

National Agricultural
Conference 2009/
28th West Indies Agricultural
Economics Conference

PROGRAMME, ABSTRACTS AND
POSTER PRESENTATIONS

**Barbados National Agricultural Conference
and
Caribbean Agro-Economic Society Conference**

**Programme &
Abstracts 2009**

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**2009 Barbados National Agricultural Conference/
28th West Indies Agricultural Economics Conference**

Monday 6th July (Lloyd Erskine Sandiford Centre)

8:30 am – 4:30 pm CAES Registration

8.45 am – 9:00am BNAC Registration

Opening Session

**Chairperson: Charleston Lucas,
National Agricultural Conference Committee Chairman**

9.00 am – 9:05am National Anthem

9.05 am – 9:10am Welcome - ***Mr. Barton Clarke, Chief Agricultural Officer,*** Ministry of Agriculture, Barbados

9.10 am – 9:20am Remarks - ***Dr. Carlisle Pemberton,*** CAES President

9.20 am – 9:30am Special Address - **Representative** of Caribbean Development Bank

9.30 am – 9:45am Special Address - ***Dr. Chelston Brathwaite,*** Director General, IICA

9.45 am – 10:05 am Feature Address - ***Sen. Honourable Haynesley Benn,*** Minister of Agriculture, Barbados

10.05 am – 10:30am Break

10.30 am – 12:00 pm Technical Feature Presentation - ***Dr. Leonard O'Garro***

12.00 pm – 1:30pm Lunch

Technical Sessions (Lloyd Erskine Sandiford Centre)

Monday 6th July 2009

Moderator:
Michael Hunte

- 1.30 pm – 2:00 pm **Technical Efficiency in the Agricultural Sectors of Selected CARICOM Countries.** C. Ligeon (Associate Professor, School of Business, Auburn University, Montgomery)
- 2.00 pm – 2:30 pm **Food Security Initiatives in the Tourism Sector.** E. Harvey (Hemispheric Specialist for Agrotourism, IICA0)
- 2.30 pm – 3:00 pm **Agritourism: A Modern Development in Caribbean Agriculture.** E. Hepburn (Graduate Research Assistant, Policy Studies, Strom Thurmond Institute Government & Public Affairs)
- 3:00pm – 3:30 pm **The Impact of Trade Liberalisation on the Food Security Prospects of Barbados.** Dwayne Nurse (Agricultural Planning Unit, Ministry of Agriculture, Barbados)
- 3:30pm – 4:00 pm **Agricultural Development and Food Security: The Way Out of Crisis.** D. Lewis-Ambrose (H. Lavity Stoutt Community College, Tortola, The British Virgin Islands)
- 4:00pm* ***Closing***
- 7:00 pm* ***Cocktail and Cultural Programme (Savannah Hotel)***

Tuesday 7th July 2009 (Lloyd Erskine Sandiford Centre)

Moderator:
Lennox Chandler

- 9:00 am – 9:30 am **Evaluation of CARDI 2008 Hot Pepper (*Capsicum chinense* Jacq.) Improved Selections.** C. Roberts (CARDI Representative, Barbados)

9:30am – 10:00 am **Small Ruminant Development in Barbados -“Should the Sheep Feedlot be Re-Established?”** P. Francis (CARDI, Barbados)

**Moderator:
Hesdie Grauwde**

10:00am – 10:30 am **Experience with High Fibre Cane 2003-2008.** H. De Boer (Agronomy Research and Variety Testing Unit, Barbados Agricultural Management Company Ltd, Groves, St. George)

10:30am – 10:45 am Break

10.45am – 11:15 am **Strategies of Control of The Pink Bollworm (*Pectinophora Gossypiella*) and the Cotton Bollworm (*Heliothis Spp.*) In the Cotton IPM Programme in Barbados.** Y. Coromoto Colmenarez, (CABI Caribbean and Latin America)

11.15am – 11:45 am **Organic Fertility Cabbage Trial.** D. Bynoe, Food Crops Research, (Ministry of Agriculture, Barbados)

**Moderator:
Ralph Farnum**

11.45 am – 12:15 pm **The Influence of High Plant Population Density on The Early Yield of Hot Pepper (*Capsicum Sp.*).** S. Skeete (Food Crops Research Ministry of Agriculture, Barbados)

12.15 pm – 1:15 pm Lunch

1.15 pm – 1:45 pm **The Importance of Pricing Data in Farmers Production and Marketing Decision Making.** M. Marville (Barbados Community College, Barbados)

1.45 pm – 2.15 pm **The Performance of Three Varieties of Parsley (*Petroselinum Crispum*) Grown with Mulch.** A. Phillips (Food Crops Research, Ministry of Agriculture, Barbados)

2.15 pm – 2:45 pm **Economic & Environmental Impact of Increased Organic Production in the United Kingdom.** D. Bynoe (Food Crops Research, Ministry of Agriculture, Barbados)

2.45 pm – 3:15 pm **The Caribbean Drought and Precipitation Monitoring Network: The Barbados Component.** A. Trotman (Caribbean Institute For Meteorology and Hydrology, Barbados)

- 3.15 pm – 3:45 pm **An Evaluation of Four Parsley Varieties Cultivated in a Semi Climate Controlled Tunnel in Barbados.** C. Wiltshire (Food Crops Research, Ministry of Agriculture, Barbados)
- 3.45 pm *Closing*
- 4:15 pm – 6:00 pm **CAES General Meeting (Savannah Hotel)**
- 6:30 pm – 7:30 pm **Manager's Cocktail (Savannah Hotel)**

Poster Presentations

1. **The Yield Performance of Forty Sweet Potato (*Ipomea Batatas*) Cultivars Grown In Barbados.** Stevenson Skeete (Food Crops Research, Ministry of Agriculture, Barbados)
2. **Outbreak of *Salmonella enteritidis* in Layer Birds in Barbados (2009).** Kerrilyn Hunte (Veterinary Services, Ministry of Agriculture, Barbados)

Wednesday 8th July 2009
(Savannah Hotel)

CAES Parallel Session A 1: Marketing and Trade Issues

Moderator:
Edric Harry

- 8:30 am – 9:00 am **Should the United States Eliminate Unilateral Sanctions Prohibiting Food Trade?** Edmund M. Tavernier (Rutgers University)
- 9:00 am – 9:30 am **Import Demand for Fish in Caribbean Common Market (CARICOM) Area.** Giap Nguyen and Curtis M. Jolly (Auburn University, Alabama)
- 9:30 am – 10:00 am **Marketing Issues Facing St Lucian Fishers.** Allena Joseph (Ministry of Agriculture, Land, Forestry and Fisheries, St Lucia)
- 10:00 am – 10:30 am **Nonlinearity and Asymmetric Vertical Transmission in U.S. Fresh Vegetable Prices.** Edmund M. Tavernier, Benjamin M. Onyango, Ferdaus Hossain (Rutgers University)

10:30 am – 11:00 am Break

CAES Parallel Session A 1: Marketing and Trade Issues (Continued)

Moderator:
Sharon Hutchinson

- 11:00 am – 11:30 am **A Three-Legged-Stool Model for Agricultural Policy Formulation in CARICOM Countries.** Ronald Gordon (University of Florida, Gainesville)
- 11:30 am – 12:00 pm **Global Change and Caribbean bananas: a comparison of the St Lucia and Jamaica experiences over the last ten years.** Chanelle Fingall and David Barker (The University of the West Indies, Mona)
- 12:00 pm – 12:30 pm **The Cuban Embargo and Southeastern Agricultural Export Markets.** Cassandra Copeland (Oglethorpe University) and Henry Thompson (Auburn University)

12:30 pm-1:30 pm Lunch

CAES Parallel Session A 1: Marketing and Trade Issues (Continued)

Moderator:
Edmund M. Tavernier

- 1:30 pm – 2:00 pm **International Trade and Food Safety. Are we ready?** Ganesh Gangapersad and Elbert Johnson (The National Agricultural Marketing Development Corporation, Trinidad and Tobago)
- 2:00 pm – 2:30 pm **Pre and Post-Accession Performance to the WTO: The Caribbean Benchmarked to the USA.** Govind Seepersad, Nkosi Felix, Omardath Maharaj (The University of the West Indies, St Augustine)

CAES Parallel Session A 2: Agribusiness Issues

Moderator:
Hesdie Grauwde

- 2:30 pm – 3:00 pm **The Banana Industry, the Agricultural Sector and the Dominican Economy: Impacts of the Banana War.** Emaline Harris-Charles (Dominica Agricultural and Industrial Development Bank)
- 3:00 pm – 3:30 pm Break**

CAES Parallel Session A 2: Agribusiness Issues (Continued)

Moderator:
Hesdie Grauwde

- 3:30 pm – 4:00 pm **Sustainability in the Tourism Sector: Assessing Ecotourist's Willingness to pay for Ecotourism Offerings in Trinidad and Tobago.** Jeanelle Joseph, Doolarie Singh-Knights (The University of the West Indies, St Augustine) and Dennis Smith (West Virginia University)
- 4:00 pm – 4:30 pm **Assessing the Role for Payments for Environmental Services within the Fond D'or Watershed, St Lucia.** Dennis Pantin and Donna Ramjattan (The University of the West Indies, St Augustine)

CAES Parallel Session B 1: Economics of Food Crop Production

**Moderator:
Bruce Lauckner**

- 8:30 am -9:00 am **Economic Impact of Different Infestation Levels of Coffee Berry Borer (*Hypothenemus hampei*) in Puerto Rico.** Carmen Alamo, Eric Belasco (Texas Tech University) and Carlos Flores (University of Puerto Rico)
- 9:00 am – 9:30 am **The Potential Economic Impact of Dwarfing Tall Golden Apple (*Spondias cytherea* Sonn.) in Grenada.** Reginald P Andall (CARDI, Grenada)
- 9:30 am – 10:00 am **Factors Affecting the Relative Competitiveness of Cassava Production in Southwestern Trinidad.** Hazel Patterson-Andrews and Carlisle Pemberton (The University of the West Indies, St Augustine)

CAES Parallel Session B 2: Food Prices and Food Security Issues

**Moderator:
Bernard Yankey**

- 10:00 am – 10:30 am **Factors Influencing Nutritional Status Among Low Income Elderly.** Isabella Granderson (The University of the West Indies, St Augustine)

10:30 am – 11:00 am Break

CAES Parallel Session B 2: Food Prices and Food Security Issues (Continued)

**Moderator:
Bernard Yankey**

- 11:00 am – 11:30 am **The effects of Net Food Imports on Obesity in Selected Latin American and Caribbean Countries.** Curtis M. Jolly (Auburn University), Pauline E. Jolly (University of Alabama, Birmingham), E. Namugabo (Auburn University), G. Nyguyen (Auburn University) and N. Diawara (Old Dominion University) and F. Ovalle (University of Alabama, Birmingham)

