



IN THE FIELD

Mapping the road for voluntary change: Partnerships in agricultural extension

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Abstract. BIOS and BIFS are two California-based, small-scale alternative agricultural demonstration programs that define an applied Agriculture Partnership Model of extension. This model operates through a structure of local project leadership, a process of responsive farmer outreach and a primary goal of voluntary pesticide reduction. It reaches back to a Land Grant approach to extension of personal relationship, equal partnership, and collaborative learning. Overall findings from a systematic assessment of BIOS and BIFS imply that the operation and impacts of these two Agriculture Partnership Projects owe more to the model, approach, and values of the projects than to any specific farming or extension techniques. A model of local partnership and responsive, learner-centered outreach, operational values such as flexibility and relationship, and a balanced systems approach to farm management and project operation combine to create a promising organizational response to the rapidly changing regulatory, environmental, and political circumstances confronting conventional farmers in California. Though some farm advisors and field research specialists within the University of California Cooperative Extension have successfully used the projects to leverage decreasing Extension resources, increase their one-on-one contact with farmers, and learn new outreach and agricultural skills, others within that system are highly critical of the two projects. Organizational tension between Cooperative Extension and the quasi-university Partnership Projects largely reflects differences in fundamental beliefs and values about legitimate knowledge, learning processes, and effective teaching as well as primary goals for agricultural outreach.

Key words: Agriculture outreach, Agricultural partnership, Almonds, BIOS, BIFS, Cooperative Extension, CAFF, Farmer-to-farmer, Local knowledge, Sustainable agriculture, Walnuts, Wine grapes

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BIOS (Biologically Integrated Orchard Systems) and BIFS (Biologically Integrated Farming Systems) are California-based agricultural demonstration programs that bridge the rhetoric of respect for farmer knowledge and local public/private partnerships to the realities of contemporary agricultural extension in the field. They represent a working Agricultural Partnership Model of extension based on a structure of local project leadership, a process of responsive farmer outreach, and a primary goal of voluntary pesticide reduction. These Agricultural Partnership Projects also raise and address questions about some of the traditional roles and relationships within agricultural extension

at a time when government agricultural support agencies such as Cooperative Extension are struggling with restricted budgets and increased pressures for new approaches to agricultural outreach.

In raising these questions, the Agriculture Partnership Projects have become sites of tension within the University of California and Cooperative Extension: tensions centering on issues of legitimate knowledge, outreach effectiveness, and the primary goals of extension. BIOS and BIFS are small-scale, alternative extension projects. They are not the only, or even the most important, factors driving California agriculture towards wholesale industry-wide change

in farming practices. However, they provide a focus and direction for some farmers confronted with rapidly shifting economic, regulatory, and political circumstances. With their emphasis on local leadership, frequent farmer contact, and collaborative experiential learning, the Agriculture Partnership Projects reach back to the progressive roots of Cooperative Extension (see Peters, 1996). They also point forward in providing an operational and focused direction for farmers, extensionists, and agriculture policy makers to proactively navigate through a period of rapid changes in California farming.

This paper is based on a detailed formative assessment report on the Agricultural Partnership Projects.¹ During an 18 month period from 1996 to 1998, researchers from the Department of Human and Community Development at the University of California, Davis closely examined educational and sociological dimensions of BIOS-Merced, the flagship project based in Merced and Stanislaus Counties in the Central Valley of California, and BIFS-Lodi, based in the Central Valley region of Lodi-Woodbridge.² The assessment was designed to answer four basic questions: (1) How do BIOS and BIFS actually work at the field level?; (2) What, if any, are the institutional and other impacts of the two programs?; (3) Why do BIOS and BIFS work (or not work)?; and (4) What is the organizational relationship between University of California Cooperative Extension and BIOS and BIFS?

