ABSTRACT: This paper examines the historical relationship between higher education in Agriculture and the economy in the English Speaking Caribbean [ESC] with special emphasis on the philosophy, content, structure and delivery of the degree offering. This is done within the context of the significant changes occurring in the agricultural sector, and in the economies of the region, the fragility of our ecosystems, as well as of globalization. The paper evaluates the current degree programmes and presents an emerging paradigm that focuses on strategies for enhancing Access to the University Education in Agriculture and the Environment in the Caribbean and the wider tropics.

BACKGROUND

The Historical Context between Higher Education in Agriculture and the Economy in the English Speaking Caribbean

The critical demand for food in the tropical world (wherein lies most of the less developed countries [LDCs]) is increasing and is likely to continue. To a large extent this is intrinsically associated with rapidly growing populations in a fundamentally traditional agrarian environment. In the Caribbean small-holder farming is widespread and so is the use of modern agrochemical inputs. In the context of food deficit three issues need to be observed:

1. the availability of agricultural technologies is not a sufficient condition for increasing food supplies in the tropics,
2. land degradation is severe and extensive, leading to reduced productivity under both traditional and modern agricultural technologies and
3. an absence of concrete development planning and a lack of instruments for its implementation to initiate the socio-economic transformation of the rural people.

Declining access to food will severely curtail development and compromise the ability of countries in the tropics to lay a solid foundation for socio-economic progress. The traditional global food baskets are unlikely to achieve production growth to meet the increasing worldwide affordable demand for food. The demand for food globally is not only driven by increasing numbers of inhabitants but also as a result of increasing purchasing power of the growing middle class particularly in some regions of the developing countries. Thus effective demand for food is increasing which would lead to increases in food prices to the LDCs with all its consequences and ramifications.

Higher education [HE] will have to play critical strategic roles for future developments of the LDCs. The two issues in this regard are:
1. relevant training for empowerment and
2. relevant research for development.

Education can be conceived as all activities that aim to provide and obtain information, knowledge, skills, the ability to use them and the ability to generate or create them. Thus there is a need to create and maintain linkages between different levels of education primary, secondary, tertiary institutions for lifelong learning. HE has a role to play at all levels.
The English-speaking Caribbean evolved as an appendage to European Agrarian Economies over the last four hundred years. These economies were developed to produce primary tropical agricultural products to be given added value elsewhere, while on the other hand the Caribbean Economies became net importers of everything including food. Today the situation has changed slightly, but not in favor of the region since dependence on imported food has increased while the export of our primary products has declined significantly. Thus local economies which were primarily agrarian responded to colonial centres’ needs and not to the needs of the Caribbean Peoples to improve their well-being.

Higher Education in Agriculture also reflected this philosophy. This is evidenced by the following statement made by Sir Francis Watts [Principal Emeritus], H. Martin Leake [Principal] and Major H. C. Corlette [Architect] of the Imperial College of Tropical Agriculture in Tropical Agriculture [ICTA], in Tropical Agriculture Volume 2, 1925:

"The object of establishing the Imperial College of Tropical Agriculture was to enable instruction of a nature somewhat similar to that which is now so widely given in Agricultural Colleges throughout the world in connection with the crops of temperate climates to be given to young men about to engage in agricultural work in the tropics. While there are abundant facilities for the former there are few relating to the latter, or tropical aspect of the case."

With the formation of the ICTA in 1921 higher education in Agriculture and the Environment was only accidentally afforded people of the English Speaking Caribbean [ESC] as ICTA from 1921 to 1960 was primarily engaged in the training of Europeans or Caribbean persons who were being tutored to service European interests and investments. But the ICTA was a colonial institution funded by both Caribbean and British investments.

In 1960 one saw the development of the Faculty of Agriculture, within the University of the West Indies [UWI] with a substantial HE and training mandate for developing the potential of the people of the English speaking Caribbean. The syllabus and training methodologies remained externally focused. The main objectives of the training were to produce the following cadres of professionals:

- extension officers
- agricultural researchers
- agricultural administrators and
- agricultural managers.