11:30 am – 12:00 pm **Estimating Demand for Fish in St Vincent and the Grenadines for Consumers and Fishers-Implication for Food Security.** Cheryl Jardine-Jackson (Ministry of Agriculture, Forestry and Fisheries, St Vincent)

12:00 pm – 12:30 pm **Promoting Food Security through Increased Production and Productivity of Selected Vegetables (under protected agriculture) and Root Crops.** Maurice Wilson (CARDI, Trinidad)

12:30 pm – 1:30 pm Lunch

CAES Parallel Session B2: Food Prices and Food Security Issues (continued)

**Moderator:
Curtis Jolly**

1:30 pm – 2:00 pm **Food Prices and Food Security in CARICOM Region: Assessing Impacts to Inform Policy Responses.** Mesfin Bezuneh and Zelealem Yiheyis (Clark Atlanta University)

2:00 pm – 2:30 pm **Food Prices and the Issues of Food Security in the CARICOM.** Aziz Mohammed and Elbert Johnson (The National Agricultural Marketing Development Corporation, Trinidad and Tobago)

2:30 pm – 3:00 pm **Improving Local Food Supply Chains for the Tourism Sector in the U.S. Virgin Islands.** Eric Wailes (University of Arkansas), Stafford Crossman Carlos Robles (University of Virgin Islands), Louis Peterson (Government of U.S. Virgin Islands) and Francis Mwaijande (University of Arkansas),

3:00 pm – 3:30 pm Break

CAES Parallel Session B2: Food Prices and Food Security Issues (continued)

**Moderator:
Mesfin Bezuneh**

3:30 pm – 4:00 pm **Retail Margins, Price Transmission and Price Asymmetry in Selected Agricultural Commodities in Trinidad and Tobago: Investigating the Causes of Increasing Food Prices.** Asisha Patterson, Doolarie Singh-Knights (The University of the West Indies, St Augustine) and Marlon Knights (The University of Trinidad and Tobago)

4:00 pm – 4:30 pm **Contribution of Agriculture to GDP in Antigua and Barbuda-Returns to Government Expenditure in the Agricultural Sector.** Jennifer Maynard (Ministry of Agriculture, Lands, Housing and the Environment, Antigua and Barbuda)

7:00 pm – 9:30 pm *CAES Banquet and Lewis/Beckford Memorial Lecture*
Prof Neville Duncan, Director, Sir Arthur Lewis Institute for Social and Economic Studies (SALISES), University of the West Indies, Mona Campus, Jamaica

Thursday 9th July 2009

Field Trip (Details to be Provided)

Friday 10th July 2009 (Savannah Hotel)

**Moderator:
Carlton Davis**

**Special Session on the Contribution of UWI,
Faculty of Science and Agriculture, to Agricultural Development in the Region**

9:00 am – 9:30 am Address by Pro-Vice Chancellor and Principal of St Augustine Campus, UWI, Prof Clement Sankat

9:30 am – 10:00 am Panel Discussion

10:00 am – 10:30 am Break

Parallel Session C 1: Food Safety Issues

**Moderator:
Hazel Patterson-Andrews**

10:30 am – 11:00 am **Depth Based Discriminant Analysis: A Case Study of Food Safety Issues of Caribbean Imports.** Asheber Abebe (Auburn University, Alabama)

11:00 am – 11:30 am **Melamine Food Recall: Effects on Animal/Human Health, Food Control and Implications on Regional and International Economic Trade.** Neela Badrie (The University of the West Indies, St Augustine), Curtis Jolly (Auburn University, Alabama), Sonia Y. De Leon and Israel de la Cruz (Foundation for the Advancement of Food Science and Technology, Manila)

11:30 am–12:00pm **Factors Associated with Acute Pesticide Poisoning Among Farmers in Northwestern Jamaica.** Pauline Jolly, N. Ncube, Patricia Bessler, (University of Alabama at Birmingham) Christopher Fogo, (Ministry of Health, Jamaica) and Curtis M Jolly, (Auburn University)

12:00 pm – 1:00 pm Lunch

Parallel Session C 2: Rural Development Issues

**Moderator:
Pauline Jolly**

1:00 pm – 1:30 pm **Belize Rural Development Project - Achievements, Lessons and Future Challenges for Rural Development in Belize.** Marcelino Avila (Belize Rural Development Programme).

1:30 pm -2:00 pm **The Nevis Model.** Eric Evelyn (Ministry of Agriculture, Nevis)

2:00 pm – 2:30 pm **The value and impact of extension services on farmer productivity.** Derrick Deslandes (The University of the West Indies, Mona, Jamaica)

2:30 pm – 3:00 pm **PRODEV Presentation.** Donnay Robert Viaud (PRODEV, Haiti)

Parallel Session D: Modern Development in Caribbean Agriculture

**Moderator:
Curtis Jolly**

10:30 am – 11:00 am **Rethinking the Role of the Agricultural Sector for the Economic Development of Barbados. “The Challenges of the 21st Century”.** Rommell Hippolyte (Ministry of Agriculture, Barbados)

11:00 am – 11:30 am **The Uses of Information and Communication Technologies (ICT’s) in Extension for the Modernization of Caribbean Agriculture.** Wayne G Ganpat (Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago), Sarojini Ragbir (The University of the West Indies, St Augustine) and Claudette de Freitas (CARDI, St Augustine)

11:30 am –12:00 pm **Applications of GIS and GPS Technology for Extension in the Caribbean: Identifying Sustainable Practices in Trinidad and Grenada.** Edwin Joseph (Grand Valley State University, Michigan)

12:00 pm – 1:00 pm Lunch

1:00 pm – 1:30 pm **Assessing Agriculture Practices in the Livestock Industry: A Base for Establishing Internationally Accepted Good Agricultural Practices in the Livestock Industry of Antigua and Barbuda.** Dookarie Singh-Knights (The University of the West Indies, St Augustine), Marlon Knights (The University of Trinidad and Tobago), Sereno Benjamin and Astley Joseph (Ministry of Agriculture, Antigua and Barbuda) and Carlton Sambury (The University of the West Indies, St Augustine)

1:30 pm – 2:00 pm **Farmer Participatory Approaches for Sustainable Agricultural Development: The Trinidad and Tobago Experience.** Deanne V. Ramroop (Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago) and Sarojini Ragbir (The University of the West Indies, St Augustine)

2:00 pm – 2:30 pm **Presentation by Augustine Merchant (IICA, St Kitts)**

2: 30 pm –3:00 pm **The National Agricultural Market Information System of Trinidad and Tobago (NAMIS), as a Stimulus for Development of Regional Agri-Food Production and Trade.** Prakash Ragbir, Avenish Ali and Elbert Johnson (The National Agricultural Marketing Development Corporation, Trinidad and Tobago)

Closing Ceremony and Coffee Break

Abstracts

Presentation 1: Technical Efficiency in the Agricultural Sectors of Selected CARICOM Countries. By C.M. Ligeon*, Associate Professor, School of Business, Auburn University, Montgomery and C. M. Jolly, Professor and Chair, Department of Agricultural economics and Rural Sociology, Auburn University, Auburn Alabama. *Corresponding author; e-mail:cligeon@AUM.edu

The Caribbean Common Market (CARICOM) countries are investing in agricultural development with limited knowledge of present levels of efficiency, and the technical efficiencies emanating from recent changes within the sector. Hence, it is important to investigate whether efficiencies in agriculture are enhanced by resource allocation, and whether growth in other sectors fosters linkage development with agriculture. We employ a stochastic production frontier, log-linear, and Tobit models, using cross sectional time series data from 1960 to 2006 for 12 CARICOM countries to examine factors influencing countries efficiency of agricultural contribution to Gross Domestic Product (GDP) per labor. Cropland per arable land per agricultural labor force, pastureland per arable land per agricultural labor force, fertilizer per crop land and pasture land per agricultural labor force positively influence agriculture per labor force contribution to GDP, while tractor per crop land per agricultural labor force negatively influences agricultural contribution to GDP per labor. The probability of the χ^2 is 0.0001 indicating that the model is appropriate to measure the production frontier. The gamma ($\gamma= 0.963$) indicates that the efficiency, or inefficiency is related to the explanatory variables, while only 3.5 percent is due to random errors. The technical efficiencies of these countries agriculture vary from 30 percent for St. Vincent to 95.0 percent for Dominican Republic. Dominica and St. Lucia experience efficiencies of 32 and 33 percent, respectively, whereas Haiti and Barbados have 93 and 94 percent, respectively. Jamaica has 80 percent while Guyana has 57 percent. All other CARICOM countries (Trinidad and Tobago, Suriname and Belize) have less than 50 percent efficiency. Industrial growth and sugar production reduce levels of technical inefficiencies, while urban population growth rate positively influences inefficiency in the sector. The CARICOM countries must examine the factors that influence agricultural efficiency both at the micro- and macro levels, and use a holistic approach which encompasses the involvement of other sectors that provide linkages to the agricultural sector. The governments can develop programs to limit the urban population and industrial growth rates which enhance agricultural inefficiency.

Presentation 2: Food Security Initiatives in the Tourism Sector. By Ena Harvey, Hemispheric Specialist for Agrotourism, IICA

The development of sustainable livelihood chains through the promotion of linkages between the agri-food sector and tourism, offers significant opportunities for reducing the negative impacts of the global food security crisis in Latin America and the Caribbean, where food security is under threat, and where agri-food chains have been significantly affected by increases in production costs and declines in competitiveness. Moreover, when one considers the high and increasing demand for fresh and processed foods to service the millions of tourists visiting LAC, as well as the significant levels of leakage of foreign exchange spent in importing food for tourists, this linkage is critical not only to food security, but also issues of food sovereignty and national security.

Rural Tourism and Agrotourism reflect a varied tapestry of offerings, closely linked to the heritage, culture, traditions, and way of life of local communities. Food represents an integral part of this tourism experience, and culinary tourism provides significant opportunity for food security initiatives, in terms of increased production as well as preservation of biodiversity and culinary traditions. Some of the fastest growing global culinary trends feature the inclusion of new flavours and unique, nutritious foods that are indigenous to Latin America and the Caribbean Region. Rural gastronomy and eating like a “locavore” have also been featured among the top 20 global trends in tourism.

Through IICA’s hemispheric programme in Agrotourism, rural communities in several Caribbean and Latin American countries have begun to reap the benefits of linking with tourism through food. Several success stories and at least four Best Practice models of farmer-hotel partnerships exist in the Caribbean Region. Artisanal foods are featured in ‘rutas turísticas’ in Central America and the international success of gastronomy of Peru is the engine for the production of indigenous crops such as quinoa, potatoes and corn, and animal species such as cuy. Greenhouse technology and organic production systems are being harnessed in several countries to produce high quality fruit and vegetable crops for both the tourism and domestic markets. Small businesses involved in the production of indigenous processed foods have also improved their incomes through direct sales of

products to visitors, participation in international and community-based culinary festivals, and through improved access into formal channels of trade with hotels, restaurants and foodservice operations. Knowledge communities are also being created in Central America and the Caribbean with the launch of agrotourism/rural tourism websites and portals, and on-line courses in agro-eco tourism.

