INSTITUTIONAL ARRANGEMENTS IN AGRICULTURAL EDUCATION, EXTENSION, AND RESEARCH: LESSONS FOR INTERNATIONAL DEVELOPMENT

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Abstract

Agricultural research, education and extension are often organized in separate institutions in less developed countries. Many developed countries also have institutionally separated systems, but have evolved mechanisms to effect coordination among these integrally related fields. Development projects in less developed countries have, in many cases, assumed that it is possible to base projects on an institutionally integrated model such as the US land grant college system wherein teaching, research and extension functions are integrated. Experience indicates that this approach is costly and unlikely to succeed in the long term. Each country has its own organizational needs which should be considered in the design of assistance projects related to agricultural knowledge systems.

International Development Assistance in Agriculture

This paper examines the nature of major international development projects supporting agricultural research, education and extension from the viewpoint of relevant institutional systems of governmental agencies. It considers improvements in the process of preparing projects to acknowledge institutional differences, and to support the integrity of agricultural knowledge systems which have evolved in most of the more developed countries. Specifically, the paper discusses institutional arrangements which incorporate universities into research and extension projects according to the requirements of each situation.

Agricultural and natural resources have been and continue to be a major focus of international development assistance agencies. This focus appears to ignore the inter-relationships which create a viable agricultural knowledge system in which the interactions between research, teaching and extension are acknowledged through organizational and funding arrangements (Falvey, Forno & Srivastava, 1995). For example, diffusion of information has mainly focused on the mechanism of extension, narrowly defined in one case as the transfer of agricultural information to enhance the productive capacity of farmers (Umali & Schwartz, 1994). Such a narrow definition may have affected the impact of so-called extension activities supported by international development agencies.
The largest world-wide lender in agricultural research, teaching and extension over the past 30 years has been the World Bank. The largest donor has been the United States Agency for International Development (USAID) although AID funding has declined significantly in recent years. Both of those initiatives have contributed to the United States of America attracting about one-third of the persons in this field from less developed countries who study abroad - around 5,000 agricultural graduates per year (Lele, 1995).

The overriding observation of World Bank investment in agricultural research and extension since the mid 1960s is that it has not been organizationally linked to universities and agricultural education (World Bank, 1994). In the 1970s, the Bank invested $750 million in research and/or extension in 27 projects in 13 countries. An additional $375 million in the research and extension components of 312 projects in 80 countries was also invested. In the 1980s, investment increased to about $1.7 billion in 38 countries, and over $3 billion in over 400 projects. The focus in the 1990s has shifted to national agricultural research systems and their links to the Consultative Group for International Agricultural Research (CGIAR) centers, with the role of universities limited to one of contract researchers. Extension projects have assisted the creation of separate extension departments which may have exacerbated the separation of components of the agricultural knowledge system (Zijp, 1996).

**World Bank Involvement in Agricultural Higher Education**

World Bank projects involving higher education have focused more on institutions than on issues relating to the agricultural education sector. Lending has been limited by a general premise that the returns from primary and secondary education exceed those of higher education (Psacharopoulos, 1994). Consequently, an average of only 17% of total World Bank education lending over the period 1963-1994 has been for higher education in agriculture. Agricultural project lending has emphasized construction and equipment over human resource development, the latter having received only $715 million of the total project cost of $2.84 billion over the period 1964-1990 (World Bank, 1994). Ambivalence toward lending for education (World Bank, 1992) has arisen from the experience of projects in the 1980s which failed to acknowledge the role of education in the agricultural knowledge system or the special needs of particular countries. This has led to a general decrease in lending for agricultural education.

Investment in higher education appears to have been based on the premise that an educated society is better prepared to make objective decisions concerning its development by providing an environment where social and cultural change can occur more readily (Ransom, Khoo & Selvaratham, 1993). Without detracting from this sentiment, it appears that the World Bank may have undervalued the potential benefits of higher education as a component of a dynamic agricultural knowledge system in conjunction with extension and research. A labor planning approach to agricultural higher education (World Bank, 1992) has further diverted attention from interactions with research and extension. Continued World Bank concern about the availability, generation and diffusion of new agricultural technology in Asia (Antholt, 1994) highlights an opportunity to reassess approaches to agricultural education lending.

World Bank experience in higher education, including agriculture, provides useful guidelines for future lending. Ransom et al. (1993) highlight the need for training in centers of excellence, realistic salaries, foreign faculty in the short term, accessing private and government talent, and joint research and training involving the private sector, universities and international agencies. Other lessons learned are ensuring equity of access, mission-oriented institutions, fostering private institutions, cost sharing and student fees and loans, transparent resource allocations, and institutional autonomy over student numbers and resource use. Perceived difficulties in...
Institutional Arrangements

Johnson (1989) has indicated that organizational limitations are the primary constraining factor in agriculture in less developed countries. Oram (1993) states that strengthening of the institutions supporting agriculture is a critical precursor to economic development. Consideration of the institutional or organizational arrangements of more developed countries is instructional in this respect. Two general institutional arrangements have evolved in more developed countries to manage the agricultural knowledge system. The systems can be categorized as:

1. Institutionally separated with cross linkages, such as in Australia, Canada, New Zealand and England.

2. Institutionally integrated, such as the US land grant universities and the institutions of Scotland and Northern Ireland.

