“Agribusiness Essential for Food Security: Empowering Youth and Enhancing Quality Products”

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Caribbean Agriculture at the Crossroads

Professor Clement K. Sankat
Pro Vice-Chancellor and Campus Principal
BSc (UWI), MSc (UWI), PhD (Guelph), FI AgrE, CEng, FAPETT
The University of the West Indies, St. Augustine Campus, Trinidad

In memory Sir Arthur Lewis and Professor George Beckford

Sir William Arthur Lewis (1915-1991) and Professor George Beckford (1934-1990) were both eminent scholars who saw agriculture as an essential piece of the puzzle of Caribbean development. Using this philosophy as the basis, this paper presents the challenges and prospects of Caribbean agriculture within a global context. It suggests that Caribbean agriculture is now at a crossroads given the many challenges including – the importation of large quantities of food; a declining interest in the profession of agriculture; an ageing population of farmers; and poor rural infrastructure. It argues therefore, that in order for there to be sustained development in the agriculture sector of the Caribbean, there is a need (1) to cultivate a passion for producing and consuming local and regional agricultural products of quality and distinction; (2) develop programmes that young people will want to be a part of; programmes that will allow them to apply their technological knowledge to agriculture, food production and food processing, which The UWI St. Augustine Campus has been introducing through its newly established Faculty of Food and Agriculture; (3) invest more in research and technological innovation; and (4) strong decision making in terms of direction and sustained action by Regional Governments.

Keywords: Lewis, Beckford, Caribbean Agriculture, Development, UWI St. Augustine
Introduction

This paper seeks to immortalize the seminal contributions of two of the region’s most eminent scholars, both of whom saw agriculture as a central part of the puzzle for Caribbean development. Sir Arthur Lewis was not only the first West Indian and Black recipient of a Nobel Prize, but he was also the first West Indian Vice Chancellor of The University of the West Indies (UWI), while Professor George Beckford was a distinguished lecturer in agricultural economics in the Faculty of Agriculture at the UWI, St. Augustine Campus. Agriculture in the Caribbean at a cross roads; ready for strong decision making in terms of direction and sustained action. Any examination of the sector must be put in a regional/ global context although local circumstances are paramount. The role of the UWI is critical to long-term success of regional initiatives in the sector. An examination of the University’s mandate in this regard will be undertaken as will an exploration of the changes made in recent years to support the sector. Finally the sub-theme of empowering youth to drive development in the sector is explored.

Consensus on the Importance of Agriculture to Development

In the People’s Republic of China agriculture’s contribution to GDP is 10%; employment in agriculture is 37%, with a 49% rural population (World Bank 2008). The Vice Minister of Agriculture and President of the Chinese Academy of Agricultural Sciences (CAAS), Professor Li Jia-yang spoke on China’s progress in food production, to feed a nation of 1.3 billion. Food production has increased twofold in China in the last 50 years, to a stable 550 billion kg. At present the country has achieved 95% self-sufficiency in rice, wheat and maize. This is simply spectacular (and the same may apply to India).

They have done this through thousands of new high-yielding crop varieties, new livestock, poultry and aquatic varieties, preventing and controlling major diseases and pests, reclaiming large amounts of mid to low yield farmlands, considerably improving agricultural mechanization, as well as making visible achievements in the agricultural utilization of renewable energy. Its mechanization rate on farms is 57%, a significant achievement for a country where agriculture is propelled by very small farms. They have done this through an agro-technological advance driven by research, science, technology and its applications, and through a multitude of initiatives dedicated to agriculture. But political will and a resolve to execute and succeed must have anchored this.

South Korea (agriculture’s contribution to GDP 3.4%, population in agriculture 7.9%, 17% rural population) in the last year —made a quantum leap in the past 50 years from a ruined economy, to now a high-tech industrial leader. But its agriculture, despite challenges, continues to be very important. South Korea became self-sufficient in rice production in 1978 with a thriving agricultural mechanization sector. In fact South Korea’s agriculture is strongly integrated with its industry — providing raw materials for downstream and food processing industries and an upstream industry of fertilizers, agro chemicals, and a vibrant agricultural machinery sector whose exports increased tenfold in the last decade, with transport and commerce including exports also expanding (KREI, 2010). This is the kind of integration that is needed in the Caribbean and countries like Trinidad & Tobago, with a strong industrial/manufacturing /energy base should seek to emulate.

Despite the industrial strength of these two countries and their growing wealth (and influence), food and agriculture continue to be very important with strong agricultural policies and support for the sector. Agriculture is integrated within the matrix of the nation’s productive sectors, not unlike the USA, Canada and Europe. Clearly with larger populations to feed, there cannot be complacency about food security. What are the lessons for the Small Island States of the Caribbean- post sugar and banana? Well if they can shape a vision of food and agriculture,
recognizing the realities of today but driven by the prospects of tomorrow, find answers around this, develop appropriate mid and long-term policies to support, coupled with a will to act/to execute, a different economic landscape can be created.

But what does the future hold for Small Island States in terms of food and agriculture/food and nutrition security? This can be examined this within the context of Trinidad and Tobago’s own food imports to the region, currently valued at US$4 billion. This represents a steadily increasing component of imports, one that had risen to 20% by 2009, representing nearly 2.4 times the value of food exports.

In 2013, the UN warned of a worsening food crisis driven by depleting food reserves, failing harvests and rising prices – prices that sparked riots in 25 countries in 2008. The report quoting from Lester Brown of the Earth Policy Rural Centre in Washington noted “we are entering a new era of rising food prices and spreading hunger. Food supplies are tightening everywhere and land is becoming the most sought-after commodity as the world shifts from an age of food abundance to one of scarcity. The geopolitics of food is fast overshadowing the geopolitics of oil. Armed aggression is no longer the threat to the future. The overriding threats to this century are climate change, population growth, spreading water shortages and rising food prices.”

Ruby (2012) advanced several reasons for what is claimed a Global Food Crisis – population growth, urbanization, rapid development in East/South East Asia, national calamities and droughts, slow supply response, the fall in the dollar, rising oil prices, agro-fuels, low productivity associated with policies that abolished or weakened support for the sector, neglected aid for science, technology and innovation and that there is only a handful of countries engaged in the global trade in staple foods.