Methods

Choices of assessment focus, guiding questions, and research methods used in this study evolved from a continuing dialog among representatives from agriculture support organizations interested in systematically examining the operation and impacts of BIOS and BIFS. An assessment team met bimonthly throughout the 18 months of the study and included representatives from the Community Alliance with Family Farmers (CAFF), the California Department of Pesticide Regulation (DPR), the United States Environmental Protection Agency (US-EPA), the University of California Sustainable Agriculture Research and Education Program (UC SAREP), the University of California Cooperative Extension, and the Lodi-Woodbridge Winegrape Commission.

Multiple qualitative research techniques were used to collect data on the BIOS-Merced and BIFS-Lodi projects. Non-participant observation was used to gain a rich sense of operation, culture, and relationship through BIOS and BIFS field days, management team meetings, research meetings, staff meetings, and

Cooperative Extension commodity meetings. Document review offered information on CAFF, BIOS, BIFS-Lodi, and Cooperative Extension organizational history, structure, and operational policies. Over 70 structured and unstructured interviews provided information on BIOS and BIFS organization and operation, information on perceived meaning and relationships within and around the two projects, and political information on the environmental and educational values of individuals and organizations connected with BIOS and BIFS. Interview participants included farmers, University of California agricultural researchers, Cooperative Extension farm advisors supportive of BIOS and BIFS and advisors not so supportive, UC agricultural program administrators, independent and chemical company PCAs, almond processors, winery representatives, Resource Conservation District (RCD) board members, county agricultural commissioners, representatives from CAFF, US-EPA, DPR, the Farm Bureau, Natural Resource Conservation Service (NRCS), the farm press, the Lodi-Woodbridge Winegrape Commission, and others. Interviews lasted from 30 minutes to 2½ hours and were audiotaped and later transcribed for analysis. Some interview participants requested anonymity.

Research focus, sampling, and data analysis followed a grounded theory approach (see Glaser and Strauss, 1967; see also Strauss and Corbin, 1990). Grounded theory provided a systematic analytic process to inductively develop and test categories and relationships of information "grounded" in the operational circumstances of the Agricultural Partnership Projects. Each round of sampling, data collection, and analysis informed the next round until patterns and relationships emerged. Issues and tensions that helped define the operation of BIOS and BIFS were developed and tested through this process.

Triangulation of data (e.g., interview transcripts, observation process notes, document review), participant checks, peer review of emergent findings and sustained contact with BIOS, and BIFS were used to increase the credibility and trustworthiness of assessment data and analysis (see Guba and Lincoln, 1981).

Introduction to BIOS and BIFS

BIOS is a demonstration program designed to help almond and walnut growers reduce the use of synthetic pesticides and fertilizers through the voluntary adoption of a biologically balanced approach to farming. The program is coordinated by the Community Alliance with Family Farmers (CAFF), a non-profit, non-governmental organization with a history of environmental activism. On occasion, that activism has

Table 1. Selected farm management strategies typically used as part of BIOS approach.

<i>Soil fertility</i>
<ul style="list-style-type: none"> • Compost and cover crops • Leaf tissue analysis • Reduced Nitrogen application • Split Nitrogen application
<i>Insect pest control</i>
<ul style="list-style-type: none"> • Frequent field monitoring • Bt (<i>Bacillus thuringiensis</i>) sprays • Beneficial insect releases • Elimination of dormant organophosphate sprays to conserve beneficial parasitoids • Orchard sanitation
<i>Weed control</i>
<ul style="list-style-type: none"> • Winter cover crops as standing mulch to reduce summer weeds • Glyphosate in tree rows • Reduced use of pre-emergence herbicides • Reduced width of herbicided strips (bare ground) in tree rows
<i>Disease management</i>
<ul style="list-style-type: none"> • Conventional fungicide applications • Careful water management • Variety choice
<i>Vertebrate control</i>
<ul style="list-style-type: none"> • Bat and owl boxes • Trapping

led to political confrontation with the University of California.³ BIOS has come to signify both an approach for orchard management and a strategy for grower outreach and extension. The biological parameters of BIOS loosely revolve around the managed use of cover crops as the foundation for a systems approach to farming (See Table 1 for a list of multiple strategies). The grower outreach component of BIOS uses educational field days and in-field technical support to help conventional growers explore and adopt a systems approach to farming that is best suited to the local conditions on each farm. Leadership for each project comes from a management team based in the project county. For most projects, the management team consists of one or two farmers, one or two pest control advisors (PCAs), the CAFF project coordinator, a technical representative from UC SAREP, and, when he or she is willing to participate, a Cooperative Extension farm advisor or research specialist.