Institutionally separated systems arise from separate lines of authority for education, research and extension. Such systems are commonly based on one ministry governing applied agricultural research and extension (often combined with regulatory and other functions) and a separate ministry responsible for universities which conduct instruction and research. This separation is duplicative, costly of financial and human resources, and insular, unless functional linkages are institutionalized. Informal links are encouraged and contribute significantly to the working of these systems but are not sufficiently durable under conditions of continuous change (Falvey et al., 1995).

The most common approach in institutionally separated systems is the establishment of cooperative research mechanisms with some core funding for research operations as a means of uniting related disciplines and scientists. Figure 1 describes the mechanisms developed in Australia, Canada and New Zealand. Such mechanisms must be regularly reviewed to ensure their continued relevance. Incomplete funding is also favored to maintain focus on required applied research and stimulate the seeking of competitive research support from various sources. Control and accountability in this approach are increasingly tied to new funding flows.

Cooperative mechanisms focus mainly on research. This parallels the use of the research function as the primary integrator in the institutionally integrated system. Researchers are also educators, and benefits are seen to flow from research to instruction through the continued creation of knowledge. A focus on applied research and a requirement to demonstrate applicability of research results provides the basis for dissemination of new information (Falvey & Bardsley, 1995). The poor linkages between teaching and extension create difficulties for extension in justifying activities separate from the research and teaching components of the knowledge system. This has contributed to cut-backs in extension funding in most countries adhering to this system.

Institutionally integrated systems are based on funding of universities for research, teaching and extension from more than one source. US land grant universities (Figure 2), for example, account for funds separately while managing the activities of research, teaching and extension through staff appointments to perform multiple functions. The flow of information from research to instruction and extension is effected through the same persons conducting two or more functions. This helps maintain a client focus in research, teaching and extension activities. The link between teaching and extension is maintained through extension being conducted in
Cooperative Research Mechanisms in Institutionally Separated Systems

Arrangements which aim to effect coordination of research, education and extension in institutionally separated systems have been developed in several countries although all have focused on research coordination in the first instance and have been formed in an environment of public expenditure reductions (Falvey, Forno & Srivastava, 1995).

In Australia, Cooperative Research Centers (CRCs) have been created in selected fields through grants to effect coordination. Staff participating in CRCs continue to be employed by their own organizations and remain located in their original offices and laboratories in the main. The research activities of public bodies, including the national organization (Commonwealth Scientific and Industrial Research Organization), state departments of agriculture, and universities have been combined for those areas that are relevant to the CRCs. Private sector interest in the outcomes of and financial contributions to research form key criteria in the selection of proposals to form CRCs. The link to education is strengthened by university staff participation in the CRCs.

Canada has established partnerships between universities and research bodies involving federal and provincial agencies and budgets.

New Zealand has reorganized institutionally to create Crown Research Institutes (CRIs) as single foci for research. Universities are admitted to the CRIs about one year after the creation of the CRIs, and the privatizing of extension and some research services.

Coordinating mechanisms are commonly used as new funding channels to stimulate redirection of activities, and to shift control of the research agenda from researchers to research and development planners, including the private sector.

Figure 2

US Land Grant Universities: An Institutionally Integrated System

Land grant universities are institutionally integrated organizations which manage the functions of research, education and extension related to agriculture in the US. These universities were founded or extended with assistance from federal lands granted to states through the Morrill Act of 1862, which provided land tracts as an incentive to establish college programs in scientific, agricultural, industrial and military studies. States applied grants to either single or multiple institutions. Land grant colleges were to provide technical education for the poor and remote rural dwellers of each state. Most colleges offered curricula broader than the act required and awards generally went to public institutions.

The Second Morrill Act of 1890 enabled states practicing racial segregation to establish black land grant colleges. In 1994, Native American colleges were added to the category of land grant colleges (NASULGC, 1995).

Funding for colleges was initially for classroom education. Funding for research and extension was legislatively appropriated in 1887 (Hatch Act) and 1914 (Smith-Lever Act), respectively, and led to the current, widely held belief that the colleges had a mandate to integrate research, education and extension. Today, funding sources for core activities include county, state, and federal levels of government, with counties supporting large proportions of the cost of extension services in many major agricultural producing states. While commonly perceived as predominantly funded by state budgets, this is no longer the case in many states, and both federal and state contributions appear to be declining. Structures for the management of functional integration vary, yet are common in their integration of research, education and extension (Young & St. John, 1993).
the same institution as formal education, and the offering of non-credit courses by teaching staff and others as an educational outreach activity. The distinction between teaching and extension is less well defined in this model (Falvey & Bardsley, 1995).