The full scope and impact of agrotourism linkages are yet to be realized. What is critical to the process is a strong policy and institutional framework that facilitates access to land and appropriate technology; protection of biodiversity and intellectual property; investment in rural infrastructure, quality assurance and security arrangements; reduction of risk; networking of community groups, best practice exchange, and training in new skills to meet the quality, volume, consistency and service specifications of the tourism industry.

Presentation 3: Agritourism: A Modern Development in Caribbean Agriculture. By Erecia Hepburn, Graduate Research Assistant, Policy Studies, Strom Thurmond Institute Government & Public Affairs

The Bahamas has made tourism the country's primary economic force. Tourism comprises approximately half of gross domestic product while agriculture comprises approximately three percent. The Bahamas has a lack of development in other sectors of the economy, (e.g. agriculture), putting the country at a global disadvantage. In order for The Bahamas to compete globally there has to be some level of food security and a larger share of alternative venues of economic activity. The lack of connection between the local farming community and the hospitality industry has been identified as one of the main areas that can potentially ease the over reliance on foreign foodstuffs.

This research examines agritourism as a viable policy option for The Bahamas. While agritourism is still a form of tourism, it offers a new venue and different dimension to the already saturated "tourism market", while stimulating interest into another sector of the economy, the agriculture sector. Linking the strongest performing sector of the country (tourism) to another (agriculture) has the ability to revitalize and inject resources for both sectors.

This paper is based on data from tourist surveys, interviews and personal observation. A classification model of agritourism enterprises is introduced and important linkages between agriculture and tourism are examined. This research investigated three varying agritourism enterprises as modern developments in agriculture and prospects for developing an economic diversification strategy for The Bahamas, utilizing agritourism.

Keywords: Agritourism, Agriculture, the Bahamas, Tourism, Development

Presentation 4: The Impact of Trade Liberalisation on the Food Security Prospects of Barbados. By Rommell Hippolyte, Economist II, Ministry of Agriculture rhippolyte@barbados.gov.bb, Dwayne Nurse, Economist II, Ministry of Agriculture dnurse@agriculture.gov.bb, Robert Saul Statistician, Ministry of Agriculture rsaul@agriculture.gov.bb

Traditional economic trade theories have often suggested that in the presence of free trade, commodity prices are expected to decline. This paper attempts to assess this assumption by analysing how Barbados's trade liberalisation efforts have impacted on the prices of food in the country. The analysis will look at the two main trade agreements in which Barbados is currently active, namely the WTO multilateral process or MFN trade and CARICOM. The paper will seek to determine how the two trade agreements have impacted on the prices of core commodities in the country.

Keywords: Trade liberalisation, prices, food security

Presentation 5: Agricultural Development and Food Security: The Way Out of Crisis.
By Dana Lewis-Ambrose, H. Lavity Stoutt Community College, Tortola, the Virgin Islands

The purpose of this study is to reveal how investments in agricultural development and food security would safeguard the Caribbean from future global crisis. History shows that agriculture was the key development that led to the rise of civilization across the world and was the main contributor to the Caribbean economy before the 1950's. However, agricultural activity declined subsequent to the emergence of tourism and financial services sectors throughout the Region. Then in the 1990's, the situation became progressively worse as the North American Free Trade Agreement (NAFTA) was implemented and the decline of the banana industry resulted. Despite these setbacks, an opportunity to reconsider the validity of this sector would become evident in 2007 and 2008, as food shortages developed worldwide and a global financial crisis was declared. These events created two options for the Caribbean: either to react to the present global climate ad-hoc or to be pro-active in approach, with the intention (i) to alleviate poverty on national levels, (ii) to advance economic development and trade across the Region and (iii) to make sustainable development more attainable for the Caribbean, as a whole. Naturally, this research supports the pro-active approach. To do this, agricultural development and food security must become the focal point of the Caribbean economies. Accordingly, the paper recommends that investment within the agricultural sector be undertaken more aggressively across the Region. The research uses the mixed research approach method to validate its claim.

Keywords: Agriculture, Agricultural Development, Caribbean, Food Security, Global Financial Crisis, Investment, Mixed Research Approach Method, NAFTA.

Presentation 6: Evaluation of CARDI 2008 Hot Pepper (*Capsicum chinense* Jacq.) Improved Selections. By C.S. Roberts, Pepper Breeding Centre, Caribbean Agricultural Research and Development Institute, Graeme Hall, Christ Church, Barbados, Email: cyril.roberts@cavehill.uwi.edu

Ten red and eight yellow berry hot pepper varieties representing advanced selections from the CARDI Hot Pepper Improvement Program were evaluated for their horticultural characters and potential for commercial production. The trials were conducted from January 2008 to June 2008 at Graeme Hall, Christ Church, Barbados. Data was collected from 20 plants in each plot using a randomized complete block design with four replications. The results showed that in the yellow berry trial four lines (YT-2, YT-5, YT-6 and YT-7) yielded higher than the check variety Scotch Bonnet while in the red berry trial five lines (RT-2, RT-5, RT-6, RT-8 and RT-9) out-yielded the check variety West Indies Red. Mature berries varied in shape, pericarp thickness and colour. Differences were also observed in plant height, canopy width and susceptibility to virus infection. The accessions that out performed the check varieties will be studied next season for potential release as new commercial varieties.

Presentation 7: Small Ruminant Development in Barbados -“Should the Sheep Feedlot be Re-Established?” by Dr. P Francis, CARDI, Barbados and Katrina White, Senior Economist, Agricultural Planning Unit, Ministry of Agriculture, Barbados

The Barbados Black Belly Sheep (BBS) has been identified as one of Barbados’s signature products and is highly regarded for the excellent quality of its meat. Sadly, the huge potential of this meat product continues to be underdeveloped. This paper evaluates the potential for the re-establishment of the sheep feedlot to significantly enhance the development of the small ruminant sector in Barbados, particularly the Barbados Black Belly sheep. This paper explores the profile of the BBS industry in order to provide some policy direction for the further development of this sector.

Keywords: Barbados Black Belly Sheep, feedlot, development, policy

Presentation 8: Experience with High Fibre Cane 2003-2008. by Harm De Boer, Agronomy Research and Variety Testing Unit, Barbados Agricultural Management Company Ltd, Groves, St. George. Email: arvtu@caribsurf.com

In an attempt to identify an alternative source of income from sugar cane, the Barbados sugar industry during the period 2003-2008, gained experience with the growing of sugar cane varieties with a high level of fibre and biomass but with very little economically recoverable sugar. The Agronomy Research and Variety Testing Unit, in collaboration with the West Indies Central Sugar Cane Breeding Station, evaluated a number of these varieties for their suitability as a source of biomass, energy, alcohol, and other products. Several agronomic trials were carried out while a sufficiently large area was planted with these canes in order to obtain information on mechanical harvesting and processing in an unmodified sugar factory. Syrup also was produced in a quantity that made it possible to make alcohol from it in a rum distillery.

Keywords: Sugar cane, fuel cane, research, varieties, yield.

Presentation 9: Strategies of Control of The Pink Bollworm (*Pectinophora Gossypiella*) and the Cotton Bollworm (*Heliothis* Spp.) In the Cotton IPM Programme in Barbados.
By Dr. Yelitza Coromoto Colmenarez, CABI Caribbean and Latin America. Gordon Street, Curepe. Trinidad and Tobago. E-mail: y.colmenarez@cabi.org, Anderson King and Janet Marecheau, Ministry of Agriculture of Barbados. Cotton Project. Graeme Hall. Christ Church. Barbados.

In Barbados the pink bollworm (*Pectinophora gossypiella*) and the cotton bollworm (*Heliothis* spp.) are the two major pests that are limiting the production of the Sea Island Cotton (*Gossypium barbadense* L). The most common method of control of those pests in the island was based in the wide spread use of conventional pesticides. The objective of this work was to evaluate and provide alternative methods of control for the main cotton pests in the island, looking forward a sustainable production. Fourteen areas planted with Sea Island Cotton were monitored weekly to determine the level of incidence and damage of the pests over a seven month period. The evaluations were conducted at the laboratory of the Entomology Department, Ministry of Agriculture and Rural Development of Barbados. As strategy of control the work was also focused in the prevention methods and in the promotion of Good Agricultural Practices; some of the methods of control evaluated were the introduction and use of biopesticides based in the formulation of the bacteria *Bacillus thuringiensis*, use of a pheromone for matting disruption (PB- ROPE), use of pesticides of low impact and use of pheromone trapping for the evaluation of the level of the population of the pests. The presence of natural enemies was also recorded; the most of them were reported attacking the egg and larvae stages of the cotton bollworm. No natural enemies were reported attacking the pink bollworm. The integration of the suggested methods was reported to be the most efficient way to control the targeted pests.

Keywords: Pink bollworm, cotton bollworm, biopesticides, matting disruption pheromones, natural enemies.

Presentation 10. Organic Fertility Cabbage Trial. By David Bynoe, Agronomist, Food Crops Research, Ministry of Agriculture, Barbados.

Fertility management remains one of the most crucial aspects of organic production systems in Barbados and has been identified as a priority for research. The choice of organic amendment has implications on soil structure and subsequent weed, pest, and disease problems as well as on the soil nutrient dynamics. This study assesses locally available soil amendments for their potential to act as a substitute for conventional fertilizers in an organic production system for cabbage (*Brassica oleracea*). The two organic amendments that were assessed in the trial included chicken and sheep manure. These organic amendments were compared to conventional fertilizer. The results of this field trial showed clearly that chicken manure produces significantly higher yields in cabbage than conventional fertilizer and sheep manure. On average 6638 lbs/acre more than conventional fertilizer and 7696 lbs/acre more than sheep manure. In addition it demonstrated that there is no significant difference in the yield produced by conventional fertilizer and sheep manure. For an application rate of 155 lbs/acre and 207 lbs/acre the interaction between fertilizer and fertilizer quantity is insignificant. This study highlights that chicken manure is a very feasible local fertilizer substitute for conventional fertilizer and can be utilized by both organic farmers and conventional farmers. In addition to producing higher yields in cabbage it also adds organic matter and beneficial micro-organisms to the soil.

Keywords: Organic Farming, Chicken Manure, Sheep Manure, Cabbage

Presentation 11: The influence of high plant population density on the early yield of hot pepper (*Capsicum* sp). By Stevenson Skeete, Agronomist and Officer-In-Charge, Food Crops Research, Ministry of Agriculture, Barbados.