BIOS grew from a Cooperative Extension case study comparing conventional and organic farming

practices used by Merced County almond growers (Hendricks, 1995). That study, funded by UC SAREP, provided a focus for organizing the first BIOS project and its success allowed CAFF to expand the program to other counties. At the time of the assessment reported here, there were six BIOS county projects operating in California's Central Valley. Five of the BIOS projects were directed specifically towards almond growers, while the remaining one was directed towards walnut growers. Since 1993, when the first BIOS project started in Merced County, 89 farmers have officially enrolled a total of over 5,000 acres in the six BIOS projects (CAFF, 1997).

Unlike BIOS, BIFS is a legislatively mandated state project administered by the University of California through UC SAREP.⁴ At the time of this study two projects had been funded under the BIFS program.⁵ The first project built on an already established area-wide IPM (Integrated Pest Management) program coordinated by the Lodi-Woodbridge Winegrape Commission. Over 40 cooperators repres-

enting over one-half the winegrape acreage in the Lodi-Woodbridge district (one of the most productive winegrape regions in the country) are officially enrolled in BIFS (Ohmart, 1997).

How do BIOS-Merced and BIFS-Lodi actually work at the field level?

Three key elements that define the operation of BIOS and BIFS emerged from this study: local project leadership, responsive farmer outreach, and a primary organizational goal of economically sustainable pesticide reduction.

Local leadership

Central to the BIOS and BIFS approach is the leadership structure of locally based management teams in which farmers, PCAs, Cooperative Extension farm advisors, and field specialists participate as equal partners. This structure (1) encourages local control of projects; (2) fosters new relationships between groups within the local agriculture community; (3) refines local leadership skills among farmers and PCAs; (4) provides a venue for the sharing of farmer, PCA and University knowledge and experience through a process of collaborative learning; and (5) levels top-down relationships that are sometimes seen between University researchers, farmers, and PCAs. Management teams plan field days, hammer out research and field monitoring protocols, evaluate general project effectiveness, plan farmer support visits to participating farms, and examine the nuts and bolts of implementing sustainable agriculture practices.

Management team meetings for both BIOS-Merced and BIFS-Lodi resemble focused, but informal, conversations among experts with different types of expertise. The dialog among team members seems open, honest (and sometimes contentious), and collaborative in terms of building a collective knowledge and experience. One team member calls it a "level learning field" between university scientists, farmers, and PCAs. An almond grower who sat on the BIOS-Merced management team recalls: "I think we all shared a philosophy going into it and we talked about the team as a *level learning field* (emphasis added) instead of a level playing field. We wanted a level learning field where the scientist and the farmer are on the same plane and learn together from each other." When asked what a "level learning field" would look like, he explained, "You would see a group of people visiting and talking together. From your perspective you wouldn't know who was the farmer and who was

the scientist. There would just be an exchange of ideas and conversation." The CAFF Project Coordinator for BIOS-Merced reinforces the importance of a shared commitment among management team members to values of equal partnership and open, collaborative learning:

The management team is more than just slots representing community positions. For example, if the "Extension farm advisor" slot on the management team had been filled by a farm advisor hostile to BIOS then there wouldn't have been a BIOS program. It would have been a great experiment that we throw out the window when it's done. Yes, we can identify these community members as key positions, but on the other hand, if the persons in those positions don't have the values to support this kind of program, then it's not going to fly.

