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The Industrialization of Agribusiness and Market Development Policies

Development, Dissemination and Adoption of New Products/Uses Technology: Is the Traditional Federal/State Research Model Obsolete?

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The implementation of freer agricultural trade policies under the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), along with broad commitments to trade liberalization via Asian Pacific Economic Cooperation (APEC) and Pacific Economic Cooperation Conference (PECC), has focused attention on global competitiveness. New product development is important in expanding or maintaining export volume and/or market share. Likewise, rural development interests continue to encourage the search for new uses and technologies to foster growth through increased rural industrialization.

Consumers concerned with food safety and nutrition are demanding alternatives and choices in the food supply. Environmental groups want agricultural production and processing technologies that maximize efficiency while minimizing negative externalities.

The Issues

The question posed in the title is: Is the Traditional Federal/State Research Model Obsolete? A very short and direct paper would simply respond with a rather emphat-

ic *yes* and sit down. But given the time assigned for this paper, we assume you expect a bit more.

In some respects the term "obsolete" is incorrect in that the traditional model was not designed to foster new products or new use technologies (Ruttan). While modifications have been made, there is little reason to expect this model to serve this purpose well. We argue that the problem is dysfunctional for at least seven interrelated reasons.

Lack of Connection Between Market Analysis and Research Prioritization

A limited number of talented applied economists are attempting to provide useful analysis of emerging markets for current and new agricultural products. Obviously, a fairly large number of our colleagues are estimating demand, consumer preferences, etc. Unfortunately, a relatively small number of these analyses are useful in influencing the research agenda in land grant colleges of agriculture.

Agricultural economists tend to assess markets for existing crops and products based on historic data. We "forecast" future markets from past behavior. In general, we lack the capacity to provide informed speculation about not-yet-devel-

oped products or technologies that could be successful.

Much of what appears in our journals and is presented at professional meetings focuses on theoretic or methodology nuance with little emphasis on interpretation or recommendation (Huffman and Just). Our work has largely ignored institutional dynamics which profoundly influence markets and market development.

Moreover, the language we use in communicating the recommendations we wish to make is generally unintelligible to colleagues and administrators from academic disciplines other than economics. At the same time, researchers and research planners have rarely sought out the counsel of those who analyze market changes and forecast agricultural product demand.

Or, phrased more simply, research decision makers have not asked for our help and we have not offered it. We, as agricultural economists, have no noteworthy impact on the process of prioritizing research. Thus, the nature and direction of changes in final product markets does not get built into research planning in any formal or consistent manner.

Persistent Focus on Production Issues

Despite rhetorical commitments to the contrary, much of our research effort continues to focus on increasing agricultural commodity production. A great deal of analysis has provided solid evidence that our research has made valuable contributions to multi-factor productivity at the farm-producer level (Huffman and Evenson; Pardey, Roseboom and Anderson; Ruttan, among several others). Research administrators and government lenders are perfectly willing to continue to "ride a good horse." Convinced that production-oriented research has pro-

duced significant payoffs in the past, decision makers are easily persuaded that this is a sound investment for the future.

So, while we argue that we should produce crops that respond to changed markets and new product needs, our research still reflects a "produce-a-lot-and-figure-later-how-to-market-it" mentality. This can be easily seen if one reviews the current portfolio of regional research projects in all four Cooperative State Research Service (CSRS) regions and the National Research Initiatives (NRI)-funded projects.

Moreover, in the larger research funding context, basic research remains preferable to applied research. Leading funders of our research, The National Science Foundation, the National Institutes of Health, and the NRI continue to be biased toward basic (also referred to as "pre-technology") research programs and projects. Basic research in the biological sciences is extremely expensive. Thus, these programs consume a significant portion of a declining public research funding pie. It squeezes out funding for more applied, product-development research.

Unfilled Need for "Systems" Research

Development of new products and markets for those products requires a systems approach to research and technology transfer. For those of us in universities this means building effective interdisciplinary research extension programs. At the same time we are acknowledging the need for interdisciplinary programs we seem to be experiencing increased disciplinary isolation and "turf" protection.

Existing incentives and perceived signals appear to encourage and enhance programmatic disconnectedness. New faculty positions are authorized and funded on a depart-

mental basis. Each department seeks to fill positions and acquire other support to pursue discipline specific activities.

