Profile of Agricultural Education and Extension: Challenges from a Changing Brazilian Rural Milieu

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Abstract

Remarkable transformations in Brazilian society are requiring a new kind of professional to face the emerging demands of a diverse, innovative, technological, and integrative agriculture and rural milieu. Colleges of Agricultural Sciences, as institutions for preparing people to work in agricultural education, agricultural research, and rural extension, are challenged to redesign their practice and lead a movement to foster strong partnerships between themselves, agricultural schools, agricultural research and extension institutions. The emergence of the National Forum of Extension’s Vice-Chancellors of Brazilian Public Universities in 1987 heralded a new era to foster changes from the universities’ stand points. Such a Forum put extension in a prominent position into Brazilian public universities, as well as enforced the university’s tripartite mission - teaching, research, and extension. The new characteristics emerging in the Brazilian rural milieu and Boyer’s (1990) concept of scholarship are the background used in this study to build a conceptual model linking agricultural education, agricultural research, and rural extension.

Keywords: Extension System, Agricultural Education, Challenges, Rural Milieu, Mission

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**Introduction**

Agricultural education and extension in Brazil have been challenged to play a new role to address the emerging demands of a diverse, integrative, and innovative rural milieu. Brazilian agriculture has been praised as the engine propelling the country’s economic growth. As a result of the advancements in agriculture, the country’s rural environment, demographics, economics, and social relations are undergoing remarkable transformations (Caporal, 1998; Carneiro, n.d.; Gordon, 2001; Graziano da Silva, 1997; Schneider, 2000).

Agricultural education started in Brazil in 1875 and is supported by federal legislation as formal education programs until the secondary level, usually delivered in agricultural schools, responsible for preparing people to work in agriculture. Agricultural schools are typically residential schools located in rural areas with some farmland in its structure (Leite, 1999; Sobral, 1998). A total of 339 agricultural education programs at the secondary level are delivered in 256 agricultural schools in Brazil, with 54,809 students registered (National Institute of Educational Studies and Research - INEP, 2000). However, despite its importance for the country, agricultural education is not recognized as a discipline or a body of knowledge in Brazil.

Extension in Brazil started in 1948, is known as “rural extension” and typically delivered by state-sponsored agencies. There is no federal legislation supporting rural extension. Current literature (Caporal, 1998; Lima, 2001; Sobral, 1998) indicated that rural extension is concerned with non-formal education and technical assistance programs mostly linked with agricultural production and productivity and social welfare of rural families. Each of the 26 states plus the Federal District has its own Rural Extension Agency, and many of them are also responsible for agricultural research at the state level.

Brazilian universities do not see the delivery of rural extension as their role. They deliver “university extension,” which can include rural extension programs but with the primary function of providing practical experience to the students. University extension is defined as “the educative, cultural, and scientific process that articulates teaching and research in a strong way, and makes feasible the transforming relationship between university and society” (Nogueira, 2000, p. 11).

Brazilian Colleges of Agricultural Sciences seldom feel themselves as an active partner in a network of agricultural education and rural extension, since higher education in agriculture is not considered to be part of agricultural education and rural extension. Brazil has 276 higher education programs in agriculture with a total of 63,260 students registered (INEP, 2001). It is important to highlight that the total number of students enrolled in higher education agricultural programs is only 13% greater than the total of students enrolled in agricultural education programs below the college level.

The task of creating the knowledge base in agriculture is, in most cases, performed by public agencies other than universities, even though some colleges are internationally recognized as centers of excellence in agricultural research. A federal agency—EMBRAPA—is the major institution conducting agricultural research in Brazil. EMBRAPA, which in the Portuguese language stands for Brazilian Agricultural Research Corporation, operates a network of 40 research units distributed throughout the country. EMBRAPA also coordinates the National Agricultural Research System with cooperating institutions, among them universities and colleges of Agricultural Sciences (EMBRAPA, 2001). Figure 1 provides a summary of the current state of the Brazilian agricultural education, extension, and research system.
There are productive partnerships between Brazilian Colleges of Agricultural Sciences and agricultural research institutions. Such partnerships occur very often between rural extension agencies and agricultural research institutions. However, effective partnerships between Colleges of Agricultural Sciences and agricultural schools (as well as between agricultural schools, agricultural research institutions and/or rural extension agencies) are often not as strong as they could be. Strengthening the links between these four leading conglomerates of institutions has the potential to bring tremendous benefit to the Brazilian agricultural knowledge and service. The country would be better prepared to face the environmental, economic, demographic, and social challenges demanded by a new rural milieu. Colleges of Agricultural Sciences, as institutions responsible for preparing people to work in agricultural education, research, and extension, congregate privileged conditions to lead this process.