**Charting a Path for Agriculture in Caribbean Economic Development**

So what then are the options? Pemberton (2006) noted deep-rooted implications of a proposal by Kendall and Petracco (2003) who offered for consideration “a new agricultural policy for the region” to be pursued on the basis of resource endowments and areas of comparative advantage. The three strategies were:

a) **Expansion of non-agricultural exports and de-emphasis on agriculture**

Implying that those countries that depend heavily on non-agricultural exports should de-emphasize agriculture and focus on a food security strategy based on the development of food reserves. Food stocks could be supplied by CARICOM countries which have a strong comparative advantage in agriculture.

However, this is in no way a sustainable option for treating food and nutrition security, neither in effectively treating with the exposure to risk presented by the concentration of economic activity in one or two service areas as advocated here in building import capacity. Further, although the focus is on sourcing food stocks from those CARICOM countries with comparative advantage in agriculture, it does not articulate how the substantial foreign capital reserves necessary to support this strategy will be developed or sustained. Alternatively, the development of local agriculture is a more holistic, sustainable and less risk-exposed option for building food stocks and food and nutrition security through agricultural and non-agricultural diversification.

b) **Agricultural export diversification**

Implying that countries with strong agricultural sectors should move away from traditional agricultural exports and instead pursue a strategy of export diversification based on non-traditional commodities. These could include a variety of fruits and vegetables, some of
which could be grown organically. This strategy suggests an exit from the sugar and banana industries.

However, the exclusion of traditional industries from an agricultural diversification strategy is not recommended (Demas 1987; Warren 2002). Instead, diversification should be looked at as a means of mitigating the risks associated with economic concentration by leveraging already existing assets (e.g. infrastructure, supportive institutional arrangements including market intelligence and market coordination). In this way, both the traditional commodities as well as the diversified portfolio benefit from economies of scope, creating a multiplier effect in the incumbent and other agricultural sub-sectors.

c) **Competitive import replacement**

In order to meet food security concerns, countries pursuing an export diversification strategy should reduce food imports and expand production for the domestic market. Import replacement would differ from import substitution to the extent that domestic production would be required to be competitive. Competitiveness should be seen not only in terms of price but also taste, freshness, food quality and food safety. An orientation towards an organic approach is implied.

This is an accurate explanation of the intent behind strategies pursued in the Caribbean in the 1970’s-1980’s where the operational objective was to develop domestic industries by capitalizing on competitive avenues available for local commodities in domestic markets. This is effective for not only stimulating domestic enterprise, but important also to managing trade deficits in food/ agricultural products caused by a heavy reliance on imports.

There are real challenges with locking regional island states into either of the first two options suggested by Kendall and Petracco (2003). And the use of the words “de-emphasizing agriculture” truly challenges me but this may be an emotive response. The first approach misses the point about agriculture’s role in building sustainable economies and producing positive social and environmental impacts through its integrative nature. In a crisis environment, we have already seen countries which are food exporters halting such trade which has serious implications for food security. Should Trinidad and Tobago adopt such a policy? This should be strongly discouraged.

Moving away from traditional exports, especially crops like sugar cane and bananas, for which we have developed tremendous expertise, is a notion which can also be challenged if we have not examined the possibilities for their full or alternative utilization, their integrative roles in the economy, and their contributions to social capital, particularly in the preservation of strong, vibrant rural communities and the indigenous knowledge contained within.

The abandonment of the sugar industry in Trinidad and Tobago, without giving its diversification an opportunity to grow, has left the communities, the industries supported, future/alternative industries, and the sustainable economic prospects of this country diminished. This view is in keeping with the current thinking of the expanded contribution of agriculture to GDP. There may also be a loss of opportunities in agro-technological capacity development for young people as the sugar industry provided a solid platform for this.

Bearing in mind the new global realities of agriculture and its holistic contribution to development, including food and nutrition security, a more **balanced** strategy which leverages agriculture as an integrator and pushes its value creation to new heights should be pursued, many of which are yet to be discovered.
Of all economic sectors, agriculture best reflects the essential nature of the ecological system which sustains human life. Agriculture is essential because it is an integrator – it has the ability to coordinate through synergistic interaction all other economic sectors. In addition to its food provisioning role, agriculture is also central to the supply of raw materials for processing and manufacturing, service sectors and in balancing the interface between human needs/activity and ecological/environmental systems. It ties commerce and enterprise development to health and well-being, and the natural environment and resource base which is the foundation for most enterprises. Agriculture, as an integrator in itself demonstrates its crucial significance. And for developing countries such as those in the Caribbean region which are pursuing myriad development goals, under challenging structural circumstances, it is beneficial to have a connecting web; a weave with which to match and fit these sometimes competing interests.

Agriculture and its benefits go beyond farming and farmers, essential as they are, but an integrated system of activities that brings value to a nation, a value, unfortunately, yet to be totally measured. However, Brathwaite (2010) noted that there was a prevailing myth in the development literature that as a country grows the agricultural sector’s contribution to the economy declines. This is so if we only examine the case of the primary agricultural sector.

However, if the sector is viewed as an expanded one with linkages to other sectors, then food and agriculture’s contribution to development actually increases. Figure 1 shows the expanded contribution of agriculture in several countries and suggests a very dramatic alternative look at agriculture’s real contribution to economic activity. Agriculture can therefore be the bastion of integrated development for us in the Caribbean.

![Figure 1: Contribution of the Expanded Agricultural Sector to GDP in Selected Countries](source: Brathwaite 2010)

Economic development in the Caribbean region actually started with agriculture. Today it continues to be the mainstay of several economies including – Belize, Dominica, Haiti, and Guyana, and remains vital on a socio-economic basis even in the more advanced states. On average it directly accounts for about 21% of CARICOM’s labour force and 6.5% of its total GDP (Figure 2).

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1 Inclusive of crop production, forestry, animal rearing, and fishing and other harvest systems.
Although it is often forgotten, agriculture is recognised as the single most effective means to poverty reduction and sustainable livelihoods. According to the World Bank (2008), agriculture-based growth is at least twice as effective in poverty-reduction as GDP growth in other sectors. No other economic activity can make that claim. Agriculture, more so than any other economic sector is unique and must be treated with priority, respect and sectoral distinction because of its role in food, good nutrition and health, all central and indispensable to human life. One must eat, and therefore producing food, and the systems by which that food is grown, transformed, stored, transported, marketed and otherwise affected, the entire system, is an absolute necessity. It is not surprising then to see food and nutrition security and in-turn sustainable agriculture as a top global priority for 2013. Addressing nutrition is of critical importance for achieving the Millennium Development Goals (MDGs), in particular those related to hunger, child and maternal health, and education. Reports indicate that 12.5% of the world’s population is undernourished in terms of energy intake.