Hot pepper was planted at a population density of approximately 16,000 plants per acre (four times the typical density). This was created by planting at 12” intra-row on split rows of the standard 5’6 beds. The control treatment consisted of plants grown in the typical arrangement of a single row of plants at 24’ on a 5’6 bed. The trial was randomised block design with 10 replicates of the 2 treatments. Total yield per area from the first four harvests was extrapolated to 7,874 lbs/ acre on the high density plots and was double the yield of the control (3,964lbs/ac). Yield at the first harvest was 2.5 times the control (F. Pr . = .001)but this difference declined in subsequent weeks. The results are discussed in relation to previous findings in relation to the early yield of pepper plants grown at high density.

Keywords: Hot pepper, capsicum, density.

Presentation 12: The Importance of Pricing Data in Farmers Production And Marketing Decision Making. By Marcia Marville, Head of Agricultural Program, Barbados Community College.

Farmers' production and marketing decisions should be based on reliable, consistent and timely information. This information includes production data, pricing information, market demand and price trends.

This presentation examines the price trends for several fresh produce items using the wholesale prices collected over a number of years beginning in 1982. It compares the annual trends for the items selected to determine whether there is any consistency in the trends and whether these can be used in assisting the farmers in their production planning.

The presentation also seeks to examine the level of price changes over the period and to determine whether climatic condition had any impact on the prices which were obtained during the period.

Presentation 13: The performance of three varieties of parsley (*Petroselinum crispum*) grown with mulch. By A Phillips, Researcher in Herbs, Food Crops Research, Ministry of Agriculture, Barbados and S. Skeete, Agronomist And Officer-In-Charge, Food Crops Research, Ministry of Agriculture, Barbados

A study was done to assess the effect of mulching on growth and yield of parsley, while noting the incidence of parsley dieback disease. Three varieties of parsley Banquet, New Curl Summer and Green River, were grown with fabric mulch and compared to the unmulched controls. The trial was a factorial design with variety and mulching being the two treatments (3 vars at 2 levels of mulch, 3 reps). Banquet growing without mulch produced the highest total yield (0.248 Kg per plant; 8,832 Kg/ha) [var F.pr=.01; mulch F.pr=.006]. For all varieties the unmulched plots produced a higher yield than mulched (variety F. Pr<.001; mulch F.pr=.01). Green River with mulch had the highest incidence of dieback, followed by 'new curl summer'. Growth data and disease incidence trends are presented.

Keywords: Parsley, yield, mulch, varieties, dieback, disease, growth

Presentation 14: Economic & Environmental Impact of Increased Organic Production in the United Kingdom. By David Bynoe, Agronomist, Food Crops Research, Ministry of Agriculture, Barbados.

Organic agriculture has grown significantly within the last ten years, in both sales and production area. The main factors that have led to this rapid growth are economic and environmental. Most previous studies have focused on the environmental impact of organic agriculture, whilst only a few of studies have assessed the economic implications. Some have speculated that an increase in organic production would lead to a reduction in the farm-gate organic prices to a point that reduces farm-level financial viability. This study reviews the environmental benefits of organic agriculture and models the economic impacts which are likely to result from increases in organic production/conversion in the United Kingdom due to agro-environmental payments. Regression analysis is used to estimate supply elasticities and water quality effects. Economic surplus analysis is used to determine the changes in economic surplus changes for producers and consumers, and the market price reductions which resulted. These economic analyses are undertaken for the organic poultry and pork sectors.

Overall the analyses showed that the economic and environmental impact of increased organic production is positive. A positive economic surplus for both producers and consumers and water quality benefits resulted from an increase in organic production. Based on this economic surplus analysis, current market information and the published literature the main economic gains from the payment would be the foreign-exchange cost saving and some correction for market failure. Several other environmental benefits would be derived: improved farm biodiversity, soil quality and energy usage.

Keywords: Organic Farming, Water Quality, Economic Surplus, Environmental impact

Presentation 15: The Caribbean Drought and Precipitation Monitoring Network: The Barbados Component. By Adrian Trotman, Caribbean Institute for Meteorology and Hydrology (CIMH) atrotman@cimh.edu.bb <mailto:atrotman@cimh.edu.bb>, (246) 425-1362

The Caribbean Drought and Precipitation Monitoring Network (CDPMN) was launched in January 2009 under the project The Caribbean Water Initiative, whose goal is to deliver sustainable and equitable Integrated Water Resources Management to partner Caribbean countries. Through a collaborative project between the Caribbean Institute for Meteorology and Hydrology and the University of Applied Sciences of Southern Switzerland, Barbados is being included in the CDPMN. The CDPMN is one way to deal with the impacts of climate variability and change and the uncertainty surrounding these by providing early warning of drought and flood by monitoring and predicting precipitation. Under the CDPMN, precipitation will be monitored on two scales: (i) regional, encompassing the entire Caribbean basin and (ii) national; using a number of climate related (mainly precipitation) indices and indicators (river/stream flow, ground water levels, vegetation status). The final drought and precipitation status of the region or country will be determined, by consensus, by networks of persons from different sectors, institutions, communities and backgrounds embracing the diversity in definitions and impacts of drought and by utilizing the spectrum of indices and indicators. Precipitation forecasts will be used in combination with the monitoring output to provide forecasts of indices with lead times of up to three months. Sectors like agriculture and water resources in Barbados stand to benefit from this activity as decision- and policy- making with respect to the management of water resources are expected to improve. What will eventually be the Barbados Water Monitor, will become operational by 2010.

Keywords: Barbados, drought, flood, precipitation monitoring, forecasting, indices.

Presentation 16: An Evaluation of four parsley varieties cultivated in a semi climate controlled tunnel in Barbados. By Colin Wiltshire Agronomist, Food Crops Research, Ministry of Agriculture, Barbados and Damian Hinds, Inter-American Institute for Cooperation on Agriculture

Parsley has become the second most widely used herb internationally. Vast amounts of this herb are imported into Barbados annually; both in the fresh and processed form. Locally there is a knowledge gap concerning the most suitable varieties for indoor cultivation. Four varieties of curly parsley were cultivated in a semi climate controlled greenhouse. Characteristics analyzed statistically included rate of growth and biomass available for processing. Trial focused on the most appropriate variety for used in the fresh form as well as ability to be processed.

Triple curl produced the heaviest yield with an average weight of 1989 g per plant and a total processable percentage of 55.3%, banquet produced the second highest yields at an average of 1505 g per plant with a total processable percentage of 57.6%. New curl summer produced an average yield of 1490 g with a processable percentage of 57.8% and green river yielded 1265 g per plant with a processable percentage of 57.6%

Poster Presentations A: The yield performance of forty sweet potato (*Ipomea batatas*) cultivars grown in Barbados. By S. Skeete, Agronomist and Officer-In-Charge, Food Crops Research, Ministry of Agriculture, Barbados, A. Maynard, Agronomist, Food Crops Research, Ministry of Agriculture, Barbados

The yields of forty sweet potato cultivars were assessed from germplasm plots and in variety trials at five locations. Seven sets of yield data were taken from germplasm plots which over a four year period. Three variety trials were done on a smaller number of cultivars during the same period. Plots were harvested at 3.5 months using a 10 foot rod as the sample size. Highest mean yields (all extrapolated) were harvested from CBS 32, southern delight and CBS49 (29, 28.4 27.4 tons per ac respectively. C104, Wilkinson, CBS28 and MGR6 were at the lower end of the scale (10.2, 10.2, 5.1, 0 respectively). The yield of CBS32 varied from 72 to 20 lbs per rod. Trends in yield for different locations and times are presented and discussed.

Keywords: potato, yield, cultivars, germplasm, variety, location, time, assess

Poster Presentation B: Outbreak of *Salmonella Enteritidis* in Layer Birds in Barbados (2009). By Kerrilyn Hunte, Stephen St. John and Pamela Whitehall Veterinary Services, Ministry of Agriculture, Barbados

Between January and March 2009, there was an outbreak of *Salmonella enteritidis* (SE) in layer flocks on four (4) farms across the island. This was determined after ten (10) confirmed SE isolates were recovered at the Veterinary Services Laboratory from specimens submitted from the affected farms. The isolates were recovered from a variety of specimens including: avian tissues e.g. ovaries, livers, uterus; table eggs and environmental samples from one (1) affected farm. As a result of the outbreak, a total of three thousand, seven hundred and sixty-eight (3,768) birds died on the affected farms. This number reflects a total of five hundred and eleven (511) birds which died as a result of infection with SE, as well as three thousand, two hundred and fifty-seven (3,257) birds which were voluntarily culled after the flock was found to be SE positive. The mortality rate of the outbreak was ~ 5% of each affected flock.

Presentation 17: Should the United States Eliminate Unilateral Sanctions Prohibiting Food Trade? By Edmund M. Tavernier (Rutgers University)

The Asian financial crisis in the late 1990s had a profound negative impact on US agricultural exports and agricultural prices. Given that impact, US agribusiness firms and farm organizations lobbied the US Congress to adopt legislation that would exempt food from US economic sanctions against certain countries. Proponents argue that the use of sanctions as an instrument to achieve US domestic policy goals are ineffective and serve only to harm the US agricultural sector. Opponents suggest that the removal of sanctions would remove any leverage that the US has to influence foreign economic and political policy goals particularly with respect to Cuba. Given the increased social and economic ties between Cuba and Caribbean countries, the lifting of sanctions is likely to be beneficial to Caribbean countries as economic growth in Cuba expands. To examine the debate, US agricultural producers were asked whether the United States should eliminate unilateral sanctions prohibiting food trade with certain other countries. Forty four percent of agricultural producers agreed or strongly agreed that unilateral trade sanctions on food should be eliminated while 29% disagreed or strongly disagreed with that statement. Twenty-seven percent of agricultural producers were neutral. Further analysis of producer response at the state level shows that 32% of agricultural producers in Florida agreed or strongly agreed that unilateral trade sanctions on food should be eliminated while 28% disagreed or strongly disagreed with that statement. Twenty-eight percent of agricultural producers in New Jersey agreed or strongly agreed that unilateral trade sanctions on food should be eliminated.

Keywords: Economic sanctions, Caribbean countries

Presentation 18: Import Demand for Fish in Caribbean Common Market (CARICOM) Area. By G. Nguyen, Corresponding author; e-mail: nguyev@auburn.edu and C. M. Jolly, Ph.D. candidate and Professor and Chair, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, Alabama.