**Purpose**

This philosophical paper proposes a new role for Brazilian Colleges of Agricultural Sciences in leading the process to strengthen the ties among themselves, agricultural schools, agricultural research institutions, and rural extension agencies. A conceptual model (see Figure 2) linking agricultural education, agricultural research, and extension education is proposed and their functions identified. Such a model helps to recognize strategic partnerships to develop programs linking the three areas towards a sustainable and integrated rural development. The new characteristics emerging in the Brazilian rural milieu and Boyer’s (1990) concept of scholarship provide the foundation upon which the conceptual model is built.

**Theoretical/Philosophical Themes**

Agriculture has changed dramatically since the massive introduction of new technologies in the production process, commonly known as the green revolution. Agriculture is now defined (beyond the traditional production enterprise) as a broad industry engaged in the production of plants and animals for food and fiber; the provision of agricultural supplies and services; and the processing, marketing, and distribution of agricultural products (Herren & Donahue, 1991).

Advancements in input, process, and knowledge technologies have impacted the rural milieu in four major areas: the production process, the economy of farming, the rural social structure, and the environment (Solbrig, 2001).

The impacts of these technologies have created a new face in the Brazilian rural milieu since the mid-1980s. Graziano da Silva and Del Grossi (1999) indicated that three groups of economic activities are dominating the new Brazilian rural scene: 1) a highly technological agriculture based on

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**Figure 1.** Highlights of the Brazilian Agricultural Knowledge and Service System.

<table>
<thead>
<tr>
<th>Higher Education in Agriculture</th>
<th>Agricultural Education</th>
<th>Agricultural Research</th>
<th>Rural Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivered through universities and Colleges of Agricultural Sciences (CAS).</td>
<td>Delivered through agricultural schools, below college level (AGS).</td>
<td>Delivered through agricultural research institutions (RES), lead by EMBRAPA.</td>
<td>Delivered through state-sponsored Rural Extension Agencies (REA).</td>
</tr>
<tr>
<td>276 programs</td>
<td>Secondary level: 339 programs</td>
<td>40 research units (EMBRAPA)</td>
<td>27 units (26 states + federal district).</td>
</tr>
<tr>
<td>63,260 students</td>
<td>54,809 students</td>
<td>Cooperated research institutions.</td>
<td></td>
</tr>
</tbody>
</table>

**Table:**

- **Higher Education in Agriculture:** Delivered through universities and Colleges of Agricultural Sciences (CAS). 276 programs, 63,260 students.
- **Agricultural Education:** Delivered through agricultural schools, below college level (AGS). Secondary level: 339 programs, 54,809 students.
- **Agricultural Research:** Delivered through agricultural research institutions (RES), lead by EMBRAPA. 40 research units (EMBRAPA).
- **Rural Extension:** Delivered through state-sponsored Rural Extension Agencies (REA). 27 units (26 states + federal district).
commodities and closely linked with agroindustries; 2) a set of nonfarm activities such as the provision of services (personal services, rural tourism, etc.), commerce, industrial activities; and 3) a set of new agricultural activities (fee fishing, hunting lodges, production of ornamental plants and animals, horticulture, fruit farming, etc.). These three groups of activities have transformed into important sources of employment and income for rural families. They found that rural residents not only limit their activities to agriculture, but also undertake nonfarm activities, as the nonfarm income of Brazilian rural residents surpassed the income generated by farm activities in 1998. Rural families in Brazil are shifting from being farm families to being pluriactive families. The emergence of part-time farmers, the plurality of economic activities, and the use of new technologies are the main characteristics of the new agriculture and rural milieu (Carneiro, n.d.; Graziano da Silva, 1997; Schneider, 2000). Such new characteristics impact all--agricultural education, agricultural research, and rural extension.