Development must be about people, as without that, it is unsustainable. Food and agricultural development are rooted in the natural and rural environments.

The question, though, remains - If agriculture is really capable of all this, why hasn’t it happened as yet? What is the missing link?

**Situation in the Caribbean – Binding Constraints and Persisting Challenges**

The region is still plagued by challenges first identified more than 50 years ago. These were best coined and recognised in the William Demas Report (1997), and later expanded on in the Jagdeo Initiative (2004-5) as the 10 key binding constraints to agriculture that may be applied to the agricultural sector in our countries; namely: limited financing and inadequate new investments; outdated and inefficient agriculture, health and food safety systems; inadequate research and development; fragmented and unorganised private sector; inefficient land and water distribution and management systems; deficient and uncoordinated risk management measures including praedial larceny; inadequate transportation system particularly for perishables; weak and non-integrated information and intelligence systems; weak marketing systems, linkages and participation in growth markets; and a lack of skilled human resources.

While quite comprehensive, these constraints and the time-line over which they have been identified, perhaps point to an unwillingness and/or inconsistency in sustaining interventions so
as to do better. Consequently, the efficacy of agricultural policies, programmes and actions, assuming they exist, are severely diminished. We need to remind ourselves of President Jagdeo’s statement on the will to succeed.

If these constraints can be removed, these island nations can harness the full potential of domestic agriculture, each with its own niches and unique propositions for growth and value creation (demand side), and position this within a regional framework for the production and trade in food and agriculture (supply side), where the constraints are also eliminated, we would be on a platform for expansion, prosperity and risk reduction.

The Government of Trinidad and Tobago in its 2013 Annual Budget (Oct. 2012) announced a Food Security Facility (FSF) with Guyana. The FSF is aimed at stimulating agricultural and livestock production; reducing dependence on foreign food imports and stimulating, regionally, the drive for food security in CARICOM. This was in recognition of the country’s growing shortages in suitable land for agricultural diversification to meet current and future needs (CaRPN 2013). The region will be looking expectantly at the implementation of this initiative and the benefits that will be derived.

The region has seen growing disenfranchisement with the virtues and simple economic prudence of producing food for ourselves (Figure 3). One notes from the current data a slight increase in food production (5%) in the region in the last few years, no doubt a response to the recent global food crisis, but the overall pattern of domestic food production is negative.

![Figure 3: Food Production Index (avg.) for the Caribbean: 2000 – 2011](image)

Source: World Bank 2013

Interestingly, in the case of traditional agricultural export commodities (Figures 4 - 7) there are mixed results which suggest that the curtain has not fallen on these long-running aspects of Caribbean agriculture. While production of some commodities has all but ceased, other countries continue to invest in production which has paid off. Production increases for citrus in Trinidad and Tobago, coffee in Jamaica and Trinidad and banana in Suriname and Saint Vincent and the Grenadines, are observed suggesting that these commodities still have a functional and profitable role to play in their economies.
Figure 4: Banana Production in Selected CARICOM Producers: 1961-2011
Source: FAOStat 2013

Figure 5: Coffee (green) Production in Jamaica and Trinidad and Tobago: 1961-2011
Source: FAOStat 2013
While these commodity industries have traditionally been looked at as a source of foreign exchange earnings, and thus there falling productivity and competitiveness seen as a burden to the respective economies, they can also be looked upon from the viewpoint of the essential role they play in life, culture and auxiliary economic benefits.
In this there is recognition of value beyond the ‘bottom line’ or the cold calculations of traditional analysis and helps elucidate a way of thinking that reveals distinct value propositions inherent in the Caribbean, and more specifically in its agricultural systems. This offers a refreshing outlook for Caribbean agriculture despite the clear long-term downward trend in agricultural production across the region.

However, somewhere in the disenfranchising thrust of globalisation, the region appears resolved to be net importers of food. CARICOM has spent over US$ 2.8 billion on food imports each year since 2008 (UN Comtrade 2013), currently estimated at US $4 billion. Our growing dependence on food imports is seen post 1990 when food imports, relative to merchandise imports increased substantially and has since not returned to those levels (Figure 8). In fact, this has nearly doubled in twenty years.

![Figure 8: Food Import Dependence in CARICOM](Food imports as % of merchandise imports)

Source: World Bank 2012

The heavy dependence of Caribbean countries on a wide range of imported foods has resulted in most of the countries being designated by the WTO as “Net-Food Importing Developing Countries” (NFIDCs). This is a frightening scene in the Caribbean given the vagaries associated with 1) global agricultural food production, 2) price volatility and 3) import capability of Caribbean countries in faltering economies. While traditional analysis of these three areas has typically emphasized the lack of resources and the absence of economies of scale in their utilization, current thinking seeks to recognize distinct value propositions inherent in the Caribbean, and more specifically in its agricultural and ecological systems, which may be leveraged to create new opportunities for agricultural development.

**Leveraging Distinct Comparative Advantages for Unique Value Propositions**

**Biodiversity**

Biodiversity is a valuable resource for agricultural enterprise development. As one of the biodiversity ‘hot spots’ of the world, leveraging endemic species should be an important feature of our development strategy for agricultural enterprise and agribusiness development. About half of the 13,000 plant species in the Wider Caribbean Region are found only here and no other place in the world – some specific only to the one island in which it is found. The high levels of endemic species may be the most abundant resource and second to human capital in terms of potential to chart a path for sustainable development in the Caribbean (Ramnanan
Maybe one might reconsider the value of these species when the reality is that 25% of the world’s pharmaceuticals are derived from plants.

This has become manifested in the international appeal and expansion of Blue Mountain coffee from Jamaica, Trinitario fine-flavoured cacao from Trinidad and Tobago, and nutmegs from Grenada, along with their concomitant value-added products. But we must also use our competitive advantage with products such as fish, West Indian avocados, mangoes, sapodillas, soursop, golden apple, breadfruit, hot pepper, spices and herbs. Regional trade and extra-regional diasporic markets must be targeted, developed and sustained.