The Caribbean Common Market (CARICOM) region depends on sea food to meet its animal protein needs. Regional consumption of fish averages about 9.4kg per capita per annum. Local production was estimated at 321,846.6 tons in 1998 but 165,787 tons in 2006, a decline of 48.5 percent. A large percentage of the fish consumed, 54 percent, comes from capture fisheries which experienced an annual decline of 1.6 percent during the last three decades. Imports of fish, on the other hand, increased by 96 percent, from 73,440 tons in 1991 to 144,216 tons in 2006. Hence, it is important to discern the factors influencing the increase in imports and the policies to be adopted to reduce the region's dependence on foreign imports. In this paper, we develop an aggregate import demand function for selected countries in the CARIOM region. Fish imports are divided into finfish and mollusks and crustaceans. The region is divided into high, middle and low income; tourist and non-tourist dependent countries. Ordinary Least Squares (OLS) regression models are used to evaluate the import demand functions. The model for import demand for all fish had an adjusted R^2 of 0.73, a mean square error (MSE) of 0.11, and (F-statistic with (DF=4/25; $\alpha=0.00$)). In general, fish imports are influenced by previous years' imports, price of imports and domestic consumer price index. The price elasticity of demand is elastic and domestic fish seem to be a substitute for imported fish. For the high valued mollusk and crustaceans, income elasticity suggests that the imported product is a normal good. For the low valued product income is not a factor. In tourist dependent countries previous years' import, price and income in the tourist originating country influence imports. The results show that imports of fish and local production are substitute products, and price is a major factor influencing demand. Hence regional governments must encourage local fish production if the quantity imported must be reduced, and governments stem the outflow of their foreign currency reserves.

Presentation 19: Marketing Issues Facing St Lucian Fishers. By Allena Joseph, Ministry of Agriculture, Land, Forestry and Fisheries

Presentation 20: Nonlinearity and Asymmetric Vertical Transmission in U.S. Fresh Vegetable Prices. By Edmund M. Tavernier, Benjamin M. Onyango and Ferdaus Hossain.

The debate about high food prices worldwide refocuses attention on the vertical transmission of prices across various levels of the marketing chain. Such transmission in an agricultural product market is an important characteristic describing the operation of the market particularly when the market experiences shocks. The extent and the speed with which shocks in one level of a market are transmitted to other levels are reflective of the actions of participants at different market levels. In the context of agricultural product markets, a commonly held perception is that those operating as middlemen in the marketing chain typically pass on increases in farm prices to customers more rapidly and perhaps more completely, than reductions in farm prices. These questions of nonlinearity, threshold behavior and cointegration under asymmetric adjustment are investigated in the vertical transmission of shocks between farm and retail prices for vegetable products in the U.S. Empirical results confirm the presence of nonlinearity and threshold behavior in the adjustment processes of farm and retail prices. Retail and farm prices are found to be cointegrated, implying long-run equilibrium relation between the two prices. However, for 4 of the five products included in this study, price transmissions are characterized by asymmetric adjustments. While retail prices adjust quickly in response to shocks that reduce the farm-retail spread below a certain threshold, it hardly responds to shocks that widen the spread. Farm prices are mostly unresponsive to retail market movements. Causation runs from farm to retail prices.

Keywords: Vegetable Prices; Vertical Linkage; Non-linearity; Asymmetric Adjustment; Cointegration

Presentation 21: A Three-Legged-Stool Model for Agricultural Policy Formulation in CARICOM Countries. By Ronald M Gordon, Courtesy Professor, University of Florida, Gainesville FL. U.S.A email: rmg251@ufl.edu

Initial optimal results are unlikely from among the myriad approaches to national agricultural policy formulation. Instead, the path to the best policy strategy for any designated agricultural environment is an iterative one that builds on three key fundamentals: relevant theory, focused empirical analyses and facilitating institutions. The theory elucidates the decision environment of the producer and consumer. Empirical analyses evaluate and present concrete feedback for relevant market issues and policy impact. Institutions provide a framework for various market transactions and support systems.

It is argued that these rudiments can be envisaged as three pillars of agricultural policy formulation requiring equal emphasis for optimal policy impact. The inter-relationship and relative importance of these fundamentals are examined within the context of the design and impact evaluation of agricultural policy. The motivation for proposing the application of this three-legged-stool model to agricultural policy formulation within CARICOM countries is that the current practice of uneven emphasis on these fundamentals may result in policy prescriptions that foster sub-optimal goal impacts.

Presentation 22: Global Change and Caribbean bananas: a comparison of the St Lucia and Jamaica experiences over the last ten years. By Chanelle Fingall and David Barker, Department of Geography & Geology, University of the West Indies, Mona Campus, Jamaica.

Trade liberalization and climate change are two powerful components of global change that are influencing agriculture, food security and sustainable rural livelihoods in the Caribbean region. This paper examines the impact of these external forces on export bananas in a period of global change. We highlight two case studies by way of example. St Lucia has embraced Fair Trade as an alternative trading network in its traditional markets in an effort to deal with the negative impacts of trade liberalization and the end of preferential treatment for EU bananas. In stark contrast, Jamaican exporters, battered by a series of recent hurricanes, have gone down a different path and withdrawn from the export banana trade altogether. We examine the background to these unfolding scenarios, and their implications for national economies and for banana producers.

Presentation 23: The Cuban Embargo and Southeastern Agricultural Export Markets.
By Cassandra Copeland, Division of Economics and Business Administration, Oglethorpe University, Atlanta, GA ccopeland@oglethorpe.edu and Henry Thompson, Economics, Comer Hall, Auburn University, AL, thomph1@auburn.edu

Cuba is a large neighbor of the U.S. Southeast with substantial export potential when the embargo is lifted. The present paper estimates the potential gains from trade in Southeastern agricultural export markets calibrating linear excess supply and excess demand to observed prices, outputs, exports, Cuban imports, and price elasticities in the literature. Linear excess supply and demand gauge market gains from trade in rice, grains, soybeans, poultry, pork, and meat. This paper is the first direct application of excess supply and excess demand with its focus on the international market and total surplus gains from trade. A brief review of Cuban trade history provides perspective on trade potential and motivates major assumptions of the model. The largest gains are for rice, grains, and soybeans with moderate gains for poultry and pork. Across these markets, total surplus increases over 3%.

Keywords: International Trade, US-Cuban Trade Potential, Surplus Gains from Trade

Thanks to Henry Kinnucan for substantive remarks and to Curtis Jolly and Parr Rossen for comments and suggestions.

Presentation 24: International Trade and Food Safety. Are we ready? By Ganesh Gangapersad, Manager, Quality Assurance. NAMDEVCO*, Elbert Johnson, Chief Executive Officer, NAMDEVCO

With a rising food import bill in the region, many CARICOM countries are faced with the challenge of increasing domestic production to achieve some level of food security to be able to compete on the local and international markets. Price is no longer the only important parameter in the marketing of food. Consumers are becoming more aware of food safety issues and are so inclined towards purchasing foods that are safe, wholesome and competitively priced.

Regional food producers, manufacturers and suppliers are faced with the daunting task of supplying food of an international standard while operating in an environment where the necessary policy, regulation and support mechanisms are not implemented and in some cases not in place. This scenario effectively creates an opportunity for extra regional food to enter the region and displace local production.

This paper presents a case study of the food safety programme implemented by NAMDEVCO in managing the trade protocol between Trinidad and Barbados over the past five years and looks at the critical issues to be addressed at the regional level and the way forward.

*NAMDEVCO – The National Agricultural Marketing and Development Corporation

Presentation 25: Pre and Post-Accession Performance to the WTO: The Caribbean Benchmarked to the USA. By Govind Seepersad, Nkosi Felix, Omardath Maharaj, The University of the West Indies.

The World Trade Organization (WTO) has completed its twelfth year of existence. It promoted a rule based approach for Agriculture, based on principles of transparency in trade, elimination of discrimination, freer trade through negotiation and like treatment, promotion of competition while encouraging economic and social development and reform among its signatories.

After more than a decade of adjustment and adoption, the impact on Caribbean Agriculture has been varied. The issue has been the subject of many debates; however, the empirical evidence has not been fully collated. It is therefore high time to take stock of the situation in the sector about the impact of WTO through a series of yardsticks that are based on hard facts and not just on perception or hearsay.

The paper analyzes the performance of one segment of the Caribbean agricultural economy (diary / beef) in pre-and-post WTO period using various indicators and benchmarks it against the performance of another leading developing country, the USA. The paper suggests different yardsticks that may be used for such an exercise and can thus be useful to policy makers in assessing other sectors in the post-WTO period.

Presentation 26: The Banana Industry, the Agricultural Sector and the Dominican Economy: Impacts of the Banana War. By Emaline Harris-Charles (Dominica Agricultural and Industrial Development Bank)

The banana war is a term which has been ascribed to the longest running dispute in World Trade Organisation (WTO) history, that against the European Union (EU) banana regime. There have been several WTO rulings in favour of US companies in Ecuador and other Latin American countries against the preferential treatment by the EU of African, Caribbean, and Pacific countries. Given the previous significance of the Banana Industry in the context of the Dominican economy, this paper examines trends in the Banana Industry and the Agricultural Sector of Dominica and other sectors as a consequence of this trade war. It also assesses the future of the Industry in light of new arrangements.

Presentation 27: Sustainability in the Tourism Sector: Assessing Ecotourist's Willingness to Pay for Ecotourism Offerings in Trinidad and Tobago. By Jeanelle Joseph, Department of Agricultural Economics and Extension, University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies; Email: JeanelleJoseph@hotmail.com, Doolarie Singh-Knights, Department of Agricultural Economics and Extension, University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies; Email: Doolarie.Singh-Knights@sta.uwi.edu and Dennis Smith, West Virginia University; E-mail: Dennis.Smith@mail.wvu.edu

The tourism sector in the Caribbean has been a significant contributor towards the region's GDP, contributing 13.8% in 2005. Ecotourism has been identified as a low impact means to provide income generating opportunities that are complementary to nature conservation as well as the welfare of the local population. These goals are sometimes not met, however, and environmentally unfriendly or economically unsuccessful ecotourism tends to prevail in many developing countries, questioning the validity of its original concept. Therefore, careful assessment of cultural, environmental, and economic aspects is necessary when introducing ecotourism to a region.

A discrete choice conjoint analysis of international and local tourist preferences for ecotourism is undertaken to analyze the decision to participate in ecotourism activities and to identify characteristics of the market segments that comprise the market for ecotourism offerings, the market attitudes towards ecotourism and the ecotourism products that could attract the market segments. Tests of market segmentation by nationality, age, and experience of traveller are conducted in a multinomial logit estimation procedure. The study also analyzes preferences of tourists to assess tourists' willingness to pay (WTP), and to assess the financial potential of ecotourism offerings.

This study provides practical planning direction to all ecotourism stakeholders to increase tourism-generated income for rural communities, and thus contribute to the sustainable development of the region more generally.