Principle criteria for promotion, tenure and other rewards generally reflect success within a single discipline. In our experience, for example, publication in discipline-specific journals is more highly regarded than publications of interdisciplinary research.

It is not surprising then that faculty tend to focus their efforts on rather narrow projects that may not result in broader "systems" solutions to new product or technology development.

Disconnectedness of Extension

The traditional land grant model calls for researchers to hand off new technologies to extension specialists and in turn to agents who "transfer" these technologies to appropriate clientele. In the case of product and market development, this model does not work well. Often the new technologies are too complex to simply be "handed off." The traditional process breaks down particularly in instances in which county agents are to deliver these technologies.

This problem is exacerbated by the separation of priority setting and funding between research and extension/outreach. Even where research is focusing on new product development, extension may be pursuing other purposes and audiences.

In the case of new products, the clientele typically served by extension is not the relevant clientele. In general, extension has not established strong linkages with the national or international agribusiness community.

One of extension's important roles is to provide reverse intelligence to researchers in setting their agenda. In the case of new

product and market development, extension is ill-equipped to serve.

Competing Organizations and Agencies

Even if we could identify significant new market possibilities, the roles of principle organizations and agencies in addressing these possibilities is fuzzy at best. Many new arrangements and actors have joined the unfocused and uncoordinated search for new markets.

A striking example is the U.S. Department of Agriculture (USDA) cooperator program. Federal funds support commodity organizations in their efforts to develop new markets. In virtually every case, these efforts are unrelated to the market analysis and new product development coming out of land grant universities. And university researchers are ignorant of the lessons learned by cooperator program participants.

The centralization of Agricultural Research Service (ARS) programs has further damaged its complementarity with university research. For example, ARS has proposed closing the Northern Potato Research Lab in East Grand Forks, Minnesota. This lab provides a singular focal point for potato product quality assurance and product development research of ARS, North Dakota State University and the University of Minnesota. If the lab is indeed closed, work on new potato product development will almost certainly become fragmented.

New federal and state organizations have entered the agricultural product/market development arena with little coordination. The U.S. Department of Commerce often carries on overseas business development programs independent of those of USDA's agricultural attachés.

In Minnesota we have a relatively young state-funded organization called the Agricul-

tural Utilization Research Institute (AURI). While evolving, the relationship between AURI and the University of Minnesota remains poorly defined. A good deal of cooperation has occurred but substantial conflict has occurred as well. Real tensions exist between AURI and the Minnesota Department of Agriculture. We suspect similar situations exist in many other agricultural states.

Conflicts Between Federal and State Objectives

For most state Agricultural Experiment Stations, federal funding has become subsidiary to funding from a combination of state sources (legislative appropriations, commodity groups, etc.). There is often no correspondence between the research objectives of the various funders.

On a national basis, Experiment Station Committee on Policy (ESCOP), Council for Agriculture Research Extension and Teaching (CARET) and other councils intend to set national research goals and priorities. The four regional associations of experiment station directors are then asked to convert these national priorities into regional priorities with each state carving out its appropriate piece of the action.

This all works well on a conceptual level. But once back home, experiment station directors must respond to the demands of their majority stockholders. These stockholders tend to be local and their objectives may differ significantly from the priorities set at the national level. What the Minnesota Soybean Council or the Missouri Corn Growers and their legislative representatives choose to support may be unrelated to the priorities set by ESCOP or CSRS. Contemporary funding and priority setting must recognize this new reality.

The Public-Private Relationship Dilemma

All this, of course, begs a much more fundamental question: Should land grant universities attempt to play a significant role in new product and market development? From our point of view, the answer is not obvious. Lindner raises similar concerns about the situation in Australia. Beyond the problems and challenges noted above other more vexing issues need to be addressed.

The agricultural processing and marketing sectors are increasingly dominated by large, multi-national firms. One has to wonder whether it is appropriate to invest public monies in research and technology transfer activities that may effectively subsidize concentrated private interests. Should taxpayer dollars be used to assist in the development of products for R. J. Reynolds, Beatrice, Tyson Foods or Grand Metropolitan Corporation? Some would argue that the benefits from new product development will ultimately accrue to consumers. But in imperfect markets, this may not be so.