All of the above entailed “Training for Certification” and for “Employment”. It is important to note that unlike the former ICTA era, within the UWI system Agriculture was no longer an independent institution but became a unit within a larger system, competing for everything from budget to space accompanied by the subsequent fragmentation of disciplines. In addition the academic and instructional directions became constrained by the new Social Sciences and Humanities outlook. Thereby restricting the development of the new pedagogical needs of HE in Agriculture and the Environment. Around this time as well one saw the further development of tertiary level Agricultural Colleges throughout the English speaking Caribbean. In fact many of these colleges preceded the Faculty of Agriculture UWI, but provided feeder students into ICTA. But the philosophy and objectives behind this training were still the same.

In addition, post 1960s, within the newly emerging independent nations more emphasis was placed on the Arts, Humanities and Social Sciences both at the Secondary and Tertiary levels, and less on the Sciences, especially on the applied sciences of Agriculture and the Environment. There were also fewer job opportunities [i.e. to seek “Employment or to be an Employee”] in these areas, a situation which remains today. This is no different to the employment trends that have taken place in the Developed Countries, but with one exception, Higher Education in Agriculture and the Environment was never neglected or compromised as has been done in the Caribbean in recent times.

The Changing Attitudes and Directions for Higher Education in Agriculture in the English Speaking Caribbean

The future direction of HE in the Caribbean countries should be determined by the following:
1. Caribbean countries are essentially agrarian, therefore development in such countries fundamentally apply to the development of the rural communities;
2. Globalization is knowledge driven;
3. Technology and its use is also knowledge driven;
4. Food security issues linked to environmental, cultural and geo-political;
5. Empowerment, training not specifically for certification, but to enable people to have increase capacity to create, acquire and use knowledge to achieve their goals and
6. Must promote sustainable resource use and production systems.

Our attitudes towards higher education should reflect the change in directions as dictated by the above.

<table>
<thead>
<tr>
<th>Year</th>
<th>Action taken</th>
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<tbody>
<tr>
<td>1921</td>
<td>ICTA Diplo. PG</td>
</tr>
<tr>
<td>1960</td>
<td>BSc. Programme Introduced</td>
</tr>
<tr>
<td>1974</td>
<td>Pre-agriculture Introduced</td>
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<tr>
<td>1983</td>
<td>Agronomy Introduced</td>
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<tr>
<td>1992</td>
<td>BSc. Programmes in LS, CS, and Agribusiness Introduced</td>
</tr>
<tr>
<td>1994</td>
<td>Human Ecology Introduced</td>
</tr>
<tr>
<td>1996</td>
<td>Merger</td>
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Table 1 presents an Events Line for HE in Agriculture at the UWI that has been the premiere Training Institution for the English Speaking Caribbean [the Caribbean Foods Crops Society started here]. This progression only demonstrated
• Programme diversification,
• changes in packaging from yearlong courses [1921 to 1974] to courses offered by the terms [from 1974] to course offered by semester [from early 1990s],
• more changes in packaging from 2001 a new change is being planned to be instituted, i.e. programmes of minors and majors, to achieve similarity in form with universities in the United States.

The latter change sounds similar to that suggested by Watts et al in 1925: “instruction of a nature somewhat similar to that which is now so widely given in Agricultural Colleges throughout the world”.

Particularly the last point reflects a change in structure essentially for conformity in form with other institutions. It is not internally driven by a philosophy or vision of Agricultural and Environmental education as a strategy for regional development and transformation. Although in the past there was an effort to make the curriculum regionally relevant. The more things change the more they remain the same. All these changes over the years have had the same Educational and Philosophical Objectives as earlier stated, and in the main have just added or reduced courses or simply repackaged them.