Presentation 28: Assessing the Role for Payments for Environmental Services within the Fond D’or Watershed, St. Lucia. By Dennis Pantin and Donna Ramjattan, Sustainable Economic Development Unit (SEDU), University of The West Indies, St. Augustine, Trinidad, W.I.

A Payment for Environmental Services (PES) scheme can be defined by Mayrand and Paquin (2004) as a tool “*to support positive environmental externalities through the transfer of financial resources from beneficiaries of certain environmental services to those who provide these services or are fiduciaries of environmental resources.*” PES schemes can target different aspects of the environment such as water services, carbon sequestration and storage, biodiversity protection, watershed protection and landscape beauty. This paper first begins with a review of the literature on payments for environmental services with specific model case studies globally.

The second section of the paper introduces the case study area of the Fond D’or watershed in St. Lucia and provides an identification and valuation of existing watershed services. The Fond D’or watershed is the second largest, comprising of 10,230 acres with twenty-three per cent (23%) of the watershed in Government Forest Reserves. These forest reserves are located in the upper watershed while within the middle and lower watershed areas there are many activities including residential settlements, agricultural production in the form of banana cultivation, forestry production, livestock production and ecotourism in the form of a Nature Park. This paper specifically focuses on the agricultural sector since these activities contribute to the majority of environmental usage (mixed farming 24%, other intensive farming 32% and flatland intensive farming 8%) which has significant environmental effects.

The third section of the paper links the valuation of the environmental services to a proposed PES scheme that can be utilized to combat negative environmental practices and promote environmental sustainability. Further, this proposed PES scheme highlights the possible implications for farmers specifically in terms of possible incomes, environmental practices and overall attitudes towards a change in practices.

Presentation 29: Economic Impact of different infestation levels of Coffee Berry Borer (*Hypothenemus hampei*) in Puerto Rico. By Carmen Alamo, Graduate Student, Department of Agricultural and Applied Economics of Texas Tech University, Eric Belasco Assistant Professor, Department of Agricultural and Applied Economics of Texas Tech University and Carlos Flores, Associate Professor, Agricultural Experiment Station, College of Agricultural Sciences, University of Puerto Rico.

The coffee berry borer (CBB) is the most damaging pests on coffee and was identified in Puerto Rico in August 2007. The lack of scientific and economic data that measures the impact of the CBB on coffee yields justifies a research study on this issue. This study proposes to develop a standard method to measure the impact of CBB on coffee yields.

Data for this study is from a field project in Puerto Rico that evaluated the impact of 18 levels of CBB infestation (0% - 10%, 12%, 14%, 20%, 30%, 40%, and 50%) on coffee yields, measured as the number of beans infected by CCB in the sample within a lab environment. The model to evaluate the impact of the infestation level on the coffee yields is specified as

$$Y_i = \beta_0 + \beta_1 I_i + \beta_2 I_i^2 + \beta_3 I_i^3 + \beta_4 HIGH_i + \beta_5 LOW_i + \beta_6 PICK_i + \beta_7 BEG_i + \varepsilon_i.$$
 where I is the infestation rate with squared and cubed terms, HIGH and LOW are binary variables for high or low altitudes, while PICK and BEG are binary variables to denote measurement during the end and beginning of the harvesting period, respectively. Normal MLE is used to estimate the previously specified parameters, where residuals are hypothesized to be heteroskedastic. To this end, we assume multiplicatively heteroskedastic errors, such that $\sigma_i^2 = \sigma^2 \exp(\gamma_1 I_i + \dots + \gamma_7 BEG_i)$, which allows for independent variables to influence both the mean and variance associated with coffee bean yields.

Results from this study provide valuable information to policy makers in Puerto Rico as well as provide an alternative system to regulated prices transactions between farmers and coffee processors.

Presentation 30: The Potential Economic Impact of Dwarfing Tall Golden Apple (*Spondias cytherea* Sonn.) in Grenada. By Reginald P. Andall, Caribbean Agricultural Research and Development Institute, P.O. Box 270, St. George's, Grenada

From the mid 1980's to 2004, golden apple (*Spondias cytherea* Sonn.) was one of the most important non-traditional fruit crops exported from Grenada. In 1995, some 617, 637 kg of the fruit was exported earning EC\$1, 439,789.11. Golden apple accounted for 36% of all non-traditional fruit exports. Because the trees are very tall (up to 14 m), harvesting is difficult and, therefore, an estimated 30% of the fruits are damaged during the harvesting process. A methodology was, therefore, developed to get low growing trees which can be easily harvested from the ground level. If golden apple growers adopt this method one can expect an increase in the quantity of fruits exported and marketed locally. Farmers will have greater control over harvesting and marketing of their fruits allowing them to access more profitable marketing arrangements. On the other hand, praedial larceny of golden apple fruits may become a factor impacting farmers.

Presentation 31: Factors affecting the relative competitiveness of cassava production in Southwestern Trinidad. By Hazel Patterson-Andrews and C. Pemberton, Department of Agricultural Economics and Extension, University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies

This study sought to determine the factors affecting the relative competitiveness (RC) measured as profit per acre, of cassava farmers in South Western Trinidad. A sample of 133 small farmers growing pure stand cassava provided the data for the study. A normalized translog stochastic RC frontier model was used to determine the factors affecting the mean and variance of the RC through the inefficiency component. The model also determined the factors affecting the variance of the symmetric random error.

The results found that the variance of the symmetric error was affected by age as well as the number of parcels of land owned by the farmer. Wage rate, the amount of family labour and wage rate squared were significant variables affecting the stochastic RC frontier.

The study found that the larger the number of parcels of land owned by the farmer, the greater was the RC and the smaller the variance associated with that RC. In addition men had a higher RC, but women tended to have a lower variance in their RC. Increasing age significantly increased the variance of the RC, but reduced the variance of the symmetric random error term.

Presentation 32: Factors Influencing Nutritional Status Among Low Income Elderly in Trinidad. By Isabella Granderson, Department of Agricultural Economics and Extension, University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies

Presentation 33: The effects of Net Food Imports on Obesity in Selected Latin American and Caribbean Countries. C.M. Jolly (Auburn University), P. E. Jolly, (University of Alabama, Birmingham), E. Namugabo (Auburn University), G. Nyguyen (Auburn University) and N. Diawara (Old Dominion University) and F. Ovalle (University of Alabama, Birmingham)

Obesity is becoming a major health problem in Latin America and the Caribbean (LAC). The prevalence of obesity and its related diseases such as cardiovascular diseases (CVD) which were estimated at 26 percent of all diseases are expected to triple by 2020. Researchers and policy makers have accredited the rise in obesity to changes in diet, life style, income and the growth of urbanization. Not much attention has been paid to food availability and imports. Food production in the LAC countries has been increasing at a slow rate, but food availability due to imports has grown at a much faster rate. Much of this growth in food availability can be associated with an increase in cheap food imports from the United States (US) and Europe. About half of all LAC countries are net food importers. In recent years surplus food producing countries have increased assistance for food purchases. The increase in food availability and consumption of imported foods are likely to affect weight gain and lead to obesity if the imported foods enhance caloric density, and lower the diversity of foods consumed. On the other hand, if the imported foods facilitate diet diversity this is likely to lower the risks of overweight and obesity. In this paper, we investigate the effects of food imports on obesity in selected LAC countries. Cross sectional data for the year 2002 for 25 selected LAC countries were collected from the World Health Organization health data base, FAO, the World Bank development indicator database, and World Penn tables. Regression analysis with a semi-log functional form was used to investigate whether food imports and other socio-economic variables were related to total population, male and female obesity. For total obesity the equation had an adjusted R^2 of 0.72 which means that the variation in the independent variable explained 72 percent of the variation in total obesity. Net food imports, meat consumed per capita per day, and total food imports, negatively influenced the

prevalence of total obesity whereas the total number of television sets and the number of tractors used in agriculture had positive effects on the prevalence of total obesity. For female obesity the equation had an adjusted R^2 of 0.68 which means that the variation in the independent variable explained 68 percent of the variation in total obesity. Net food imports, meat consumed per capita per day, and total food imports, negatively influenced the prevalence of female obesity, whereas the total number of television sets had positive effects on the prevalence of female obesity. Female participation in the agricultural labor force had no effect on female obesity. For male obesity, the equation had an adjusted R^2 of 0.64 which means that the variation in the independent variable explained 64 percent of the variation in male obesity. Net food imports, meat consumed, and food imports, negatively influenced the prevalence of male obesity whereas the total number of television sets had a positive effect on the prevalence of male obesity. However, net food imports had a negative influence on obesity in LAC countries indicating that net food imports may be enhancing the nutritional status of these relatively poor neighbors of the US.

Presentation 34: Estimating Demand for Fish in St Vincent and the Grenadines for Consumers and Fishers-Implication for Food Security By Cheryl Jardine-Jackson, Ministry of Agriculture, Forestry and Fisheries, St Vincent

Presentation 35: Promoting Food Security through Increased Production and Productivity of Selected Vegetables (under protected agriculture) and root crops. By M. Wilson, CARDI, Trinidad.

Two issues form the basis of activities which characterize the CARDI initiatives within its work programme; the increasing urgency of regional food security and the emergence of issues within a background of limited resources and environmental change. In this context, increased production and productivity of vegetables under protected agriculture as well as root crops are the focus of two new projects being implemented by CARDI over the next three years. The projects are entitled as follows:

- *Increased Production of Root and Tuber Crops in the Caribbean through the Introduction and Dissemination of Improved Production Technologies*
- *Increased Production of Vegetables and Herbs through the Use of Protected Agriculture in the Caribbean*

A holistic approach (within limitations) to the sustainable development of the industries is adopted. For this reason, the projects address key components which dictate the capacity of the region's industries to be competitive and to efficiently service the demand for these items. These components, determined within a commodity chain mode, comprise the servicing of markets, the transfer of production technology through training, the organization of commodity based groups, and the supply of planting material. The proposed loci of operations include Haiti, Jamaica, Barbados, Trinidad & Tobago and strategically selected OECS countries, however, the entire region would be expected to benefit from the project's expected output.

Presentation 36: Food Prices and Food Security in CARICOM Region: Assessing Impacts to Inform Policy Responses. By M. Bezuneh and Z. Yiheyis, Department of Economics, Clark Atlanta University, Atlanta, GA 30310, Corresponding Author: M. Bezuneh, mbezuneh@cau.edu

The recent sharp increase and volatility in food prices have shaken governments, in both developed and developing countries, and international development communities. As a result, it has stimulated renewed interest in assessing its impacts on food security. This paper will attempt to contribute to these growing efforts.

The purpose here is to examine the relationship between food consumption, which we take as a measure of food security, and food prices and other factors using the well-established availability/access/utilization framework in the CARICOM region. More specifically, the main focus of the paper will be on “chronic” as opposed to “transitory” food insecurity. The result is expected to have wider policy implications for both immediate as well as long-term national and regional food systems.