In any case universities, individually and collectively, remain trapped by conflicts between serving public needs and the realities of modern global markets and marketing. Many universities are aggressively building commercial research and development capacity in the hope of generating revenues from licenses and royalties. Without the benefit of empirical evidence, we would opine that success to date in such ventures has been spotty at best.

Universities are ill-equipped to either clearly define their proprietary rights or to enforce them. Even in instances in which rights are clearly recognized in the law, universities often lack the legal acumen or the political will to aggressively protect their

economic interests. For example, many universities hold rights to crop varieties legally vested under the Plant Variety Protection Act. Most find it difficult to extract rent from their "inventions" or to prosecute those who do so illegally.

The law and university policy is as yet unclear about the economic rights of university scientists who develop commercial innovations. In some cases, faculty share in royalties or profits. In other cases, they do not. A recent draft report from the Council for Agricultural Science and Technology (CAST) raised ethical concerns about emerging university-private sector relationships, particularly in instances in which faculty could face a conflict of interest.

The gap between potentially commercialized research results and real commercialization is often quite wide. Universities have insufficient capital capacity or the risk taking mentality required to move a scientific outcome to a marketable product. Private sector partners frequently recognize and exploit a university's inability to carry a new technology through development to the market.

Recommendations

If we resolve that universities should play a meaningful research-transfer role in developing new products and technologies, then a major overhaul of the current system is called for. And this overhaul must be bilateral. That is, both the federal and university side of the partnership require significant change.

On the federal side, we suggest that both the CSRS and the Federal Extension Service (ES) be dismantled.¹ They are largely administrative units and we believe

administrative oversight can be more effectively and efficiently provided in a decentralized system.

Federal funds for research and technology transfer should be allocated on a regional basis to a small number of top tier research institutions. General priority setting, coordination and tracking responsibilities could be vested in restructured regional research-extension committees. Working cooperatively, these committees could identify national initiatives which could be funded by "off-the-top" allocations. However, relevant research planning and implementation would occur at the regional level.

On the university side, considerable streamlining will need to occur. Perhaps twelve or fifteen core research universities will be retained with the remainder and their key faculty serving as support or ancillary roles. Given the rapidly rising costs of cutting edge research, funding will not be sufficient to sustain broad ranging research programs at forty or fifty universities.

Universities and their research faculties will have to forge balanced partnerships with private sector firms and organizations. This will mean redefining commitments to public service. One possible approach is the creation of quasi-public research institutes. Universities and private firms could act as "co-owners" of these research institutes. Research faculty members could move out of their university roles into an institute when proprietary outcomes or conflict of interest concerns are at issue.

In any case, universities will have to confront the full range of legal and ethical challenges inherent in closer relationships with private sector interests.

Faculty incentives and rewards will have to change to reflect these new institutional commitments. A patentable development will have to hold at least as much prestige as

a journal article. And universities will have to continually re-evaluate their distribution of effort between "basic" (pre-technology) and "applied" research. That is, universities, individually and collectively, will have to determine how much effort to expend on the creation of pure knowledge relative to commercial technologies.

Mandated cooperation between research universities, the Agricultural Research Service, other federally-sponsored product and market development programs will be imperative. The current cross-purpose approach will not meet the demands of global competition.

Finally, traditional commodity organizations and state legislatures will have to "buy into" a new, more coordinated approach to product and technology development. This will mean a pooling of funding with less specific control. The Minnesota Soybean Council, for example, will have to participate in research programs which blend their funds with funds from other states and organizations. In some cases, commodity or industry groups in one state will have to rely on research from universities in other states. New relationships and means of communication will have to be built between researchers and the clients they serve.

Summary

However one chooses to phrase it, the traditional federal/state model is not serving new use or product development well. In our view, continued tinkering with this model is unlikely to significantly improve the situation. If universities are to play an important role in new product/use technology development, a major restructuring of the priority setting and funding system will be required.

The most profound challenge facing universities is to clarify the values and policies that guide their relationships with private sector firms. Until this is done, it will be impossible to build new institutions and new approaches to product and use development.

NOTES

1. Under USDA reorganization, CSRS and ES have been subsumed under the Cooperative State Research, Education and Extension Service (CSREES).

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