

ARE RESEARCH ALLIANCES BETWEEN PRIVATE FIRMS AND LAND GRANT UNIVERSITIES COMPATIBLE WITH THE ORIGINAL PURPOSE?

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Increased collaboration between private firms and State Agricultural Experiment Stations (SAES) raises fears that the independence, objectivity, and credibility of SAES and their scientists may be compromised. Likewise, there is concern that public funds provided to these institutions will be expended for private gain. This paper addresses the need for, and provides examples of, increased public/private collaboration and the policies and protocols used to avoid problems.

Key words: agriculture; collaboration; industry; intellectual property; public-private relationships; Land Grant universities

Introduction

The mission of SAES is to support a “permanent and effective agricultural industry in the United States (U.S.)” and to contribute to the “welfare of the consumer”. Expanded collaboration between SAES and private firms is consistent with the mission and necessary for its accomplishment. The challenge is for each state to facilitate this collaboration while preserving the independence, objectivity, and credibility of its institutions and scientists. Sound management of publicly owned intellectual property is an important part of this challenge.

The agenda of SAES research will continue to be influenced by the source of financial support. The important thing is that research results not be influenced. The food and agriculture sector continues to grow in size and complexity. Strong public support will be necessary if SAES are to collaborate effectively with the private sector and at the same time address issues of broad public interest, including social impacts of new technology, human health, food safety, environmental quality, and natural resource conservation.

The Mission Statement Of SAES

State Agricultural Experiment Stations (SAES) are the agricultural research arm of Land Grant universities. The Hatch Act (1887) created the SAES and placed them in land-grant institutions. The act assigned to the SAES the following responsibility:

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. . . to conduct original and other researches, investigations, and experiments bearing directly on and contributing to the establishment and maintenance of a permanent and effective agricultural industry of the United States, including researches basic to the problems of agriculture in its broadest aspects, and such investigations as have for their purpose the development and improvement of the rural home and rural life and the maximum contribution by agriculture to the welfare of the consumer, as may be deemed advisable, having due regard to the varying conditions and needs of the respective states.

When the Hatch Act was passed, farmers made up most of the population. They were the producers, processors, distributors, retailers, and consumers of agricultural products. They also provided almost all of the production inputs and support services. Farmers were also the principal clients and users of SAES research. Most of the economic activity, physical assets, and inputs associated with the “agricultural industry” were under the control of farmers. Agriculture was a rural enterprise.

State Agricultural Experiment Station research caused agriculture to become more specialized and its technology to become more complex. Private firms were formed to provide inputs and support services, including: standardized equipment, buildings, seed, fertilizers, pesticides, pharmaceuticals, feed formulations and additives, farm and estate management services, shipping, marketing services, custom field operations, custom livestock feeding, pest management services, transportation, and so on. In addition, food processing, manufacturing, distribution, and retailing firms and food service operations proliferated as consumers became more urbanized and affluent and demanded a wider array of more uniform, safe, convenient, and affordable food.

State Agricultural Experiment Stations continue to “contribute to [the] establishment and maintenance of a viable agricultural industry” and to the “welfare of consumers.” However, they now work with a much more diverse clientele, including many private firms, to accomplish this mission. Future changes will probably be even more dramatic than those of the past. But the SAES will still have an important role to play, among them the training of future agricultural scientists.

Sources Of Support For Food And Agricultural Research

Core (recurring) funding for SAES is provided by a combination of state and federal contributions. State funds account for more than 80 percent of recurring SAES funding in most states and exceed 95 percent in some states. Gifts, grants, and contracts from both public and private sources account for the growth in non-recurring funds (soft money). Non-recurring funds account for 30 to 60 percent of SAES budgets. Industry gifts, grants, and contracts make up about 5 to 15 percent.

As the size and number of agribusiness firms have grown, their total investment in research, including their investment in SAES, has increased. Federal investment in food and agriculture research increased little, if any, over the last two decades, in spite of evidence that the return on investment is very high (Huffman & Evenson, 1993).

