, banquet/or social visual aid equipment or other related needs;
- Coordinate business arrangements with the Executive Business Manager to establish charge accounts if appropriate;
- Coordinate budget matters with program chairman and Executive Business Officer to establish appropriate registration fees;
- Coordinate all program arrangements and planned activities with other Program Committee members;
- Shall have the option to solicit additional assistance from the membership as needed;
- Attend the Executive Committee meeting prior to their assigned meeting.

Article V
Meetings

Section 1

The Executive Committee will recommend sites for the winter and summer meetings two years in advance. The winter meeting shall continue to be held in association with SAAS unless otherwise ordered by the Society. The Active members will approve Executive Committee site recommendations at the business meeting of the winter meeting. Nominations of potential winter and summer meeting locations will also be accepted from the membership during the business meeting.

Section 2

The President in conjunction with the Executive Committee can only call special interim meetings.

Section 3

Active members in attendance at any winter, summer, or special meeting shall constitute a quorum.

Article VI
Executive Committee

Section 1

The Executive Committee shall consist of current officers, the immediate past President, and one representative from each participating state.

Section 2

The Executive Committee shall have general supervision of the affairs of the Society between annual business meetings, make recommendations to the Society, and shall perform such other duties as are specified in these bylaws. The Committee shall be subject to the orders of the Society.

Section 3

State Representatives shall be selected by the membership of their respective states.

Section 4

The Executive Committee shall meet at least twice annually. A meeting will be held during each of the semi-annual meetings.

Article VII
Committees

Section 1

The President shall appoint a Nominating Committee consisting of three immediate past Presidents that are still active in the Society. The Nominating Committee shall be appointed during the annual meeting. It shall be the duty of this committee to nominate candidates for the offices to be filled except for the office of Executive Business Manager and Society Proceedings Editor, and a Communications Officer. The Nominating Committee shall report during the business session of the annual meeting and prior to the election of officers. Before the election, additional nominations from the floor shall be permitted. An Executive Business Manager candidate and a Society Proceedings Editor, and Communications Officer candidate shall be selected by the Executive Committee prior to the annual meeting, and the appointment shall be recommended to the Society for approval. The Society membership may also make nominations from the floor.

Section 2

Special committees shall be appointed by the President as the Society or the Executive Committee shall from time to time deem necessary to carry on the work of the Society. The President shall be ex-officio member of all committees except the Nominating Committee.

Article VIII
Parliamentary Authority

The rules contained in the current edition of "Robert's Rules of Order Newly Revised" shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with these Bylaws and any special rules of order the Society might adopt.

Article IX
Amendment of Bylaws

Section 1 - Amendment by Active Membership

The Bylaws can be amended by a two-thirds vote of the active membership during the business session of the annual meeting. Notice of the proposed change must be given to the Society President one week prior to the annual meeting. The notice shall include the full text of the amendment and the President will make such amendment available to the entire membership at least 24 hours prior to the winter business session.

Section 2 - Amendment by Executive Committee

In an emergency, the bylaws can be amended by action of the Executive Committee provided strict procedures are followed. A member proposing the amendment shall provide the Executive Committee Chair with the full text of the proposed change. The Chair shall distribute copies and/or place the full text on the website for committee members 45 days prior to the voting deadline. Voting may be by letter, telephone with confirming letter, or by roll call if taken during an Executive Committee meeting. State Representatives of the Executive Committee are to review the amendment with their respective delegation and cast one vote reflecting the delegation's view. A two-thirds vote of the Executive Committee members voting is required for adoption of an amendment. The Chair shall announce the voting results, and should the proposed amendment pass, the Business Manager shall revise the bylaws to include the amendment(s) and place the full text of the revision on the web site for review by the Society membership . Amendments to the bylaws are to be ratified by the active membership at the winter meeting.