Access, content, structure and the delivery of the degree offerings: Historically access to programmes has been via High Schools, Secondary Schools and Technical colleges. But the main constraint to access has been the need for the science based courses which are not offered at all the secondary schools. The programmes have been offered for three years (six semester packaging), with accommodation for attendance in either the full or part time mode. Some programmes are offered in distance mode partially or completely. Courses have been mostly classroom based with limited practical exposure. With an increase in secondary school enrollment in Trinidad and Tobago, the near future will also see an increase in demand for places in HE. HE institutions should therefore need to prepare to accommodate this expected increase in demand for access.
The Present Situation in Caribbean Economy and the Environment:

The Economies of the English Speaking Caribbean are driven by the following:
1. Agriculture, which is plagued with problems and is on the decline, but people must eat every day, and Agriculture is linked to good environmental management [and the Caribbean economies are net importers of food];
2. Tourism, which is a very fickle industry and is in the main dependent on a well managed environment [and the food and beverage which services the tourist sector are import based and its meaningful contribution to the economy can be improved through greater utilization cuisines based on locally produced foods]; and
3. Mineral Extraction Industries, [Oil and Natural Gas, Bauxite, Limestone], these are all non-renewable resources, and can lead to environmental degradation if not properly managed.

The situation ahead has become even more complicated due to:

1. Imminent Globalization;
2. Global Warming with potentially devastating impacts on agriculture in many parts of the Tropics;
3. Increases in the Volume and Value of Importation of food leading to decreased food security;
4. Decreased employment in Agriculture and increasing unemployment within our economies;
5. New Communication Technologies making information or misinformation more accessible to all;

Higher Education in Food, Agriculture, and Natural Resource Management- an Imperative for the LDCs.

In this regard the following points should be noted:
1. There is a positive relationship between access to higher education, economic growth and the reduction in poverty.
2. A community of well educated people is better able to adopt and make use of new and emerging technologies and better able to adapt to changing market environments, and taking advantage of the opportunities created.
3. A well educated society is better able to govern itself and to secure and keep abreast of information that will facilitate governance.

Critical Changes needed in Higher Education in Agriculture and the Environment

Critical Changes are needed in Higher Education in Agriculture and the Environment for the Caribbean and these must be in the context of the following considerations listed.
1. Institutional arrangements are needed that promote growth and development of the disciplines of Agriculture, Food and the Environment within the UWI system.
2. The academic contents of the programmes should conform to the peculiar requirements of the sub-region. There is a clear need to form partnerships for life-long interaction. It is high time that students are accepted as equal partners and stakeholders in this process and see themselves as such.
3. Agriculture should establish strategic alliances and linkages with pertinent regional and extra regional institutions and organizations.
4. The existing funding of the UWI is enrollment dependent and as a result budgetary allocations are subject to fluctuations.

HE: Training and Empowerment Curriculum [HFTEC]
The new educational paradigm is set within the context of an evolving Socio-Economic Matrix. This new and evolving framework has the following features:

1] Universal ACCESS to information;
2] Increasing demand for ACCESS to higher education per se, within an environment of rigid matriculation requirements;
3] Increasing demand for knowledge based services;
4] Changes in underlying attitudes for acquiring HE and these are:
   • a shift away from Education only for Certification for Employment to Education for Empowerment
5] Recognition of the need for continuous upgrade of skills;
   • training on a need to know basis for skills upgrade and acquisition

Suppose an HE institution is to take an entrepreneurial approach to agribusiness management training through the provision of new courses and curriculum to achieve it or, to offer new programmes for empowerment and training within this proactive situation. But the HE institution continues to use old teaching and delivery models. Then questions must now be raised about whether objectives of this new approach will be achieved.

Some of these questions are:

• Will these new courses, which have a corporate orientation lend themselves to teaching and information dissemination in the traditional didactic format?
• How does one successfully coordinate a field trip into the mind of an agro entrepreneur?

It is believed that the Case Study and Problem Based methods hold the answer to these questions. In fact schools of Business and Law have been using these methods for decades. The Faculty of Medical Sciences [UWI] and other Medical Schools have gone to the Problem Based Teaching modes over the last five years. Schools of Agriculture, the Environment and other Applied Sciences have not gone this route as yet and are being left behind.