Brazilian rural extension system has been criticized for the development of an imbalanced agricultural model. Brazilian extension model was initiated with a purpose of educating people to assimilate technical progress in agriculture (Caporal, 1998; Lima, 2001). Extension was tied closely with technical assistance and supervised credit, which constituted its basic tools. In the early years, extension agents focused on transforming peasants into modern farmers in order to foster an increase in agricultural production and productivity. Lima (2001), based on empirical data of the São Paulo state extension service, acknowledged that extension agents have not changed very much. According to him, their practice remains highly based on production agriculture and is characterized by the belief on technology transfer as the major (if not the exclusive) path to the development.

Caporal (1998) indicated that Brazilian rural extension is facing currently an identity crisis in need of a new extension model. Abramovay (1997) asserted that extension faces the challenge to bridge the gap between a restricted and fragmented educational preparation of extension agents and the need that the extension agent be an agent of development, part of a wide process of social mobilization. Colleges of Agricultural Sciences and agricultural schools are not providing their graduates with the tools to face new social and economic realities.

The 1937 reform of Brazilian higher education conceived a university primarily as a conglomerate of professional schools mostly devoted to professional preparation of people with little commitment to research and service (Mendonça, 2000). Such a concept affects Brazilian higher education in some degree until today, and helps clarify why research had a secondary role in Brazilian public universities. We can understand, from this perspective, the emergence of a federal agricultural research network outside universities with the establishment of EMBRAPA in 1973. It is important to point out that some colleges and universities that were not supported by the federal government did not follow the 1937 model. Most of these colleges and universities are the ones currently playing major roles in agricultural research and extension.

However, the concept of a tripartite mission comprising teaching, research, and extension has been emphasized in Brazil since the 1987 establishment of the National Forum of Extension’s Vice-Chancellors of Brazilian Public Universities. The forum, a permanent organization, has put extension in a prominent position, as well as stressed the importance of research as part of the public university mission. University extension is seen as a path to universities meeting its societal role through integrating teaching and research (Nogueira, 2000). The forum also highlights the question of integrating
cutting-edge research and teaching. Such an issue is evidenced also in the American literature as well (Boyer, 1990; Lincoln, 1999), recognized as a form of scholarship that should be rewarded.

Subsequent to the reformulation of higher education in 1937, and in the midst of the country’s industrial expansion and democratization right after the World War II, agricultural education was legally separated from higher education in agriculture. Since 1946, agricultural education should deal only with professional preparation of people below college level to work directly in agricultural production and/or to assist people holding higher education degree in agriculture. The expectation was to accelerate workforce preparation to face the rapid technological changes in agricultural production. This vision was enforced in the Agricultural Education Development Plan of 1973 to the extent it considered the role of the agricultural technician as eminently technical, in which the content of its preparation is ultimately defined taking a job position simultaneously as starting point and goal (Franco, 1987). Recent professional education reform (Decreto No. 2208, 1997) reinforced this vision which determined that agricultural education (until the secondary level) should be delivered independently from general education.

Revision in the Brazilian literature (Abramovay, 1997; Caporal, 1998; Carneiro, 1999; Carneiro, n.d.; Franco, 1987; Graziano da Silva, 1997; Graziano da Silva & Del Grossi, 1999; Leite, 1999; Lima, 2001; Nogueira, 2000; Sobral, 1998) suggests that extension, agricultural education, and higher education in agriculture should give priority to six major areas: community development, economic plurality, leadership and life skills development, social welfare, environment and sustainability, and family agriculture.

**Conclusions and Recommendations**

A new cadre of agricultural education and extension professionals is needed to face the changing characteristics of Brazilian agriculture and rural milieu. The current prominence of extension in Brazilian universities, brought about by the Forum of Extension’s Vice-Chancellors, sets the stage for Colleges of Agricultural Sciences to take charge of a movement to foster generation of new agricultural knowledge through research, synthesis, practice, and teaching. Such a movement will impact the colleges, agricultural schools, and research and extension institutions preparing people to work in these areas.