Some Cooperative Extension advisors and specialists with experience on both Extension advisory committees and Agriculture Partnership management teams say that the "level learning field" and the collaborative process of the BIOS and BIFS teams are different from relationships in typical Extension advisory committees. One advisor comments, "In Cooperative Extension we get input from farmers, but it is more one-on-one. This is a real team approach. I've never seen this kind of collaboration before." Another Extension advisor reflects on his experience with a BIOS management team:

It was various types of people who got together without a hierarchy. Everybody, including the farmers, had equal say. That stuck out in my mind. Extension sits down with PCAs and farmers. They have meetings that are focused on a particular goal, but in most of their meetings they are the *farm advisor*. They are the *scientist*. They hold onto that role. That wasn't the case in BIOS.

Responsive outreach

BIOS-Merced and BIFS-Lodi demonstrate a responsive process of farmer outreach that emphasizes collaborative learning. Both projects use familiar vehicles of outreach such as field days, workshops, field manuals, and farm visits, but within those vehicles, value is explicitly placed on farmer and PCA experience and more formal opportunity is created for a relationship of exchange centered around that experience. Field days provide the main contact between BIOS and almond farmers in Merced and Stanislaus counties. The field days are usually held in the orchards of BIOS cooperators and normally attract

30 to 40 participants, only a small percentage of whom are BIOS-enrolled growers. BIOS field days have a reputation, even among many critics, for presenting practical information that is locally and seasonally relevant. Often a farmer or PCA or panel of farmers is included among the presenters. Even when farmers do not formally present, their experience is invited and valued during open discussion. Cooperative Extension farm advisors and outside specialists are also invited and welcomed as equal participants in the process of collaborative learning.

Neighborhood Grower Meetings bring the Lodi-Woodbridge Winegrape Commission, BIFS, and a message of IPM directly into grower homes, barns, and wineries. Originally designed to reach all 630 growers in the district, the Neighborhood Grower Meetings gather small groups of 10 to 20 farmers, PCAs, and winery representatives in relaxed and informal settings where the BIFS Project Director introduces IPM as a safe, economically, and environmentally sound approach to vineyard management. The Project Director and Commission leaders believe that intensive personal outreach on an area-wide basis is necessary to help many of the district growers make the transition to an IPM approach. For some small-acreage growers, it is their first personal introduction to IPM, their first personal contact with the Commission, and their first personal contact with the local Cooperative Extension farm advisor. The BIFS Project Director recalls, "What I decided to do was sit down with every grower in the district whether it was in their living rooms, barns, or whatever. Some people thought it was nuts, but it's happening."

Characteristics of openness, flexibility, and an emphasis on relationship and local context are common to outreach efforts in both BIFS-Lodi and BIOS-Merced. These characteristics were built into both projects from the start as they evolved from shared concepts about a learner-centered outreach that was based on frequent contact with participating farmers and an emphasis on collaborative learning. Both outreach projects demystify the University expert, though to different extents and through different methods. BIOS-Merced consciously values and creates formal and informal opportunities for farmer knowledge in all vehicles of outreach. BIFS-Lodi attempts to make University research knowledge more open and accessible through informal, relaxed, local presentation settings and open, learner-centered teaching techniques.

Primary goal

While the management team structure and collaborative, learner-centered outreach serve multiple organ-

izational and educational functions within BIOS and BIFS, the operations within the two projects are focused on the *primary* goal of voluntary reduction in the on-farm use of synthetic pesticides and fertilizers. Farmer motivation to reach that goal may be economic (e.g., reduced spray costs), regulatory (e.g., reduced chemical availability) and/or environmental (e.g., family and farm health), but the goal of pesticide reduction remains the primary organizational focus of the two projects.

What, if any, are the institutional and other impacts of the two projects?