Presentation 37: Food Prices and the Issues of Food Security in the CARICOM. By Aziz Mohammed, Manager, Market Facilitation and Elbert Johnson, Executive Officer, The National Agricultural Marketing Development Corporation, Trinidad and Tobago

The unprecedented rise in food prices over the last two years sent shock waves throughout the entire world.

The rise in prices was caused by a number of factors, increases in commodity prices, greater demand for food and commodities, especially in China and India, drought and flooding as well as conversion of corn into fuel.

Especially vulnerable were the lower income groups in society. This group, which makes up a sizeable portion of the CARICOM countries, spends a large portion of its income on food consumption. The region is large importer of fuel and staples, such as wheat, rice and corn. The rise in prices resulted in double digit inflation in the region.

Individual member states of CARICOM adopted various measures to ease the burden of higher food prices. Among the measures undertaken were tax cuts, prices subsidies, social safety nets and steps to Increase agricultural production.

The high food prices brought into sharp focus the need for the region to have a sustained program for agricultural development in the region.

This paper looks at the causes of soaring food prices in Trinidad and Tobago and the impact of some government responses to mitigate rising prices and measures to address the issue of food security.

Presentation 38: Improving Local Food Supply Chains for the Tourism Sector in the U.S. Virgin Islands. By E. Wailes, University of Arkansas, Department of Agricultural Economics and Agribusiness, S. Crossman and C. Robles, University of Virgin Islands, Cooperative Extension Service, Louis Peterson Commissioner of Agriculture, Department of Agriculture, Government of U.S. Virgin Islands, and F. Mwajande, University of Arkansas, Department of Agricultural Economics and Agribusiness.

This study identified key production, marketing and policy constraints and barriers for local food supply chains to enhance agricultural market development for agritourism in the U.S. Virgin Islands. Focus groups and questionnaires were administered to policy decision-makers, farmers, and the hospitality sector to obtain information about these barriers and constraints and to identify appropriate policy responses to improve local food supply for the tourism economy. This information was evaluated using both qualitative and quantitative research methods to determine the relative importance of the constraints and agreement among stakeholders. Key constraints included inadequate production resources (land, irrigation, and credit) and lack of quantity, quality and information of local foods to meet the demand by the tourism sector. Findings were presented and discussed at stakeholder meetings. A pilot project to integrate producers and island restaurants and resorts (Farmer-Chef Connection) was proposed and is being implemented. Legislative proposals to address production and marketing resource constraints are also being developed. Emphasis on active participation of stakeholders and the development of a policy network is viewed as critical to developing sustainable food tourism supply chain linkages.

Keywords: Sustainable, local, food, chains, tourism, Caribbean

Presentation 39: Retail Margins, Price Transmission and Price Asymmetry in Selected Agricultural Commodities in Trinidad and Tobago: Investigating the Causes of Presentation: Increasing Food Prices. By A. Patterson, Graduate Student, D. Singh-Knights, Lecturer, Department of Agricultural Economics and Extension, U.W.I., St. Augustine and Marlon Knights' Associate Professor, Center for Biosciences, University of Trinidad and Tobago

Large structural shifts in the global economy are causing a dramatic rise in the price of food. Since 1994, food prices in Trinidad and Tobago have risen above 350%, faster than the price of other items. From March 2006 to 2007, the food component of the retail price index increased by 19% whilst the overall price index increased by 8%. Sizable and fluctuating price differences have been recorded between wholesale and retail prices. This paper looks at the development of retail food prices, its causes, the potential impact in terms of food security and possible policy recommendations. Through time series analysis, price margins and time lags are examined to determine the nature and lag of the response in municipal and retail price changes to wholesale prices. Non-linear hedonic models are estimated using auction price and quality data for specific commodities and markets to examine whether buyers have systematic preferences for specific attributes (weight, market class, sales lot size, market location and timing of sale) and whether they pay significantly different prices for these attributes consistent with their preferences.

The results show that the price transmission between wholesale and retail happens in the same week and that price asymmetry, i.e., the different transmission of price increases compared with price decreases, is present for most products. Products characterized by relatively more standardization and homogeneity are shown to have lower retail margins and to behave symmetrically. The results also indicate that buyers have systematic preferences for specific product attributes and that these preferences are implicitly reflected in prices offered in traditional auction markets. The results underscore the need for increased producer supply response to capitalize on the opportunity offered by higher commodity prices by targeting specific attributes and by better timing production and marketing undertakings.

Keywords: Food prices, food security, price lags, price margins, price transmission, hedonic price analysis.

Presentation 40: Contribution of Agriculture to GDP in Antigua and Barbuda-Returns to Government Expenditure in the Agricultural Sector. By Jennifer Maynard, Ministry of Agriculture, Lands, Marine Resources and Agro-Industries, Antigua and Barbuda

Presentation 41: Depth Based Discriminant Analysis: A Case Study of Food Safety Issues of Caribbean Imports. By A. Abebe, Department of Mathematics and Statistics, Auburn University

Caribbean food imports often face detentions and refusals by the U.S. resulting in a major loss of income. In this paper, we consider a classification procedure based on statistical depth functions for determining if the U.S. will detain imports from a specific country. Statistical depth functions are functions that are used to order multivariate data and also to measure centrality of a multivariate data point in a data cloud. It is shown that the classification procedure can be robust against outlying observations. In other words, the classification procedure predicts detention with a lower probability of error than classical procedures when the data are skewed or heavy tailed.

Moreover, an algorithm for ranking variables according to their contribution towards predicting detention will be given.

Acknowledgement: This work is supported by the U.S. National Science Foundation grant DMS-0604726.

Presentation 42: Melamine Food Recall: Effects on Animal/Human Health, Food Control and Implications on Regional and International Economic Trade. By N. Badrie, Department of Food Production, Faculty of Science and Agriculture, University of the West Indies (UWI), St. Augustine, C. Jolly, Professor and Chair of Agricultural Economics and Rural Sociology, Auburn University, Alabama, S. Y. De Leon, I. de la Cruz, Foundation for the Advancement of Food Science and Technology (FAFST) Manila and H. Ali, Chemistry, Food and Drugs Division, Ministry of Health, Trinidad and Tobago, West Indies

Revelations of significant safety threats posed by melamine contaminated imported and local foods have dramatically heightened public concern and triggered food control measures. In China 54,000 children were reported sick and sought medical treatment due to the use of melamine contaminated infant formula. About 12,900 children were hospitalized and millions of dollars were lost by industries producing baby foods, implicated in the scandal. Melamine is a synthetic chemical used in a variety of industrial applications including the production of resins and foams, cleaning products, fertilizers and pesticides. It is not naturally occurring and is not allowed to be added to food. It is a low oral toxic chemical that is used in food contact materials such as labels and containers. It is high in nitrogen and has been added to animal feeds to disguise their protein content, lower costs and increase manufacturers' profits. Companies have, therefore, adopted the practice of adding melamine to animal feeds, especially in the poultry industry to enable them to meet feed protein requirement.

Though melamine is considered metabolically inactive and low in toxicity, excessive exposure to the substance has been found to cause urinary tract stones, and crystals in the urine. Its association to cancer is doubtful, and hence the International Agency for Research on Cancer (IARC) of the World Health Organization has been hesitant to link the product to cancer risks.

Since the Chinese scandal, a number of countries on the continents of Asia, Africa, Latin America and Europe have adopted food control regulations to prevent the product from entering the food chain. Food control is to control and promote the safety, appropriate quality and composition of all foodstuffs, and to prevent and eliminate any effects of foodstuffs that might be harmful to human health. The United States and China have thus set

minimum quantities from .23 to 1mg/kg for infant milk and 2.3 kg/mg for other foods. Given that little is known about the long-term ill-effects of consuming melamine, and the associated risks of this imported food products to the Caribbean and the developing world, it is important to examine the probable health and economic risks associated to melamine tainted food products.

This paper focuses on the chemical hazard, cases of melamine food poisoning, effects of melamine on animal and human health, food safety and quality control measures, institutional structure and capacity to tests and control melamine entry into the food chain, impact on International and Regional Trade and recommendations for better food control and protection of consumers from unsafe foods.

Keywords: Melamine, food recall, food safety, international trade, economic implications, consumer protection

Presentation 43: Factors Associated with Acute Pesticide Poisoning among Farmers in Northwestern Jamaica. By Pauline Jolly, N. Ncube, Patricia Bessler, (University of Alabama at Birmingham, Birmingham, AL), Christopher Fogo, (Ministry of Health, Jamaica) and Curtis M Jolly, (Auburn University, Auburn, AL)

The safe production and marketing of food is a major step towards food security. However, many farmers put themselves at risk from pesticide poisoning during the production process. The unsafe use of pesticides is a major problem, especially in Caribbean Common Market (CARICOM) countries where the most persistent and hazardous pesticides are used by farmers with limited training. Excessive and improper use of pesticides is one of the major causes of chemical poisoning in the CARICOM area. In Jamaica, high levels of pesticide residues have been detected in surface water and aquatic life but the extent of acute pesticide poisoning among farmers has not been determined.

We conducted a population survey using an interviewer-administered questionnaire among farmers in three parishes of northwestern Jamaica to determine the occurrence of pesticide poisoning and to identify factors associated with pesticide poisoning.

Approximately 16% of the 359 farmers who participated reported incidents of pesticide poisoning within the last two years. Age 40-49 years (compared with 20-39 years), shorter distance from home to the farm, 20-29 years of farming experience (compared with ≤ 20 years), using hand-held sprayers and never wearing masks/respirator when handling pesticides were significantly associated with pesticide poisoning. Factors that were protective against pesticide poisoning included, always reading the instructions on the pesticide bag before use, using special tools for mixing and applying pesticides, and farm owned/run by a family. The majority (60%) of farmers who reported pesticide poisoning never sought medical attention for poisoning.

Approximately one in six Jamaican farmers experienced symptoms of acute pesticide poisoning but the majority did not seek medical attention. The factors found to be associated with pesticide poisoning in this study indicate that implementation of specific intervention strategies and education of farmers can lead to safe handling and use of pesticides and reduction of acute pesticide poisoning among farmers.

Presentation 44. Belize Rural Development Project - Achievements, Lessons and Future Challenges for Rural Development in Belize. By Marcelino Avila, Belize Rural Development Programme (BRDP).