The Philosophy behind the Teaching and Delivery Strategies for the Alternative Approaches

1. Training should focus on the empowerment of the learner.
2. There should be linkages within the training or education for Agriculture and the Environment from the Primary to the Secondary to the Tertiary level.
3. Servicing the needs of the stakeholders must be of primary concern.
4. Training must not be in the abstract and must involve appropriate training methods and tools and should be locally entrenched.

Elements of New Degrees/ Higher Education Programmes in Higher Education for Agriculture and the Environment

1. Entry Routes
   Must accommodate the needs of all potential learners.
2. The Philosophy behind the Education Initiative
   The new philosophy must be derived from within the societies. [See Box]
3. The Finished Product Desired
   [Begin with the End in Mind: Creating Problem Identification and Solving abilities]
   ⇒ Technical Competence
   ⇒ Technological Competence
   ⇒ Empowerment
   ⇒ Experience
   ⇒ The Skills
The type of human
Entrepreneurs
Creating Problem Identification and Solving abilities

4. The Pedagogical Needs and Approaches
   ⇒ Pedagogical Needs
     1. Old
     2. Added
     3. Different
   ⇒ Programme Delivery Modes
     1. Modes
     2. Access

5. Programme Participants
   • The University/ Programme Management Unit
   • The Stakeholders or Workplace sites
     • Commercial Farms
     • University and HE farms and facilities
     • Commercial Processing Facilities
     • Other Institutional Facilities
     • The Food and Beverage Service Sector
     • Other
   • The Learners

6. Programme Content
   This will now have to worked out after feedback from this paper is obtained an with the participation of all stakeholders.

7. Programme Delivery
   ⇒ Delivery Modes
   ⇒ Infrastructure Requirements

8. Learner Evaluation
   ⇒ Continuous Assessment
   ⇒ Final Evaluation

9. Programme Evaluation

A Radically New Approach towards the Delivery of Agricultural and Environmental Education
An outline of the Programme Framework

Pre-entry Profiling and Characterizing:
1. Students given pre-entry questionnaires
2. The programme for the student to follow will be based on their background, needs, and goals.

Entry: Phase 1
Semester 1/
[3 Months Face to Face/
Six to 9 Months Distance]

Phase 2
Workplace Based Programme
[Two/ Three Calendar Years]
[Workplace Exposure plus

1. This period could be conducted either in the face to face or distance modes.
2. This would involve the student being exposed to
   • The method of programme execution
   • The expectations of the student
   • An approach at developing problem solving skills
   • The information kit
   • Knowledge based skills
3. Flexibility for the student to change routes
Distance Education Delivery

This could be disciplinary based [e.g. Tropical Agronomy and Horticulture, Marketing Processing and Product Development, Tropical Animal Science and Production, Tropical Environmental Management] or could be rotational. This would depend on the areas of concentration required by the student and the type of disciplinary degree being pursued.

This period could involve the following:
1] courses delivered by distance to the students;
2] the students working on problems or projects within the workplace

Phase 3
Out of Workplace Based Programme
[One Calendar Year: Face to Face/ Two Calendar Years: Distance]

The student or learner could now leave the workplace and devote full time to study to finish the formal part of the education within the prescribed framework.
This could be done:
Via distance or through the formal classroom setting.

CONSTRAINTS

The constraints faced in attempting to develop a programme with the above features are as follows:
1] the university’s slow response to the rapidly changing socio-economic matrix and some of the university’s management staffs’ attitude towards HE in Agriculture, in the recent past;
2] people within the ESC are being exposed to temperate based programmes which are are attractive but not necessarily relevant to the Caribbean and the wider Tropical world and the LDCs;
3] locally created programmes are not “sexy” and attractive to some outward looking university academic administrators.

CLOSING REMARKS

It is now clear that in order to initiate a proactive and empowering solution to HE in Agriculture and the Environment the following have to be addressed:
1. The institutional arrangements for Agriculture in the UWI must be addressed as a matter of urgency.
2. Prompt initiation of dialogue with all the stakeholders.
3. Immediate expanded use of Case Studies and the Problem Based Teaching Methods.
4. The expanded exposure of student exposure to the industry.
5. Planning of the New Programmes Development in consultation with the wider clientele and stakeholders.

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