BIOS and BIFS-Lodi have had impacts on agriculture support organizations such as US-EPA, DPR, the Farm Bureau, Cooperative Extension, local Resource Conservation Districts, and local offices of the Natural Resources Conservation Service. Through policy, regulation, and program sponsorship these support organizations influence the direction of California farming. Some of the impacts of BIOS and BIFS are specific in terms of policy and personnel changes. More important, the two projects have shifted the dialog within these agencies, creating internal organizational space to support progressive new approaches to agriculture research and outreach. "BIOS-like" has become an adjective within some agriculture support organizations, adding a measure of credibility, legitimacy, and political support to other partnership projects. A California-based senior associate in the US-EPA credits BIOS with showing the agency that a new approach to agricultural outreach can work:

It has had an effect on EPA both here and nationally. It is viewed as a program that is innovative and likely to work. BIOS-like projects are now being funded in other regions throughout the country. Washington is looking to us. There is a lot of attention paid to California. BIOS is one of the things that inspired our reorganization to a more integrated regional ag strategy here in Region IX [Western region]. The agency can point to BIOS and say, "Yes, this kind of approach is feasible and it can happen."

At the county level, BIOS-Merced and BIFS-Lodi are having impacts on Cooperative Extension. Farm advisors and specialists who chose to actively participate in BIOS and BIFS report professional and organizational benefits from their involvement. Noted were (1) increased one-on-one farmer contact; (2) contact with a more diverse range of farmers; (3) development of new agricultural knowledge and new outreach skills; (4) development of new research

opportunities; and (5) the leveraging of Extension resources to more effectively get University research into practice.

Survey evidence shows that BIOS and BIFS-Lodi growers have made substantial changes in their orchard and vineyard management practices since they enrolled in the projects (CAFF, 1997; Ohmart, 1997). Noting the small number of growers actually enrolled in BIOS and BIFS, a representative from the California Almond Board cautions that the direct impacts of the programs should not be overestimated: "I'd say BIOS is a pretty small fish in a big pond."⁶ Yet, since program boundaries for both of the projects are highly permeable, it is safe to assume that project impacts reach beyond enrolled growers. In both BIOS and BIFS-Lodi, most outreach activities are directed to all interested growers regardless of formal program enrollment. For example, only 40 growers are officially enrolled in the BIFS-Lodi project, yet over 340 growers, representing over 80% of the wine grape acreage in the Lodi-Woodbridge district,⁷ attended at least one of the BIFS-sponsored Neighborhood Grower Meetings focused on IPM in viticulture.

Supporters and some critics of BIOS and BIFS believe the political and operational success of these projects is influencing the dialog in the larger agriculture community around issues of pesticide use, alternative farm practices and effective farmer outreach. An independent consultant who has worked with projects similar to BIOS and BIFS throughout the country comments, "The most important contribution of BIOS is that it's so well known among so many different circles. It has created discussion. Whether they wanted to or not, people had to think about it. It has had ripples throughout the state and country." A Cooperative Extension program administrator observes, "It is creating a debate in the University, a discussion about how we do things here. Not only does BIOS question how we do things, it questions the kinds of things we do. My perception is that there is a considerable amount of discussion on it." An independent PCA on the BIOS-Merced management team notes, "BIOS has turned the whole Valley into a coffee shop. People are talking all over about this stuff, whether they mention BIOS or not." The Executive Director of the Lodi-Woodbridge Winegrape Commission makes a similar point about BIFS-Lodi: "There is a lot of interest in what we are doing with the IPM program in Lodi. I get calls all the time from around the state and outside California. People are excited by this. They want to know what's going on down here."

Why are BIOS-Merced and BIFS-Lodi working?

Conditions in California agriculture are ripe for the development of BIOS and BIFS. Farmers are losing the use of chemicals both through increased pest resistance and increased pesticide regulation. New biological pest control alternatives are finding success in the markets and in the fields. A change in the political climate has freed more money for research and extension support of alternative approaches to farming. At the same time, Cooperative Extension, the traditional source of farmer support, is facing increasingly restrictive budget demands. Farmers are becoming more aware of the environmental and health dangers associated with some conventional farming methods. In general, this is a time of rapid change in agriculture. The seeds of BIOS, BIFS, and other similar projects are germinating in these conditions of change.