In addition, we must use our competitive edge as it relates to our livestock including the production of the Barbados Black-belly Sheep, Trinidad and Tobago Buffalypso, the Jamaican Hope and commercially farmed exotic meats such as Agouti (*Dasyprocta leporine*) and Lappe (*Cuniculus paca*). But deepening and significantly heightening the value addition from Caribbean agriculture must be factored into our strategies. Science technology and entrepreneurship will play a very important role here.

**Exotic Foods**

Globalisation and social integration are creating opportunities for exotic foods – not just in their production and supply, but also the demand for new culinary experiences where traditional knowledge and folklore that surround such foods which is a typical feature of the experience economy (Richards 2012) wherein Caribbean tourism is already well-established. There is also interest in identifying the distinct aromatic volatiles, taste sensations and flavours in such foods for the development of new products (Agriculture and Agri-Food Canada 2011).

**Health and Wellness**

Globally, health and wellness is a major consumer-spending segment and is estimated to be worth US$ 1 trillion by 2017 (Euromonitor International 2012) – up from US$ 600 million in just 2010 (Ford 2009). Figure 9 shows the projected cumulative and component growth in the global health and wellness market. The largest components of this market are the naturally healthy and fortified/functional foods segments, in which many Caribbean products fit. Functional foods, obtained from crops that naturally contain components that have a physiological function, are foods that have a potentially positive effect on health beyond nutrition. The market for this component alone was estimated to be worth $200 billion in 2012 (Euromonitor International 2012).

![Figure 9: Global Health and Wellness 2007-2017, Retail Value RSP](image)

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2 Functional foods are foods that have a potentially positive effect on health beyond nutrition.
Source: Euromonitor International 2012

For the Caribbean with its high levels of endemic biodiversity and flora, the strategic resource base exists for developing sustainable industries around nutrition-dense, functional foods and products for this consumer segment. These can be the basis for proactive initiatives for agribusiness development utilizing strategic partnerships/linkages with the private sector and other stakeholders (Gupta 2011) in areas such as research and product development, all motivated by their strong growth potential. Health-related beauty and hygiene lines both yield approximately US$200 billion per annum, and are expected to enjoy a 6% sales lift each year (McKinsey& Company 2012). Unlikely contributors such as sweet potato, cocoa, coffee, fruits and herbs are actually experiencing increasing demand for new product development.

This concept of unique value propositions is a winning strategy for agribusiness development in the Caribbean and has a stronger comparative advantage in this area than a strategy of price competitiveness for homogenous products. There are several strategies for doing so including market development around strong brand identities and using indigenous knowledge and geographical indications for preserving brand, value and return on investments; all supported by consistent and targeted research, development and knowledge transfer.

**Sustaining Efforts**

It might surprise many to know that, despite its variability, the annual rate of growth of value-added from agriculture was higher than any other productive sector in the Caribbean in both 2009 and 2010 (Figure 10).

![Figure 10: Value added Annual Rate of Growth (%) for Major Industries in the Caribbean](source: UNData 2013)

Exploiting the full possibilities for agriculture necessitates consistent and sizeable investment in R&D. Unfortunately public spending on agricultural research in the Caribbean has been almost negligible. Following a decade of slowing growth in the 1990s, global Public spending on agriculture research rose by 22% from US$ 26.1 billion in 2000 to US$ 31.7 billion in 2008 (IFPRI and GFAR 2012). Public agricultural R&D spending in China, India, and Brazil—the three top-ranked countries in terms of public agricultural R&D spending in the developing world—accounted for one-quarter of global spending and half of combined spending in
developing countries. These countries are showing dramatic productivity growth in agriculture and significant returns on their R&D investments. Available data for Latin America and the Caribbean suggests that the Region as a whole has yet to fully awaken to this reality, with investment in agriculture continuing to decline rapidly post 1998.

This should be a poignant message to agricultural developmental and financial planners and researchers in the Caribbean region for the coming decade. There must be greater efforts to increase investments in R&D and to sustain the progression of research products/outputs into consumables with unique value propositions. Our R&D efforts must ultimately bring value to the expanded productive agricultural sector.

With respect to Trinidad and Tobago, public spending on research and development in all areas is of the order of 0.1% of GDP. This needs to be multiplied at least tenfold, with the food and agriculture sector being specifically targeted, to create the necessary impacts on innovation and enterprise development. Additionally, the private sector needs to be engaged and particularly so in the downstream, value added possibilities for agriculture. It is my respected view that despite perceived lack of spending on agricultural research and development, there are several institutions in Trinidad and Tobago (Ministry of Food Production, CARDI², UWI³, UTT⁵, ECIAF⁶, CARIRI⁷, SFC⁸ etc.), whose mission it is to support such activity. The work of these institutions needs to be directed, rationalised, coordinated, supported and monitored by a national agricultural research authority. Such an authority should forge international partnerships and facilitate technical cooperation with developing countries like the BRICS so as to benefit from their capacities, knowledge and experiences.

This is something that Sir Arthur Lewis knew well and proclaimed over 40 years ago. In 1967 he noted that,

“The bases for agricultural progress are well known….. Money must be spent on research and agricultural extension to bring knowledge of new seeds, fertilizers and pest and disease control to the farmers. Investment is also needed in roads, water and processing facilities” (Lewis 1967, 466-77)

**Education and Agriculture**

We know that there is an important role for educational institutions such as The University of the West Indies to play in supporting agriculture enterprise development given these realities. On the subject of agriculture and education Sir Arthur Lewis noted that,

“To establish a prosperous peasantry it is necessary not merely to provide land, but also to provide instruction through schools….. Given these essential institutions, there seems no reason why the West Indian peasant should not learn to utilise the land as capably as the planter” (Lewis 1938) “Our small farmers ought all to have gone to agricultural institutions” (Lewis 1972)

The vision of the UWI remains strongly committed to serving the diverse people and needs of the region including the area of agriculture, an area on the Campus that has recently been strengthened. In fact, agriculture has truly been at the heart of this thinking given the origins of the UWI from the Imperial College of Tropical Agriculture (ICTA). The Faculty of Agriculture

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³ Caribbean Agricultural Research and Development Institute  
⁴ University of the West Indies  
⁵ University of Trinidad and Tobago  
⁶ Eastern Caribbean Institute of Agriculture and Forestry  
⁷ Caribbean Industrial Research Institute  
⁸ Sugarcane Feed Centre
opened its doors in October 1960 to 67 students, 39 undergraduates in the new BSc Agriculture programme, and 28 postgraduates inherited from the ICTA (Brereton 2011).