Research efforts within Colleges of Agricultural Sciences should be strengthened under the concept of the *scholarship of discovery* in order to contribute to the stock of human knowledge and the intellectual climate of the college or university (Boyer, 1990). Such an intellectual climate may result in a paradigm shift, bringing agricultural education in Brazil to the status of a discipline. Basic and applied research in agriculture and related areas should be harmoniously divided between colleges and research institutions in order to avoid overlapping of tasks and expenditures. This requires a close partnership and integration between institutions. Colleges of Agricultural Sciences should consider research outside agricultural production as a top priority.

Research in political economy is highly recommended. Political economy is the concept that includes the social, cultural, economic, political, and demographic dimensions of a society.

The criticisms about the fragmented preparation of extension professionals (Abramovay, 1997) and the highly production agriculture-based curriculum (Lima, 2001) indicated a need for a more holistic preparation of agricultural professionals both at higher education and secondary levels. A balanced blend of
agriculture, science, and political economies in the curriculum could provide the basis for bringing new insights and meaning to agricultural knowledge and service. Moreover, Colleges of Agricultural Sciences and agricultural schools are expected to prepare its graduates not only for agricultural careers, but also for careers outside agriculture. Boyer (1990) proposed the *scholarship of integration*, as conducting research at the boundaries where fields converge in order to make connections across disciplines. Such integration presupposes strict convergence between all partners involved.

Colleges of Agricultural Sciences should use extension as a powerful tool in the application of knowledge. Strengthening partnerships with agricultural schools and rural extension institutions is highly desirable. According to Boyer (1990), knowledge is not first discovered and then applied; rather, new intellectual understandings can arise out of the very act of application in a process he called *scholarship of application*. Agricultural schools should provide tools to the application of knowledge, preparing its graduates with more intellectual understanding and lessening its ties with immediate job positions.

Colleges of Agricultural Sciences should pursue the *scholarship of teaching* as an activity that both educates and entices future scholars through transmitting, transforming, and extending knowledge (Boyer, 1990). A study to describe how colleges, agricultural schools, agricultural research and extension institution administrators perceive the mission of the institutions and the possibilities of integration is highly recommended. Also, agricultural education, agricultural research, and rural extension should revise and redirect their focus to address the six priority areas as indicated in the literature. Figure 2 depicts graphically the proposed model.

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**Figure 2.** Proposed model for integrating Colleges of Agricultural Sciences (CAS), Rural Extension Agencies (REA), Agricultural Research Institutions (RES), and Agricultural Schools (AGS) in delivering Agricultural Education and Extension Programs.
The sixth report of Kellogg Foundation, *Renewing the Covenant, Learning, Discovery, and Engagement in a New Age and Different World*, has provided valuable recommendations for bringing the universities closer to the people. In that, the report addresses the role of public universities and public responsibilities. Such recommendations are valuable to Brazilian universities in integrating the three (research, extension, and teaching).

**Educational Importance**

Teacher preparation programs and in-service education needs of extension agents should be identified. A needs assessment profile should be developed to identify specific programming areas that can be developed and delivered to address the six priority areas. Also, empirical data about the appropriateness of those priority areas should be collected. The major challenges resulting from the proposed model are to bring the available resources together and to identify major areas of integration. Colleges of Agricultural Sciences are required to redesign their teaching and research functions, as well as to put extension as their primary function in order to meet the demands of the new Brazilian rural milieu.

Colleges of Agricultural Sciences in Brazil should take a leadership role in the integration of agricultural knowledge and service systems. Education and communication play critical roles in the development of agricultural and extension institutions. Therefore, the need for changing the preparation of agricultural and extension personnel becomes imperative. Such an effort will help focus areas outside agricultural production, thereby contributing not only with agricultural production and productivity, but also with the integration between rural and urban milieus on an equitable basis.

In order to facilitate integration of teaching, research, and extension systems, a Task Force comprising of primary stakeholders should be appointed. The function of the Task Force is to bring various entities together to chalk out a plan to implement the integration efforts. First, the Task Force should focus on the challenges and opportunities that currently exist for integration in Brazil. This provides a better understanding of the issues and concerns that needs to be addressed if integration has to become a reality and success. Second, the Task Force should identify priority areas for development. Such priority areas may be in extension, teaching, and research or a combination of all three systems. Third, the Task force should also develop mechanisms for periodic evaluation of its work in meeting the integration efforts.

**References**