The World Bank and USAID have supported projects in less developed counties that are based on the institutionally integrated model, striving to reproduce land grant style institutions. However, the governmental structures of these countries, more often than not, separate teaching from extension, with research being split between at least two agencies. Such systems conform more to the institutionally separated model.

The experience of the World Bank and USAID in applying the land grant university model in less developed countries, which dates back to the 1960s, indicates that inadequate attention was given to the differences between the institutional arrangements of less developed countries and the US. Such differences include the importance of three levels of government funding (federal, state and county), strong internal management, and the multiple appointment system for integration of functions. In addition, the environment which fostered the development of land grant universities in the US is not easily reproduced. That environment included such factors as favorable price interventions by states, a largely literate, politically vocal and landed rural population, and wide availability of agricultural support services, including input supplies, credit and technical packages (World Bank, 1992).

A brief comment on the outcomes of projects based on the introduction of land grant style institutions in less developed countries is instructive. Successes have been documented. For example, in India, a parallel university system of state agricultural universities was established largely with USAID support (Easter, Bisaliah & Dunbar, 1989). Busch (1988) notes the high cost of establishing that system but provides little indication of the concern raised a few years later in a World Bank review regarding inappropriate institutional culture, inadequate management and administration, and low academic standards associated with declining funding and poor employment prospects for graduates (World Bank, 1995). A separate review of World Bank and USAID involvement in agricultural higher education support stated that the land grant model was not fully absorbed by any of the countries (World Bank, 1992). Johnson and Okingbo (1989) also expressed the frustration experienced from introducing the model in an unsuitable institutional environment. An alternative approach in which existing institutional arrangements were acknowledged and utilized was found to yield benefits. Chaudry and Al-Haj (1985) indicate how in Taiwan parallel extension systems were supported by industry and government to provide overall benefit.

Critical Elements of Models

While it is convenient to apply a model such as the land grant university to a particular country, it is obvious that the preconditions that contributed to its success in the US cannot be duplicated. It is also important to recognize the dynamic nature of this model which requires constant updating to suit changing needs specific to the US. Therefore, it is more appropriate to elicit the critical elements common to the two types of institutional arrangements described in this paper, and to use these elements as a guide in refocusing the functions of existing institutions in less developed countries. The following is a partial list of elements:

1. Recognizing the benefits of viewing research-teaching-extension as an organizational and interdependent continuum.

2. Involving suppliers and users of services in the system in designing institutional improvements.

3. Fostering collaborative and interdisciplinary research and instruction.
4. Viewing extension as one aspect of educational outreach.

5. Basing strategic planning on a holistic knowledge system rather than, for example, a national research agenda developed in isolation from the overall educational system agenda.

6. Designing durable core structures in institutions that can ensure integrity of functions during periods of reorganization and funding changes.

7. Maintaining an outward-looking focus on means of servicing client needs.

8. Operating within sustainable funding levels for core activities.

9. Ensuring involvement of staff across functional areas when funding is reduced. This is a benefit of multiple appointments.

10. Introducing system-wide total quality management approaches which include continuous human resource development.

11. Developing management skill and commitment which is cognizant of the need for developing a sustainable institution.

Conclusion

The integral nature of research, education and extension in agricultural knowledge systems requires linkages between separated institutions in those countries in which organizational arrangements do not automatically cause these activities to be co-managed. Determining appropriate mechanisms for such integration requires analysis of the functions and funding flows of existing organizations, and their expected future roles, as well as the custom-designing of mechanisms appropriate to each specific situation. On the other hand, where the opportunity exists to create single institutions which integrate the functions of research, education and extension for a region, the land grant model is a source of information for strategic planning. However, this opportunity would be more the exception than the rule.

The common need is for organizational mechanisms which effect coordination, collaboration and co-financing. Coordination is necessary among research, teaching and extension, and among organizations. Collaboration is necessary among researchers from different organizations for efficiencies in human and physical resource use, and among researchers from different disciplines. Co-financing is necessary to bring disparate resources together to achieve a critical funding mass for major activities. The resulting organizational structure should reflect the objectives of the organization and the means of accomplishing these objectives. Ideal structures will probably differ from country to country and require detailed management system analysis.

From the perspective of major international development agencies, such as the World Bank, we conclude that it is necessary to analyze each situation separately. Analysis of the agreed functions of the concerned organizations and existing structures to determine the flexibility available for change includes addressing such management issues as control and accountability. The approaches of the International Service for National Agricultural Research (1984) and the Food and Agriculture Organization of the United Nations (1993) also seem to be open to such considerations. In common with our conclusions, the implications that a management analysis prior to the planning of development assistance projects is necessary is significant. It appears that the days of a prescriptive model copied from another country are over.

References


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