If public funding of SAES stagnates or decreases, the ability of SAES to accomplish their mission will be diminished. However, an increase in private funding of agricultural research is not incompatible with the mission of SAES. In fact, private research is absolutely essential if the findings of public research are to be transferred to practical applications. Public and private food

and agriculture research projects are both different and complimentary. They are often different components or phases of a process leading to successful commercialization or other uses of new technology and information.

In recent years, some states, including Illinois, Iowa, and Indiana, increased their investment in SAES food and agricultural research rather dramatically. In each case, farm, environmental, conservation, consumer, trade, and other organizations with a stake in agriculture formed alliances to seek increased public funding for university research of particular interest to them. A similar approach will probably be implemented at the federal level and may trigger another period of increased federal funding of food and agricultural research in SAES.

Complementarity Of Public And Private Research

Successful SAES research leads to more private sector research. For example, almost all crop breeding and genetics research prior to about 1940 was conducted in the SAES. This research led to the development of very effective but complex plant breeding methods, which, in turn, led to such developments as hybrid corn. As variety development and improvement became more complex and specialized, it became economically feasible for specialized firms to develop varieties and market seed to farmers.

At first, these firms used non-proprietary inbred lines and varieties produced by universities. So most seed firms were selling essentially the same varieties. However, in order to compete more effectively by differentiating their products, some firms conducted their own research and produced their own proprietary inbred lines and varieties. Most SAES got out of the business of producing commercial corn varieties during the 1950s because it was neither necessary nor appropriate for them to compete directly with private firms in this activity.

State Agricultural Experiment Stations did not stop conducting crop improvement research, however. They continue to introduce new breeding methods and germplasm, improve specific traits of crops, and make this technology publicly available. State Agricultural Experiment Stations continue to conduct basic research on genetics and plant breeding. They continue to produce new varieties of self-pollinated crops, especially small grains, because most private seed firms have not been able to recover costs of small grain variety development. Soybeans are an intermediate case, in which, for various reasons, commercial varieties are developed by both private firms and universities.

Similar examples can be given in virtually all food and agriculture research areas. The private sector research programs and the SAES each do what they can do best. Their efforts are complementary and interrelated in complex ways. Each specific situation is different. But, in general, universities conduct most of the basic, practice-oriented, and adaptive research. Private firms conduct most of the product-oriented developmental research.

The Growing Need For Public/Private Alliances

Expanded relationships and joint ventures between universities and private firms are not only compatible with the SAES mission but are essential to their mission. Increasingly, private firms are forming horizontal and vertical alliances in order to achieve business goals. This trend is driven by specialization and competition and is part of what is referred to as the industrialization of agriculture.

The growing economic and technological complexity of value chains in agriculture places a premium on coordination and fosters vertical partnerships. Participants in the agricultural value chain are increasingly linked to each other by contracts and agreements that specify their respective responsibilities, as well as their shares of risks and revenues. In this situation, university collaboration is in the best interests of the consumer. It is the most effective way for results of public sector research to be transferred into practice in modern agriculture. As technology becomes more complex, even more coordination will be required to facilitate positive change.

Intellectual Property Management

In the early days of SAES, it was generally accepted that any intellectual property (new discoveries, information, or technology) developed in SAES research should be freely available to the general public. In modern agriculture, however, making new research discoveries freely available for use by everyone is often not a good way to assure wide use of new information. Since universities do not operate factories and stores, they depend on private firms to commercialize new technology, thus, making it available to farmers, consumers, and other users.

State Agricultural Experiment Station research typically produced information or prototype products that need much more research, especially developmental and adaptive research, before the research results can be used in practical situations. Private firms will not make the large additional investment required to commercialize a SAES discovery if other private firms can freely copy and market the resulting product or service. That is why universities enter into restricted use agreements with private firms.

These agreements (usually licenses) give the private firms exclusive or semi-exclusive use of certain specific research discoveries for a specified period of time, hopefully enough time for them to recover their initial investment and obtain some profit. Private firms profit from using publicly generated knowledge only if resulting products are of use to and preferred by consumers. In the long run, increased private firm profits reflect expanded public welfare.