As early as 1962 when the UWI became independent of the ICTA, the Faculty of Agriculture began a process of specialisation in the teaching and discipline of agricultural studies that was aimed at better equipping future professionals for the highly technical and specific demands of fields such as crop and animal production and farm management. But with the declining fortunes of agriculture in the region, in 1996, the UWI Administration decided to combine the Faculty of Agriculture and the Faculty of Natural Sciences in a single Faculty, the Faculty of Science and Agriculture. The institutional arrangement did not find favour with all, especially the members of the Faculty of Agriculture and the agricultural stakeholder community in the Caribbean. In fact, there were those who were of the view that the Faculty of agriculture would eventually disappear from the University structure and consequently, teaching and research in agriculture were at risk (Brathwaite 2011).

Within the past five years there were intensive discussions both within and outside of the University on the matter of the re-creation of a Faculty of Agriculture, bearing in mind the new realities and imperatives for food and nutrition security. In 2011, it was proposed to the Council of the UWI that a Faculty of Food and Agriculture be established so that the University can play its leadership role in the region and assist its member states in addressing critical development issues such as food security, climate change, poverty, and rural development. I am pleased to say that this was approved and on August 1st 2012 a new Faculty of Food and Agriculture at St Augustine was born; one which we hope will recapture the identity of this discipline within the UWI. In parallel a new Faculty of Science and Technology was established to pursue leading edge teaching and research in this area.

The Research programme of the School must be driven by the needs of the agricultural sector in the region and must be coordinated with the programmes of the Ministries of Agriculture, the Caribbean Agricultural Research and Development Institute (CARDI), IICA and FAO, and other entities involved in Agricultural Research and Development in Trinidad and Tobago and the region. This will be an area of immediate focus as we attempt to meet the needs of our stakeholders. The key areas of focus of the Faculty will therefore be in the areas of teaching, training, research, extension and outreach services. Table 1 provides a breakdown of student enrolment for programs offered by the Department of Food Production while Table 2 shows the programs offered by the Department of Agricultural Economics and Extension.

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<th>Table 1: Current and Projected Enrolment in Programmes offered by the Department of Food Production</th>
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### Programmes

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Source: Compiled by Author from information from the Faculty of Food and Agriculture, UWI 2013

### Table 2: Enrolment in Programmes Offered by the Department of Agricultural Economics and Extension

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<tr>
<td>Postgraduate (MPhil, MSc, PhD)</td>
<td>20</td>
<td>47</td>
<td>45</td>
<td>61</td>
<td>59</td>
<td>51</td>
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<tr>
<td><strong>Total</strong></td>
<td>334</td>
<td>543</td>
<td>707</td>
<td>687</td>
<td>549</td>
<td>671</td>
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</tbody>
</table>

Source: Compiled by Author from information from the Faculty of Food and Agriculture, UWI 2013

The popularity of programs in environmental and natural resource management, geography, and agri-business management reflect a wider appreciation of agriculture by young people today in the context of the natural environment and the value added imperatives of agri-business/entrepreneurial growth.

The existing BSc Agriculture program has just been revised to address stakeholder concerns. One major concern has been that although students liked the practical aspects of their courses, they expressed their dissatisfaction with the fact that there is generally too little time allocated to practicals and field activities. For them, the lack of hands on approach was something that must
be dealt with. Agriculture alumni also felt that the practical aspects of their respective programs were not well developed and so considered this a major short coming of the program. In calling for improvements, the need for more practicals than theory was therefore emphasised.

Further, a new two year undergraduate Diploma has just been developed with two main objectives in mind:

a) Produce Diploma level graduates to meet the manpower demand for entry level technical positions in the food and agriculture chain throughout the region, or being farmers or entrepreneurs.

b) Prepare students with CSEC qualifications and keen interest in pursuing professional level training in Agriculture to matriculate for degree level admission, with a sound practical training and a solid background of agricultural sciences.

The initial aim is to offer the Diploma face-to-face in various sites through collaboration/partnership with relevant regional TLIs. The arrangements for delivery regionally need to be worked out between the UWI and the TLIs and we are committed to this.

Today, tertiary level programs are offered in eight CARICOM countries and by nine institutions:

1. The Samuel Jackman Prescod Polytechnic (SJPP) – Barbados
2. The University of Belize - Belize
3. The Dominica State College (DSC) – Dominica
4. The University of Guyana (UofG)– Guyana
5. The American University of the Caribbean (AUC) - Haiti
6. The College of Agriculture Science and Education (CASE) – Jamaica
7. The Eastern Caribbean Institute for Agriculture and Forestry (ECIAF), UWI and University of Trinidad and Tobago (UTT) - Trinidad and Tobago
8. The Anton de Kom University of Suriname (AdKU)- Suriname

These institutions focus on agriculture studies (typically agronomy and animal husbandry) at the undergraduate level, with the UWI offering the most diverse set of programs at the certificate, undergraduate and graduate levels. These include: Agronomy, Agribusiness Management, Nutrition and Dietetics, Agriculture Food Safety and Quality Assurance, Tropical Agriculture, Livestock Production, Crop Protection, Crop Science, Horticulture, Nutritional Sciences, and Foods and Foodservice Systems Management. We stand ready to work with the other TLIs in the region to create synergies and articulation.
Table 3: Summary of Tertiary Agriculture Programs offered in CARICOM Member States

<table>
<thead>
<tr>
<th>Diploma and Associate Degree - Level</th>
<th>Undergraduate</th>
<th>Postgraduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJPP-Bds Tech. &amp; Vocational Training</td>
<td>UAC BSc. Agriculture</td>
<td></td>
</tr>
<tr>
<td>Cert. = 2</td>
<td>Minors = 3 Majors = 7 BSc. = 4</td>
<td>PG Dip. = 2 MSc. = 7 MPhil. = 10 PhD = 10</td>
</tr>
<tr>
<td>Dip. = 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASE-Jam ASc. General Agriculture B.Tech Agriculture Production &amp; Food Systems Management Dip. Agriculture</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>AdKU-Sur BSc. Agricultural Production</td>
<td></td>
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</tbody>
</table>

Source: Author’s compilation 2013

These programs reside in the Faculty of Engineering at UWI and significantly enhance the complementary skills base of trained professionals for food, agriculture and the environment.