BIOS-Merced and BIFS-Lodi have responded to these conditions with an approach to outreach that emphasizes local leadership, equal partnership, and collaborative learning. This approach can be labeled as an "Agriculture Partnership Model" to grower outreach. The model is expressed differently through the different agricultural, organizational, and social contexts of BIOS and BIFS, but the underlying structure, process, and goal are the same.

Recognition of the operational values expressed in BIOS-Merced and BIFS-Lodi is also crucial in describing and understanding the operation and impacts of the projects. BIOS-Merced and BIFS-Lodi are more than a bundle of outreach techniques. The model is empty unless the values and beliefs undergirding it are expressed through the outreach process.

Some of these values include an emphasis on relationship through frequent farmer contact, flexibility in program development and operation, locality in project development and leadership, an emphasis on a systems approach to farm management and agricultural outreach, and a willingness to give up a measure of program control. The underlying values that guide the two projects are visible through characteristics of project development and operation such as equal partnership, farmer-to-farmer extension, voluntary participation, local leadership, and program development through shared concepts rather than rigid plans. In describing an Agriculture Partnership approach to extension, one Cooperative Extension program administrator observes, "In a sense, what we are dealing with in agriculture are questions of complexity and chaos. It's not control and domination. We are moving from control to becoming more comfortable with complexity and chaos. It is a hell of a shift."

What is the organizational relationship between the University of California Cooperative Extension and BIOS and BIFS?

Some of the very features that distinguish the Agriculture Partnership approach of BIOS-Merced and BIFS-Lodi create organizational tensions between the projects and other agriculture support agencies, particularly the University of California and Cooperative Extension. These tensions find expression in a sometimes uneasy organizational relationship between the partnership projects and Extension that is communicated through the individual decisions and comments of farmers, farm advisors PCAs, and project staff members.

One site of tension between the partnership projects and Cooperative Extension revolves around the types of knowledge used for extension outreach. Through the management team structure, the invited participation of farmer experts in outreach events and publications and, in the case of BIOS, an explicit program goal of redefining the relationships among University scientists and farmers, BIOS, and to a lesser extent BIFS, create value and formal opportunity for sharing multiple sources of knowledge. That value and formal opportunity do not entirely fit into the organizational identity and some of the organizational values professed by Cooperative Extension. A former Cooperative Extension farm advisor who resigned his position on a BIOS management team describes how closely the identity adopted by Extension is now defined by an expert-derived statistical significance: "There are significant differences between BIOS and Extension and that's one of the things that led to my resignation. There's all kinds of information available in the world today. Some of it is seat of the pants. Some of it is hardcore, scientifically valid data. From the viewpoint of an Extension advisor, the work we do is based on scientifically valid research. By that I mean it is set up using proper statistical methods, analyzed then reported as significant or not based on statistics." A campus-based Extension researcher adds: "The main problem I have with projects like BIOS is that they create pseudo research and then try to pass it off as real science. Suddenly on-farm demonstration becomes fact." Critics frequently voice concern that BIOS is "anecdotal" and "pseudo science." A BIOS farmer acknowledges this concern:

Absolutely there are people in Extension who are not comfortable with BIOS. BIOS doesn't fit the traditional scientific model where information originates as a result of research – research defined by the perspective of the scientist in the laboratory.

A lot of BIOS practices originate more through observations of growers out in their fields.

Another almond grower enrolled in BIOS points out that the Agriculture Partnership approach does not discount the importance of University research:

We're not anti-science. We're really not. From our perspective this is not science versus traditional unproved methods. It's not either/or. We need to bring in the observer and give credit that maybe you don't necessarily have to have spent a lifetime in the university to make valid observations. And those observations may play out differently in the real world than they did in the laboratory. That's all we're saying. We want a level learning field. We want the scientist out walking through the same field that the farmer is walking in.