Usually, in return for a license, private firms are required to pay a royalty proportional to the gross or net returns realized by the company through the sale of the new technology. The level of exclusivity and the amount of the royalty are negotiated on a case by case basis based on the relative contributions of private participants, universities, and others. Thus, universities are compensated for public investments in research; incentives are provided for discovery, invention, and commercialization; and practically useful technology and products become available to producers and consumers. The following example illustrates this approach.

The Illinois Agricultural Experiment Station began research on high oil corn in 1896. Very little commercial interest was shown until 1988. At that time, University of Illinois scientists and administrators decided to license exclusively the most advanced lines of high oil corn to one or more private firms who would agree to do the additional research and product development required to commercialize this material. Through a competitive process, Pfister Hybrids and DuPont were selected to commercialize the University's intellectual property, that is, the high oil corn lines. DuPont and Pfister formed alliances with other private firms to accomplish that goal.

Collectively, these private firms spent hundreds of millions of dollars to develop commercially useful high oil corn hybrids that capitalized on the unique high oil corn genes present in the University of Illinois material. The benefits of this investment are already flowing to the participating firms and to both producers and consumers of corn and products derived from corn,

including animal products. Royalties from the use of the licensed high oil corn lines are now flowing back into the University of Illinois and are being invested in further research on high oil corn and other topics. Without research participation and investment of private firms, high oil corn would still be primarily of academic interest. Similar examples could be given in almost all areas of SAES research. Sound intellectual property rights management helps SAES accomplish their mission of creating and maintaining a permanent and effective agricultural industry and serving the best interests of both producers and consumers.

How Funding Sources Influence The Research Agenda

There is little doubt that those who provide funds for SAES research influence the research agenda. As land-grant institutions evolved, especially over the last two decades, state and federal funds have increasingly been used to pay fixed costs associated with research, including the salaries of permanent employees, that is, scientists, professionals, and support staff. These funds also provide for the operation and maintenance of core research facilities. State Agricultural Experiment Stations scientists are expected to compete for public and private gifts, grants, and contracts to support the variable costs of research. These costs include salaries of most graduate and postdoctoral students, some support staff, temporary labor, equipment, supplies, and expenses.

To the extent that the variable costs of SAES research are funded with gifts, grants, and contracts, the subject matter of research will be strongly influenced by those providing the gifts, grants, and contracts. Private sector grants and contracts generally support research related to potential commercial products or services, business management issues, and so on. Government grants and contracts generally support (1) basic research in a wide range of fields and (2) research on issues of broad interest to the general public, such as human health, environmental, and natural resource management and utilization issues.

As indicated, product oriented SAES and private sector research are complementary. Society would benefit little from public pursuit of knowledge for knowledge sake (basic research) without private sector access to, and utilization of, that knowledge. But it is also important that basic knowledge be sought even when there are few or no predetermined commercial applications. Many practical outcomes of research were not anticipated when the research was launched. The wide array of products that resulted from the research required to place a man on the moon is a good example.

There are some applications of research that are not commercialized in the usual sense of the word but are nevertheless very important. Research on food safety, environmental quality, and natural resource conservation may provide a basis for formulating sound public policy and regulations. Public policy itself is a subject of research, the results of which are used extensively by legislators and government agencies. Research on the economic, social and political implications of technology may help individuals and governments anticipate and compensate for changes. There is often no need to protect the results of such research as intellectual property.

Continued public funding of SAES helps assure that research on important, non-commercial topics is conducted. Private firms may or may not be interested in such research, depending on the extent to which the outcome impacts their businesses. They should not be expected to fund research unless they can recover the costs through resulting productivity or efficiency improvements, or market expansion.

Among private firms, there are often both winners and losers as a result of the introduction of new technology. The winners are usually the early adopters of the new technology. But, at best, early adopter benefits are soon competed away, as more advanced technology is introduced. Ultimately, the benefits of the new technology accrue to the consumer, in the form of higher quality, safer, more diverse, and more affordable products. Thus, it is appropriate that the consumer bear some of the cost of SAES research.

Neither the SAES nor the private sector is currently able to deal adequately with the differential impacts of technological change. An important role of SAES is to anticipate change and help both private and public decision makers adapt to it.

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