I applaud the work of the Departments of Food Production and Agricultural Economics and Extension which have traditionally been the UWI’s foremost engagers of stakeholders in the agriculture community of the Region. But let me also say that despite our successes or failures as it relates to agricultural education, there remains a lot to be done. I say this because there is a daunting reality given the importance of agriculture. We must therefore ask ourselves – why is there a declining interest in agriculture, specifically among our youths? Is it because they cannot find jobs? Is it because they are not compensated well after they have completed their

9 A detailed list of these options is given in Appendix I.
education? And more so, where do our graduates go after completing their education in agriculture?

A series of tracer surveys done by the UWI from 2007 - 2012 offer some insights into the employability, career prospects and outlook for agriculture disciplines which helps to elucidate this pattern. Agriculture graduates were amongst the most populous in those graduates who remained unemployed at least one year after completing their degree (Figure 10).

![Figure 10: Unemployment Rates by Faculty – 2009](source: UWI St. Augustine, Campus Office of Planning and Institutional Research 2013)

According to our 2009 tracer survey of first degree graduates we realize that in agriculture there are high unemployment rates (21%) and secondly, we also realized that graduates from agriculture are among those with the lowest paying jobs. On average, graduates in agriculture earn salaries of just over TT$5,250 per month (Figure 11).

![Figure 11: Monthly Median Salaries by Faculty/School (TT$): 2009](source: UWI St. Augustine, Campus Office of Planning and Institutional Research 2013)
Only 27% of agriculture graduates were employed in the agricultural sector. Others were employed across sectors, mainly education (22%), health (15%) and financial (10%) – this is not necessarily a negative. Quite noticeable is the fact that a number of graduates in this area were employed in positions in which they appeared to be overqualified. Further, a significant number of graduates from agriculture indicated that they were currently employed in jobs unrelated to their degree discipline.

Notwithstanding the fact that these findings must be rationalised against traits of graduates, labour market saturation and the rate at which new jobs are being created in the agriculture sector; there is clearly a loss of youth involvement in agriculture.

**Agriculture and Youth**

I wish once again to evoke the wisdom of Sir Arthur who was of the view that if agriculture was not transformed, then there was little chance of attracting the bright young people that it would require (Figueroa 2009). In order to limit the rural-urban drift and to get youths, especially in the rural communities interested in agriculture, Lewis opined that “expansion of rural education and the modernisation of agriculture should march in step” (Lewis 1966 115-130)

At the conference in China I spoke about, the matter of ageing populations engaged in agriculture was a consistent theme, as all regions were facing this dilemma. This will be a major impediment to the development of this sector and must be addressed.

In the Caribbean there is concern over the rural-urban drift accelerated by income disparity and producing a fall in employment, wages and productivity in rural areas as skilled workers move to higher-earning, urban opportunities. The resulting high unemployment and low-wage employment in urban areas is often a major contributor to crime, highly intensive use of utilities and energy, and increased sensitivity to food and nutrition insecurity.

Employment and value creation in rural communities through integrated agriculture and value creation can make meaningful contributions to changing this present scenario. An education is essential – in fact, in a recent statement, the education adviser of the Organisation for Economic Cooperation and Development (OECD) noted that the poorly educated will be those paying the highest price in the present economic down-turn. Agriculture can be the critical medium for the use of education and knowledge to produce food, sustainable livelihoods and opportunities for enterprise.

Ladies and gentlemen, youth involvement in agriculture is essential to sustainability but often treated as an option of last resort where all else has failed. This thinking must change! Agriculture should not be what they do because they cannot find anything better; it should be something that they do because they are motivated and trained and there is commensurate reward. It is morally wrong of us to advise the youth to stake their livelihoods, careers and potential in something that we ourselves do not think is worth the investment. If we can build agricultural communities that create added value from food production (crop, livestock, fish) where technology is developed and utilised and the use of manual labour reduced, where their communities are adequately serviced (transportation, utilities, health care, education, markets and commerce, entertainment etc.), then the rural/urban drift will be stymied and youth engagement in such communities is likely to succeed. Couple this with the early training of young people in agricultural practices at our schools, primary and secondary, technical knowledge or the knowledge and practical skills of agriculture with business management/entrepreneurial/communication skills, we may succeed. But this will not be possible without young people wanting to practice agriculture having no access to land, markets, and financial support.
Options to involve Youth in Agriculture

As a priority, there is a need for the engagement of students at our primary and secondary schools in agriculture, food production and marketing practices, with an emphasis on developing the skills, love and passion for the subject. Then at the tertiary level programme, improvement in the depth, breadth and modalities of the education, learning, and training in agriculture programmes, to meet future opportunities.

Improving the Value Proposition of Agriculture through Praxis Learning

Firstly, changes in the way students are prepared with knowledge and skills to meet the demands of careers as competent practitioners are needed. Let me say here my own perspective has been that over the years at our universities, there has been a big focus on graduates as employees, sourcing jobs in government and extension services, in state enterprises, and in other areas of agribusiness in the private sector. Expectations have risen in graduates that this is the call. And that is good, but not enough; but what about graduates as practicing agriculturalists/ professional farmers? The Faculty of Law produces Lawyers; The Faculty of Medical Sciences, produces Doctors; the Faculty of Engineering produces Engineers. But what about the Faculty of Agriculture? Is this Faculty producing enough farmers/ entrepreneurs? I am sorry to be so blunt, but I do feel our Institutions need to rethink what outputs are being created and the knowledge, skills and awareness contained.

Programmes in agriculture should produce agriculturalists with core competence in the business of farming and with knowledge to advance their skills in tertiary programmes, if so desired. This is something that the Caribbean must carefully consider in making a case for human resource development in agriculture and with learning institutions playing their part in preparing students to create value.

Agriculture has a very distinct advantage over the myriad and increasing number of alternative courses of study available to students; up to the early tertiary level it should be heavily praxis-oriented learning, focussed around the practical application of knowledge which must be contextualised based on the situations of application rather than simply the substance of learning. This is perhaps best seen in the dual education system of Germany that combines practical and theoretical education. In this model, apprenticeships in a company and vocational education are combined to maximize the quality of learning and the employability of the graduate at completion of studies. There are distinct benefits to the student who gains both experience and income while learning at a task that properly matches his/her skill and knowledge level. In the process, the student is given real opportunity to evaluate both the programme of engagement and its career prospects so to be sure that this is truly in line with his/her expectations.