As many in Cooperative Extension and BIOS point out, most of the BIOS biological system actually rests on a scientific foundation of University of California research. Supporters of BIOS underscore that University-approved science will continue to play a crucial role in helping farmers develop new tools and understanding for a systems approach to farm management, but assert that it is no longer appropriate for replicated science to completely define the boundaries of valuable knowledge.

Some farm advisors voice concern that BIOS, by placing farmer knowledge on the same speaking platform as University-expert knowledge, is a threat to the credibility of Extension as a source of scientifically based, replicated information. One farm advisor warns that farmers will no longer trust Extension if the message to its "true believers" is confused with anecdote:

As a farm advisor representing the scientific community, all of the information we generate and publish, whether it's in a journal or UC bulletins, is based on proven information that we have developed scientifically in the field. There are all types of farmers, but a lot of farmers have come to associate work that has been generated in that fashion with valid data. They figure, "If it's proven, then I believe it's true and I want to implement it." Well, if all of a sudden, half the stuff that I'm pushing or saying is testimonial based on one observation or a couple of observations and the other half is hard core scientific and they don't know which is which, then pretty soon your credibility with the true believers begins to erode.

Another farm advisor who decided against joining the BIOS management team in his county comments,

"We [Cooperative Extension] need to guard our reputation. We need to be unbiased information providers." Others, both inside and outside of the University, question whether Extension really guards statistically significant knowledge as closely as some advisors claim. A program director within Extension comments, "I've heard criticism that BIOS isn't real science a lot of times, but I'm not sure that's a strong argument. A lot of times we [Cooperative Extension] make recommendations that are not based on hard science. We need to look at ourselves with that one." A farm advisor adds, "We're supposed to make recommendations only on things that are well proved by test plots. That's all well and good, but if you really look at the recommendations we make, in a lot of cases it's based on experience and based on things that are not test plot."

Beyond concerns about purity of presentation, some supporters of the Partnership Projects question whether replicated research can adequately meet the complex, site-specific information challenges of a systems approach to agriculture. A past Director of UC SAREP notes,

The UC system and most universities are predicated on the scientific method with reductionist, replicated research which, theoretically, carefully evaluates a practice. With this information the university can say, "We've done this research and here's the way you should farm." But sustainable agriculture doesn't fit as easily into that kind of research. We're asking much larger systems questions. We're not asking reductionist questions.

Another site of tension between BIOS and Cooperative Extension is centered around issues of outreach approach. For BIOS, the learner-centered process of outreach is as important as the information content of outreach. For Extension, the teaching and learning process sometimes takes a back seat to technical content. A grower outreach that consciously encourages relationship and emphasizes a learning environment of equal exchange and interaction demands different skills than an extension based on the transfer of scientific research. A University program administrator observes that the social science complexities of an Agriculture Partnership project can be especially challenging for those Extension farm advisors who are primarily trained in the biological sciences:

Managing a BIOS or a BIFS project is an enormous undertaking compared to a standard research project because it is so much more complex. You've got all the people interactions. Everyone brings baggage to the table. I've told other farm advisors that if they

are going to take on the management responsibilities for these kinds of projects, they better think long and hard about it. They will have a tiger by the tail.

Also winding through the organizational unease between BIOS and Cooperative Extension is a fundamental political question of who should benefit most from extension services. CAFF answers this question through an organizational history of activism, an explicit political agenda that seeks to renegotiate existing relations in agriculture, and an explicit environmental agenda that seeks to change the way farmers farm. Cooperative Extension assumes a value "neutral" stance of technical service and efficient support. This position in itself can be seen as a political agenda, but it is hidden beneath notions of service, efficiency, and productivity. In addition to differences of outreach approach and goals, there remains distrust within Extension from some of the confrontational rhetoric that CAFF directed towards the University of California during past political struggles.