Presentation 45: The Nevis Model. By E. Evelyn. Ministry of Agriculture, Nevis

Prior to 1990, there was a production-led approach to crop production in Nevis. Farmers harvested their crops hoping to get them sold and not producing them for a specific market. This approach to production changed in 1990 when the completion of the Four Seasons Resort (FSR), a 5 star hotel, provided an opportunity to revise the Marketing Approach in Nevis. This revision eventually led to a multi-faceted marketing strategy for agricultural products. The Four Seasons Resort which offers 400 beds and employed in 1990 about 575 persons, created a large single market for agricultural produce. The multi-faceted approach involved joint activities of producers, research and extension in a closely monitored production and marketing system which developed into the 'Nevis Model'. This model encourages producers to become more oriented towards commercializing agriculture. In 1990, the Department of Agriculture along with Allied Agencies discussed with the management of the Four Seasons Resort about supplying local produce to the hotel. The hotel management agreed to become involved in an organized marketing programme and provided information pertaining to vegetable requirements, quantities needed and the price they were prepared to pay for each product. They welcomed the opportunity to do business with the farmers as a single entity. Following the initial discussions between research, extension and the producers, the Nevis Growers Association (NGA) was formed with 12 members. For the producers, this was an opportunity to focus on supplying produce for a specific market in a Market-Led system and to establish an Agro-Tourism Linkage. To facilitate the marketing of agricultural products, a Marketing Division was established within the Department of Agriculture. This Division coordinates the marketing of produce of all farmers and also function as a clearing-house for the NGA. Over the years, the Nevis Model has evolved and a much wider range of produce is now being provided. In addition, a number of animal products are also being provided.

Presentation 46: The Value and Impact of Extension Services on Farmer Productivity.
By Derrick Deslandes, The University of the West Indies, Mona, Jamaica

Presentation 47: Rethinking the Role of the Agricultural Sector for the Economic Development of Barbados “The Challenges of the 21st Century”. By R. Hippolyte, Economist II, Ministry of Agriculture. rhippolyte@barbados.gov.bb; Agricultural Planning Unit Ministry of Agriculture, agriplanning@caribsuf.com

The role of the agricultural sector in Barbados has been substantially relegated as the country has continued on a path of economic diversification, in order to attain sustainable economic growth and development. Policy initiatives aimed towards this notable structural change in the economy have therefore resulted in the significant decline in output from the sector. However, recent global and national challenges in the twenty first century have brought the relevance of the agricultural sector to the fore.

This paper provides an overview of the policy framework and development of Barbados’ agricultural sector. The paper also highlights three agricultural issues which can severely impact economic development in Barbados if not urgently addressed. These are: the rising levels of imports, rising food prices and rising levels of non-communicable diseases. Strategies which may be deemed beneficial for the local agricultural sector, if it is to remain a viable tool for national economic growth and development, have also been identified.

Keywords: Barbados, agriculture, economic development

Presentation 48: The Uses of Information and Communication Technologies (ICT's) in Extension for the Modernization of Caribbean Agriculture. By Wayne G. Ganpat (Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago), Sarojini Ragbir, (The University of the West Indies, St Augustine) and Claudette de Freitas (CARDI, St Augustine)

The history Information and Communication Technologies (ICTs) use in Agricultural Extension in the region has been fairly good. The use of radio and television in early days as well as increased use of computer-based presentation software for farmer education in recent times show attempts to keep up with emerging technologies. Unfortunately, these tools can be considered as “old ICTs” and a whole new range of “hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information” (World Bank, 2009) known as new ICTs, is available. These present opportunities for extension organizations and staff in the region to communicate much more effectively and efficiently with clients and each other.

The need to hasten the use of modern ICTs is urgent because the client base of extension has now expanded beyond farmers to include agribusiness entrepreneurs, agri-processors and marketers. Extension is now expected to provide technical support beyond farm production practices in such areas as value addition, business development and marketing and to a category of clients more technology oriented than traditional farmers.

This paper outlines the benefits of ICT use in the region and provides examples of modern ICT tools and techniques that are available for use in the region: internet kiosks; community based telecentres; SMS texting; internet radio and video; mobile learning units, the creation of virtual extension officers and virtual information centres for specialized clients.

Some of the challenges to overcome are identified and the paper concludes with suggestions for the way forward using ICTs in extension: revisit extension's role and functions; improve client sensitization, build staff technical capacity, and improve access.

Effective ICT use has great potential to hasten the modernization of Caribbean agriculture. Policy makers however, must facilitate its immediate use if key agricultural development objectives as set out by regional leaders are to be met.

Presentation 49: Applications of GIS and GPS Technology for Extension in the Caribbean: Identifying Sustainable Practices in Trinidad and Grenada. By Edwin Joseph, Grand Valley state University, Allendale Michigan

Technology changes the organizational structure and roles of employees in the workplace. Many researchers in the Caribbean are now incorporating GIS and GPS technologies into their field work, but there is little collaboration or communication that could lead to wider use and long-term sustainability. The use of GIS and GPS in the Caribbean can therefore be best described as sporadic and disconnected. In a 2008 GIS training workshop in Trinidad, and a 2009 workshop in Grenada, participants were given the opportunity to learn how to integrate GIS, GPS, and multimedia into everyday extension practice. Post training responses reveal that extension officers are optimistic about the impacts of GIS on their jobs. Participants identified GPS and multimedia as tools that enabled optimal use of time in the field, and encouraged collaboration. This paper reviews cost-effective sustainable solutions for innovative extension practices for the Caribbean.

Presentation 50: Assessing Agriculture Practices in the Livestock Industry: A Base for Establishing Internationally Accepted Good Agricultural Practices in the Livestock Industry of Antigua and Barbuda. Doolarie Singh-Knights, Lecturer, Department of Agricultural Economics and Extension, U.W.I., St. Augustine, Marlon Knights, Associate Professor, Center for Biosciences, University of Trinidad and Tobago, Sereno Benjamin, and Astley Joseph Extension Officer, Ministry of Agriculture, Antigua and Barbuda and Carlton Sambury, Student, Department of Agricultural Economics and Extension, U.W.I., St. Augustine

Sustained increases in sheep and goat inventory suggest that Antigua and Barbuda can significantly increase the proportion of its domestic demand for livestock products from locally produced animals, as well as potentially supply live and processed animal products to its CARICOM and non-CARICOM neighbors. These markets are likely influenced by factors affecting global demand including social, environmental, and, health and safety issues. An improvement in local and regional economies and an increase presence of international or regional supermarket chains would necessitate an increase in the quality of locally produced livestock products, and improvements in the conditions under which they are produced. The assessment and implementation of Good Agriculture Practices (GAPs) is a necessary step if livestock producers are to meet the demand of an increasingly discerning local or regional consumer base or if they are to tap into the more lucrative and demanding hotel and service markets.

Baseline data on the management practices of livestock producers in Antigua and Barbuda was collected to:

1. Ascertain the extent to which GAPs are being implemented;
2. Evaluate the suitability of the EUREPGAP assessment forms as a basis for developing local standards with the potential of ‘bench marking’ to EUREPGAP; and to
3. Determine the requirements for establishment of local standards and a certifying body.

The results suggest that producers and meat handlers are not compliant in many important areas or control points, which stems from general lack of appropriate animal identification

and record keeping, the lack of formal training by many producers, the lack of legislative framework and regulatory agencies to support compliance. Interestingly, there is a high degree of compliance in some areas attributed to both good management practices and the relatively low use or absence of practices that have raised consumers' concerns about the safety and quality of livestock products. Additionally, Antigua and Barbuda is seemingly free of many major diseases including notifiable diseases, and provides free Veterinary health service to producers. Therefore, it is suggested that livestock producers in Antigua and Barbuda can become compliant with certifiable GAPs with minimal alterations in their production systems.

Presentation 51: Farmer Participatory Approaches for Sustainable Agricultural Development: The Trinidad and Tobago Experience. By Deanne V. Ramroop, Ministry of Agriculture, Land and Marine Resources, Trinidad & Tobago and Sarojini Ragbir, Department of Agricultural Economics and Extension, University of the West Indies, St. Augustine, Trinidad and Tobago, West Indies

Pest management is one of the most limiting factors to crop production in Trinidad & Tobago. One of the problems identified was the transfer of both existing and new technologies to farmers to ensure development of their knowledge base, leading to sustainable agricultural production. A pilot Farmer Field School (FFS) project in 2003, introduced the use of Farmer Participatory Approaches (FPA) for Ecological Crop Management (ECM) in Trinidad & Tobago. During the period 2004/2008, thirty eight FFS have been conducted with over four hundred (400) farmers.

In order to assess whether FFS is a sustainable practice, a survey of 25% of the farmers (106) who had participated in FFS over a period 2003-2008, was conducted in May 2009, to determine responses to factors related to sustainable rural development dimensions, namely, Institutional, Environmental, Social and Economic factors. These farmers were interviewed in groups in the field and their responses captured using the meta card system of voting. These responses were then transferred to the questionnaires.

Basic frequency analysis was carried out which indicated that more than 90% of the farmers were very satisfied with the institutional arrangements, became more knowledgeable of the factors related to environment and agreed that the knowledge gained from FFS empowered them to make more sustainable agricultural development decisions. More than 79% of the farmers improved their knowledge and skills in Crop and Plant Health Management. With regard to the economic factors 95% of the farmers agreed that their income or standard of living had not increased since there was no reduction in pesticide costs and other inputs. More than 94% of the farmers had adopted the technology transferred using the FFS methodology and are currently using these techniques. The study, however, could not conclusively state that FFS is a sustainable practice since further statistical tests are required.

Keywords: Ecological Crop Management, Farmer Participatory Approaches, Farmer Field

Presentation 52: Presentation by Augustine Merchant

Presentation 53: The National Agricultural Market Information System of Trinidad and Tobago (NAMIS), as a Stimulus for Development of Regional Agri-Food Production and Trade. By Prakash Ragbir, Manager, Information and Communications Technology. NAMDEVCO, Avenish Ali. Database Administrator. NAMDEVCO, Elbert Johnson, Chief Executive Officer, NAMDEVCO

Availability and accessibility of appropriate information has been identified as one of the major constraints to the advancement of the agricultural sector both locally and regionally. To address this problem, in January 2007, NAMDEVCO launched its National Agricultural Market Information System (NAMIS). This system is currently being used as a tool that provides timely and accurate information to stakeholders in the Agri-food sector thus enabling them to make informed management decisions. The collection methodology employed allows for the collection of wholesale and retail prices and volume information for fresh produce, sea-food, and processed products in over 80 different collection areas throughout Trinidad and Tobago.

To date, NAMIS has proven to be a valuable asset to the agricultural sector by effecting a reduction the price spreads between wholesale and retail, leveling the playing field between buyers and sellers and by identifying areas of opportunity. By May 2009, over 1 million hits have been recorded to the website; an average of 3,000 per month. The Buyers and Sellers Forum have so far accounted for sale of approximately 1.53 million kg of fresh produce among 173 registered users in Trinidad and Tobago; an average of 40,000kg per month.

The system has the potential of becoming the model for market information and intelligence, as well as other forms of advanced markets and trading systems such as e-commerce and commodity exchanges.