This alone can have a significant impact on academic and job performance. There are also noted benefits to the employers from this practice including access to well-trained employees who are already familiar with the requisite tasks and business model. This allows a reduction in the learning lag, typically associated with a new employee who becomes fully productive much later. But this will not be possible without the engagement of employers. And let me say this is not only the business of Governments/ Ministries of Agriculture, but the private sector as well. They need to invest significantly in agri-business enterprises to begin with and use this internship model to develop skilled employees for future success. In the field of Engineering, this model has been a great winner, and graduates have has always been high in praise for the internships offered in our sugar companies, for example – now a lost opportunity.
The Agriculture Professional Development Programme (APDP) launched in 2011 by the Ministry of Food Production in Trinidad and Tobago, to which the UWI subscribed fully and with enthusiasm, is a good example of an initiative to breach this gap. The programme offered 50 graduates an opportunity to partner with and learn from farmers, researchers, entrepreneurs and other professionals in the agriculture community over the course of one year as a means of gaining practical knowledge and skills for entrepreneurship and employability. In their recent graduation ceremony, held last week on Wednesday June 26th 2013, several graduates from the programme noted the positive change in their outlook on agriculture, as well as their sense of empowerment to be agripreneurs.

For the UWI and other learning institutions in the Caribbean, this approach is an opportunity for the youth to be more fundamentally educated in the realities of their discipline and to make connections with the stakeholders both within and outside of the agriculture sector with whom they will have to work. The old way of education, based upon theory and laboratories, in classrooms, will not succeed. We will produce the same results, unfulfilled graduates who can add little value to agricultural production. The laboratory and the classroom must also be on the farms. This is not to say we must not develop a strong cadre of scientists/economists who will create new knowledge and solutions to our challenges in agriculture, Masters and PhD graduates, but they too ought to be focussed on problem solving and impact. But a programme of study alone will not suffice. We must summon the will to create an appropriate environment for our graduates to enter – land, markets, finance, technical support, mentorship and continuous professional development. Agriculture and its variants must be noble and rewarding professions. No less.

**Building Partnerships between Agriculture and Education**

Agriculture is an integrator. So too is education given its far-reaching impacts on all facets of society. I see a truly valuable opportunity to create synergies between the two. Most recently we have seen a growing appreciation for the role of agriculture and education to food and nutrition security. I wish to emphasize nutrition within food and nutrition security as it is often lost in our eagerness to address complex issues of food availability and escalating food prices. Lifestyle choices, health and wellness issues are key priorities of today and education institutions have a meaningful role to play in enriching the learning experience of students through courses of study and supporting evidence-based policy formulation through research. The UWI is doing its part here and young people are getting engaged – programs in Food Safety, Nutrition, Dietetics, Public Health etc.

The Regional Food and Nutrition Security Policy (RFNSP) recognises that this kind of holistic approach to agriculture planning and development is needed in the region but often lacking. It states, “interface between agriculture, health, nutrition and education, etc. have been largely neglected because the institutional framework and mechanisms for dealing with such multi-sector issues did not exist”. It is clear then that we need greater integration in the strategic thinking and operationalization of actions amongst institutions working on Food and Nutrition Security (FNS) to immediately alleviate this.

The RFNSP (2010) also sees a role for education in promoting information on optimum diets and nutrition so that consumers can make informed decisions. Therein are also avenues for agriculture students to create value through careers in agricultural communication and information products. These have a ready consumer base in agricultural researchers, policy makers, planners and the health-conscious public. There are also more practical avenues for engagement of young professionals in the food nutrition education component of the many school feeding programmes in the Caribbean – many of which are already fully supported by the Ministries of Education and Agriculture and by our graduates.
Mentorship of Youth in Agriculture and Supporting Youth Involvement

The practice of mentoring is noted as being truly functional in the positive and rapid development of youths (Michigan State 4-H 2013) as well as more efficiently producing relevant know-how and savvy to capitalize on available opportunities in agriculture (YPARD 2011). In this way, mentoring directly correlates to supporting youth entrepreneurship and self-reliance. The 4-H Club in Jamaica has made significant efforts to represent and support young farmers/business owners, while the same in Trinidad and Tobago has actively used back-yard gardening and agricultural studies in its summer and youth mentorship programmes. We need to lend support to such programmes, the Youth Apprenticeship programme in Agriculture in Trinidad and Tobago (YAPA), the St Lucia Agriculture Forum for Youth (SLAFY), and the Kuru Kuru Cooperative College Programmes in Guyana for example. They can help to develop the possibilities and passion for careers in agriculture. Young people in urban environments recognising the challenges of such, may be attracted to a different lifestyle. But access to land, finance and support will become necessary.

Recognising and communicating successes in agriculture to the youth is an imperative. In many cases, youth are completely unaware of the scope and potential for societal contribution, volunteerism and wealth-creation in agriculture. A study conducted by King (2006) found that this was and will continue to be an important avenue for reaching young people and encouraging their involvement/engagement in agriculture, as well as demonstrating new areas where their talents can be utilised to support the sector.

Consequently, there has been an increase in the use of print, electronic media and electronic information systems to accelerate the rates of learning, innovation and human resource development which depend on access to information and knowledge. Youths today respond more to interactive social media. We need to use these new communication technologies (such as Facebook, Twitter, YouTube) to engage our young people in social, political and economic activities, including agriculture, in their respective countries. One example of this is the Agriculture Media Awards jointly hosted by the CARDI and the Inter-American Institute for Cooperation on Agriculture (IICA), started in 2010, which encourages youth submissions to the award competition and also uses it as a vehicle to promote more inclusive youth involvement in agriculture through media. Use of new media to sensitise, promote, communicate and disseminate information about agriculture and the critical need for youth to engage in its development process in the Caribbean is something that should be avidly supported. This is important to showcasing the success stories of agriculture to our youth.

Agriculture and Political Leadership

Agriculture and the perceptions of it can’t be improved, unless or until there is leadership and in particular, political will to actualize this change. Agricultural policies are very necessary instruments for development, but they are what they are – directions for action. What we need more than ever before in this Region is the willingness to act, to get the things done, and this requires strong leadership.