Finally, some Extension advisors, researchers, and administrators express dismay over the amount of political support the Partnership Projects have gained in the state legislature. One farm advisor comments,

BIOS and BIFS have got people excited now, but we [Extension] have been doing this same work for years. These programs have gained a huge amount of public money because they are politically correct. If Extension received that kind of money we would have the resources to do all the hand-holding that BIOS and BIFS do.

One farm advisor sees fundamental differences between the outreach approaches of the Agriculture Partnership Projects and Cooperative Extension: "It is a different philosophy, a different way of thinking, a different paradigm." Others point out that BIOS and BIFS do not represent a new model of agricultural extension so much as an updated Cadillac version of a model that goes back to the roots of Cooperative Extension – a model based on personal relationships and co-learning. A UC program administrator comments,

It seems to me that BIOS goes right to the heart of the Land Grant idea. We are helping farmers deal with the problems of the day. We are helping them produce food and fiber in an environmentally sound way that helps build community. It's different than handing out recipes for how you do things.

Clearly, some farm advisors and specialists in Extension are experiencing opportunity through the projects. Farm advisors and specialists continue to play crucial

roles in BIOS and BIFS project leadership as local management team members and, in some cases, as principal project sponsors. They have constructed roles within BIOS and BIFS that allow them to maintain and expand their professional reputations while protecting the integrity of the University. They make sure that a voice of University-generated knowledge joins farmer and PCA expertise as part of the partnership conversation. They become experienced and expert resources for questions of research methodology. They give up program control. In return they expand their farmer contact and leverage resources for extension of University research.

One organizational roadmap for voluntary change

While BIOS and BIFS are certainly not driving wholesale change in California agriculture, they are providing one organizational roadmap that is helping some farmers, PCAs, and agriculture support agencies to voluntarily and proactively navigate that change. A founding organizer of CAFF comments,

I think agriculture is in chaos in a lot of ways. Still to this day we are losing more farmers than we are gaining. There's chaos on the international market. Rules for pesticides and everything else are changing constantly. Worker's compensation is a nightmare. It is just a mess. I mean the whole thing. Their world is nuts. And we [BIOS and BIFS] try to be a pilot car, at least on this one issue. "You can follow us. We have some ideas."

There are tensions between the partnership projects and Cooperative Extension, but those tensions have proved to be sites of opportunity for some farm advisors and specialists.

Overall, this assessment implies that the operation and impacts of BIOS-Merced and BIFS-Lodi owe more to the model, approach, and values of the projects than to any specific farming or extension techniques. A model of local partnership and relevant, responsive outreach, values such as flexibility and relationship, and a balanced systems approach to both farm management and project operation combine to create a promising organizational response to the rapidly changing regulatory, environmental, and political circumstances confronting California farming.

Notes

1. The full assessment report, *Leveling the Learning Fields*, describes the organizational contexts, in-field operations,

operational values, and institutional impacts of BIOS and BIFS in much greater detail. A photocopy of the full report is available from the authors at the Department of Human and Community Development, University of California, Davis, CA 95616, USA (\$15 photocopy charges).

2. The assessment was carried out with funding from the Agriculture Initiative of the US-Environmental Protection Agency (US-EPA) along with support through the Department of Human and Community Development at the University of California, Davis.
3. In its previous organizational incarnation as the California Action Network (CAN), CAFF helped instigate a successful lawsuit against the University of California demonstrating that UC agricultural research hurt the economic competitiveness of small-acreage farmers in California. The decision was later overturned on appeal.
4. State Assembly Bill #3383 (1993). Agricultural Chemical Reduction Pilot Demonstration Projects, sponsored by CAFF, signed into law by Governor Pete Wilson.
5. In 1999, five new BIFS projects operating in 14 California counties were established.
6. There over 7,000 almond growers in California.
7. There are approximately 650 grower members in the Lodi-Woodbridge Winegrape Commission farming 65,000+ acres.

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