Revision Dates:

Revised 10-01-85
Revised 02-05-88
Revised 02-06-92
Revised 01-29-95
Current Revision 2001

RCAS Committee Assignments 2001-2002

Local Arrangements (Orlando, FL)

Findley Pate, Florida, Chairman
Ed Hanlon, Florida

Awards

John Hodges, Tennessee, Chairman
Randal Rawls, Alabama
Dave Langston, Arizona

Nominations

Ben Kittrell, South Carolina, Chairman
Butch Withers, Mississippi
John Robinson, Arkansas

Membership and Internet Services

Joe McFarland, Chairman
Phil Hunter, Tennessee
Ron Robbins, Louisiana
George Granade, Georgia
Mike Phillips, Arkansas
Merritt Taylor, Oklahoma
Jim Smith, Mississippi
Paul Sebesta, California
Ray Cartee, Utah
Ed Hanlon, Florida

Proceedings

Dennis Onks, Tennessee, Chairman
Carl Tart, North Carolina
Merritt Taylor, Oklahoma

Finance

Jim Jones, Virginia, Chairman
Denny Thompson, Executive Treasurer, North Carolina
Malcomb Pegues, Alabama
Jim Smith, Mississippi
Bob Roth, Arizona
Ed Hanlon, Florida

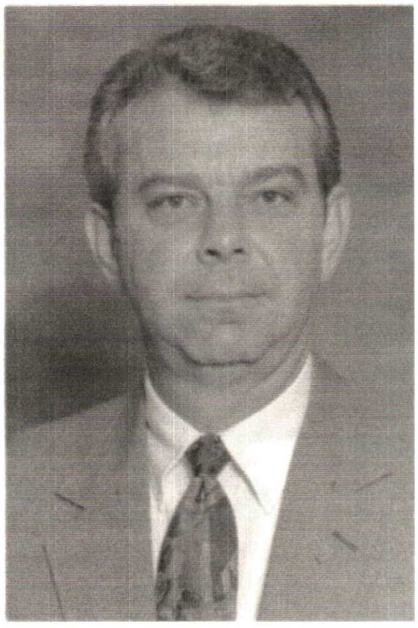
RCAS Expansion

Ben Kittrell, South Carolina, Chairman
Paul Sebesta, California

Butch Withers, Mississippi
Findlay Pate, Florida
John Robinson, Arkansas
John Hodges, Tennessee
Lyle Lomas, Kansas
Carl Tart, North Carolina
Jim Pitts, Alabama
Chuck Reid, Michigan
Paul Nyren, North Dakota
Jim Beaty, Indiana
Ray Cartee, Utah
Robert Dunker, Illinois

2002 Distinguished Service Award Recipient

Dr. John Hodges III
Superintendent, Knoxville Experiment Station
Knoxville, Tennessee



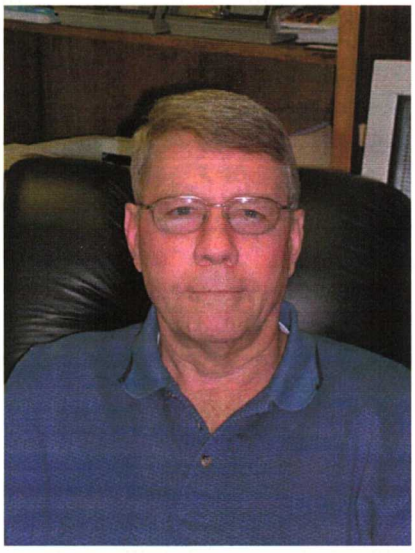
Dr. Hodges is the first of two members recognized this year by the RCAS membership for distinguished service and support of the Society's mission to improve the administration of agricultural research units. This award has been earned by service as a member and committee chair during his membership for the past 28 years. During this period he has served on the By-laws, nominations, finance, local arrangements, awards and membership and program committees. He is currently chair of the awards committee.

John's working career has been with the University of Tennessee as Superintendent of the Knoxville Experiment Station where he continues to serve. He has represented the Agricultural Experiment Station in the planning and construction of over $20 million in improvements for the research program during his tenure. Being a member of University and community activities has resulted in his selection as a leader for developing a partnership between U.S. organizations and similar organizations in many South American Countries. He is also a member of Gamma Sigma Delta and Alpha Zeta and on the Tennessee Board of Directors for Alpha Gamma.