And the question of leadership certainly received a great deal of attention from Beckford. From his scholarly writings it is apparent that he felt that any plan for agricultural development needed “dynamic leadership”. Beckford noted in his path breaking publication, “Persistent Poverty” (1972) that,

“Our study of plantation economy and society suggests that underdevelopment derives from the institutional environment – the nature of political organizations” (Beckford 1972, v)
But let me also invoke here the name of a contemporary regional statesman who has contributed to the development of agriculture in the Caribbean region, the former President of Guyana, Bharrat Jagdeo. He noted,

“We simply can’t move the sector forward unless there is the political will to do so in the country; and the political will has to express itself in policies, incentives and specific budgetary allocations to tackle important issues like drainage and irrigation, research and development”10.

In conclusion at the present cross-roads, CARICOM countries, cognizant of the vulnerability of livelihoods and incomes in a volatile economic environment, should reassess the role of agriculture in development and take action to secure and sustain the welfare of their citizens – central to this being the right to safe, wholesome and nutritious food.

It is commonly known that energy is presently Trinidad and Tobago’s mainstay. In 2010 the United States imported 190 billion cubic feet (bcf) of gas from the country. This represented 44% of the LNG imported by the US for that year, and makes Trinidad and Tobago the largest exporter of LNG to the US. In fact, over the last ten years Trinidad and Tobago has consistently been the number one supplier of LNG to the US, with a supply of as much as 75% of US LNG in 2008.11 As positive as this may seem, Trinidad and Tobago must look very carefully and thoughtfully at its development strategy in the context of the future of the energy industry. According to a recent article of The Economist, “Shale Gas – an unconventional source of methane, like coal-bed gas has rapidly transformed America’s energy outlook and this will transform the USA into energy self-sufficiency by 2030. Other countries are also beginning to exploit this new energy availability. Other alternative energy technologies, bio-fuels for example, are also gaining momentum in their production and usage.

What does this mean for Trinidad and Tobago in the future? If substantial earnings are lost from falling prices or falling energy production, or if there are catastrophic climate events, how will the country sustain itself? It is in this global context that we must ensure that the local food and agricultural sector is developed and integrated in the economic/social/cultural space, in all of the Caribbean.

References


Brathwaite, C. 2010. “Renewing the University of the West Indies: Leadership Role in Agricultural Education in the Caribbean.” The UWI St. Augustine.

Brathwaite, C. 2011. “A Proposal for the Establishment of a Faculty of Food and Agriculture at the University of the West Indies (UWI), St. Augustine.” A Presentation to Academic Board, The UWI St Augustine.

Brereton, B. 2011. From Imperial College to University of the West Indies: A History of the St Augustine Campus, Trinidad and Tobago. Kingston, Jamaica: Ian Randle

CaRAPN. 2013. CIPO: “Farming Change – Growing more Food with a Changing Resource Base.” Available at http://www.pn4ad.org/docs-a-products/finish/3-critical-issues-

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10 “President Jagdeo to advocate further assistance for Region’s agriculture sector – at FAO World Food Summit in Rome”, Friday 13th November 2009.

11 Adapted from the Address by His Excellency Dr Neil Parsan, Ambassador and Permanent Representative to the Organization of American States, at the 7th OAS Private Sector Forum - June 2-3, 2011


UN Comtrade Database. 2013. Available at http://comtrade.un.org/


World Bank. 2012. “Food Import Dependence (Food Imports as a % of Merchandise Imports).” Available at http://data.worldbank.org/indicator/TM.VAL.FOOD.ZS.UN


## Appendix I

Tertiary-level Programmes in Agriculture offered by the UWI, St. Augustine

<table>
<thead>
<tr>
<th>Certificate, Diploma and Associate Degree - Level</th>
<th>Undergraduate</th>
<th>Postgraduate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certificate</strong></td>
<td>BSc</td>
<td>MSc</td>
</tr>
<tr>
<td>1. Diploma in Agricultural Extension</td>
<td>BSc Agribusiness Management</td>
<td>1. MSc Agricultural Economics</td>
</tr>
<tr>
<td>2. Diploma in Institutional and Community Dietetics and Nutrition</td>
<td>BSc Human Ecology (comprised of the major in Family and Consumer Sciences AND the major in Nutritional Sciences OR the major in Foods and Foodservice Systems Management)</td>
<td>2. MSc Marketing and Agribusiness</td>
</tr>
<tr>
<td></td>
<td>BSc Human Nutrition and Dietetics</td>
<td>3. MSc Agric-Food Safety and Quality Assurance</td>
</tr>
<tr>
<td></td>
<td>BSc General Agriculture</td>
<td>4. MSc Crop Protection</td>
</tr>
<tr>
<td><strong>Majors</strong></td>
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</tr>
<tr>
<td>1. Major in Agricultural Science</td>
<td>MPhil Agricultural Extension</td>
<td></td>
</tr>
<tr>
<td>2. Major in Tropical Landscaping</td>
<td>MPhil Agricultural Economics</td>
<td></td>
</tr>
<tr>
<td>3. Major in Agribusiness</td>
<td>MPhil Human Ecology</td>
<td></td>
</tr>
<tr>
<td>4. Major in Family and Consumer Sciences</td>
<td>MPhil Crop Science</td>
<td></td>
</tr>
<tr>
<td>5. Major in Foods and Foodservice Systems Management</td>
<td>MPhil Earth &amp; Environmental Science</td>
<td></td>
</tr>
<tr>
<td>6. Major in Nutritional Sciences</td>
<td>MPhil Food Quality &amp; Safety</td>
<td></td>
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<tr>
<td><strong>Minors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Minor in Communication and Extension</td>
<td>PhD Agricultural Economics</td>
<td></td>
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<tr>
<td>2. Minor in Entrepreneurship</td>
<td>PhD Agricultural Extension</td>
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<tr>
<td></td>
<td>PhD Crop Science</td>
<td></td>
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<tr>
<td></td>
<td>PhD Earth and Environmental Science</td>
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<td></td>
<td>PhD Food Quality &amp; Safety</td>
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<td>PhD Horticulture</td>
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<td></td>
<td>PhD Livestock Science</td>
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<td>PhD Soil Science</td>
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<td></td>
<td>PhD Geography</td>
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<tr>
<td><strong>PG Diploma</strong></td>
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<tr>
<td>1. Agricultural and Rural Development</td>
<td>Agricultural and Rural Development</td>
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<tr>
<td>2. Agri-Food Safety and Quality Assurance</td>
<td>Agri-Food Safety and Quality Assurance</td>
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