John continues to actively recruit for the RCAS and encourages any administrator who wants to improve the service to Agriculture and it people to join the society. Because of agricultural leaders like Dr. Hodges, the society has benefited its members through needed information and growth that help all members to succeed. The RCAS expresses its appreciation to Dr. John Hodges III for his distinguished service with this for 2002.

2002 Distinguished Service Award Recipient

Dr. John F. Robinson
Director, Rice Research & Extension Center
Stuttgart, Arkansas



Dr. John Robinson is the second member to be recognized this year by the RCAS membership for his distinguished service and support of the Society's mission to improve the administration of agricultural research units. This award has been earned by service as an officer and committee chair and by the promotion of the society to the agricultural community. He began active participation with his membership 10 years ago. Prior to serving as an officer, he was the state representative for Arkansas and chair of the local arrangements, finance and membership committees. He served as secretary in 1996, 2nd Vice-President in 1997, 1st Vice-President in 1998 and President in 1999.

John has spent most of his career with USDA-ARS as a research entomologist beginning in 1968. He served at stations in Ankeny, Iowa; Charleston, South Carolina; Crowley, Louisiana; and became resident director of the Rice research & Extension Center, Stuttgart, Arkansas in 1989. He has published over 160 articles and been a member of the National Rice Germplasm committee and the Arkansas Seed Council.

John continues to serve as past president and serves on the executive committee to provide continuity to the new leadership. He continues to actively recruit for the society and encourages any administrator to enjoy the exchange of information that is offered as a member. It is because of the leadership of agricultural administrators like Dr. Robinson who have contributed to the success that the society has enjoyed. The RCAS wishes to express its appreciation to Dr. John F. Robinson for his distinguished service to this society.

Past Recipients of the Distinguished Service Award for service, leadership, and outstanding contributions to RCAS over an extended period of time.

YEAR AWARDED	RECIPIENT
1987	John Ewing
1988	Robert "Bobby" Moss
1989	Joe High, Jr.
1990	Wallace Griffey & Bill Webb
1991	Norman Justus
1992	Gene Morrison & Jere McBride
1993	William Loe & Howard Malstrom
1994	James Riley Hill
1995	Edward Worley
1996	Robert Freeland & Will Waters
1997	Joe Musick
1998	Dennis Onks
1999	John "Ike" Sewell
2000	F.T. "Butch" Withers, Jr.
2001	Joe McFarland
2002	John Hodges III & John Robinson

PAST PRESIDENTS, RCAS

YEAR	PRESIDENT
1969 – 1970	Robert Moss
1970 – 1971	Preston Reed
1971 – 1972	Charles Douglas
1972 – 1973	Charles Douglas
1973 – 1974	D. M. Gossett
1974 – 1975	Henry Marshall
1975 – 1976	Tom Corley
1976 – 1977	H. Rouse Caffey
1977 – 1978	E. G. Morrison
1978 – 1979	Robert Moss
1979 – 1980	Joe High, Jr.
1980 – 1981	Julian Craigmiles
1981 – 1982	Freddy Peterson
1982 – 1983	Wallace Griffey
1983 – 1984	Bill Webb
1984 – 1985	Gary Elmstrom
1985 – 1986	Norman Justus
1986 – 1987	Robert Freeland
1987 – 1988	Jere McBride
1988 – 1989	Howard Malstrom
1989 – 1990	Bill Loe
1990 – 1991	Edward Worley
1991 – 1992	Will Waters
1992 – 1993	James R. Hill, Jr.
1993 – 1994	Joe Musick
1994 – 1995	Dennis Onks
1995 – 1996	Jim Pitts
1996 – 1997	F. T.(Butch)Withers
1997 – 1998	Ben Kittrell
1998 – 1999	Findley Pate
1999 – 2000	John Robinson
2000 - 2001	Denny Thompson