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45

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**“Reality and Potential of Food Security and Agricultural Diversification in Small Island
Developing States”**

**“Realidad y Potencial de la Seguridad Alimentaria y la Diversificación Agrícola en
Pequeños Estados Insulares en Desarrollo”**

**"Sécurité alimentaire et diversification agricole dans les petits états insulaires en
développement: réalisations et perspectives".**

**United States Department of Agriculture,
T-STAR Sponsored Invasive Species Symposium**

**INVASIVE SPECIES SAFEGUARDING: IMPERATIVE FOR CARIBBEAN
REGIONAL AGRICULTURAL DIVERSIFICATION AND FOOD SECURITY**

**Special Symposium Edition
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TOWARDS ACHIEVING ENHANCED FOOD SECURITY THROUGH COMBATING INVASIVE SPECIES: Regional Academic Institution Perspective

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INTRODUCTION

According to the *Rome Declaration on World Food Security* enunciated at the World Food Summit held in November 1996 ... *Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life* (FAO, 1996). The latest FAO data indicate that 923 million persons, and most of these in developing countries, are chronically hungry (FAO, 2008); these persons do not have sufficient food to meet their basic nutritional needs and this, despite the ongoing global efforts to achieve Goal 1 of the Millennium Development Goals of halving the proportion of persons suffering from hunger by 2015. In fact, in a region like Sub-Saharan Africa, hunger is increasing (UN Millennium Project, 2005). For the Latin American and Caribbean region, FAO (2008) estimated that 45.2 million persons are undernourished (North America and Central America, 8.8 million; South America, 28.8 million; Caribbean, 7.6 million). Alarmingly, the FAO suggests that the number of chronically hungry persons in the world rose by 75 million in 2007 due principally to soaring food prices; this compares with an increase of 6 million for the 2003-2005 period over the 1990-1992 baseline period (FAO, 2008). However, FAO questions whether it is being too conservative and quoted USDA data (derived with a different methodology from that employed by FAO) which indicated that the number of undernourished persons increased by 133 million in 70 countries studied, due to high food prices (FAO, 2008).

One of the major constraints to increased food production and food security is the action of crop pests, whether native or invasive aliens. Oerke (2006), for example, reported global losses in several crops, varying from 50 percent in wheat to over 80 percent in cotton; for maize, rice and potatoes losses were 31, 37 and 40 percent, respectively. Further, according to this report, weeds generally caused the highest potential loss (34 percent), with animal pests and pathogens responsible for losses of 18 and 16 percent respectively.

INVASIVE ALIEN SPECIES IN THE CARIBBEAN

There have been several recent reports highlighting the increasing introductions of invasive alien species (IAS) in the Caribbean and measures to mitigate these introductions. For example, Kairo *et al* (2003) documented a range of IAS threats to the Caribbean but still recognised that several knowledge gaps exist, for example, with respect to the reporting (or under-reporting) of micro-organisms or of marine organisms. Interestingly, from an agriculture perspective, the least number of invasive threats identified were to agriculture. Other reports have listed specific

threats to agriculture (Pollard, 2005; Pollard and Pegram, 2004; Pollard et al., 2008). Also, IAS threats to US-Caribbean agricultural trade have also been considered (Klassen et al., 2004). The impact of IAS on agriculture is both direct (loss in yield, impact on livelihoods) and indirect (*e.g.* loss in biodiversity). For example, not only does the giant African snail cause severe loss in yield to several crops (Mead, 1961; 1979; Mead and Palcy, 1989; Matalavea, 1997; Birat, 1971; Srivastava, 1973) but this pest has also been observed preying on veronicellid slugs at two sites on the island of Oahu, Hawaii (Wallace et al., 2008). This recent observation could have grave implications on the impact on biodiversity in those areas where the giant African snail has been recently introduced as it may cause a decline in native molluscan species.

IS THE REGION PREPARED TO DEAL WITH INVASIVE ALIEN SPECIES?

Role of Governments

According to the Convention on Biological Diversity (CBD), Article 8(h) ... *Each Contracting Party shall, as far as possible and as appropriate: Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.* All governments of the Caribbean have ratified and/or acceded to the CBD and, hence, are obliged to implement its provisions. Therefore, it is obligatory on the part of every Caribbean Government to do all in its power to prevent the introduction of, or to control or eradicate those invasive species which threaten ecosystems or indigenous species. However, the question is how many Governments have put the required mechanisms in place (policies, research, legislation and regulations, *etc*) to combat the increasing IAS threats resultant from the increasing imports of agricultural products by Caribbean countries and the growing numbers of tourists into the region.

In order to prevent the introduction of new pests into a country, provisions of the International Plant Protection Convention (IPPC) and the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) apply. These international agreements, of which nearly all Caribbean countries are Parties, establish a framework of rules and disciplines to guide the adoption, development and enforcement of sanitary and phytosanitary measures to safeguard human, animal and plant health from those organisms that may be introduced (IAS included) through trade in agricultural products and in such a way that their negative effects on trade are limited. How successful have Caribbean governments been in the application of measures of these two agreements?

According to Kairo *et al* (2003), there is considerable variation in the capacity of island states in the Caribbean to tackle invasive species issues at the national level and, further, even when there might be some national capability (*e.g.*, regulations and infrastructure in relation to the agriculture sector generally) ... *there is often a lack of capacity and enforcement.* In the latter regard, governments were strongly urged to address the need for the drafting and implementation of required legislation and regulations to deal with the introduction, spread and management of invasive alien species. Taken further, it was the view of these authors that governments need to have a clearly enunciated policy on invasive alien species.

Apart from national action, there is also the need for regional collaboration to mitigate the impact of a growing number of regional threats. Recent regional impact of agricultural invasive alien pests, such as coconut lethal yellowing or red palm mite (*Raoiella indica*) or pink hibiscus

mealybug (*Maconellicoccus hirsutus*) indicate the need for regional responses to such threats (e.g., Kairo et al., 2008). In fact, the point has been made that preventing the introduction of invasive alien species must be a collaborative effort not only regionally but also globally. For example, Burgiel et al. (2006) stated ... *To be most effective, a system of prevention measures must be international or regional in scope, and implemented at the national level via strong legislative and regulatory systems.*

Role of Regional Research and Academic Institutions

Notwithstanding the obligatory role of governments, what must or should be the role of regional research/academic institutions? Do they have a role to play? If so, then to what extent have these institutions taken up the challenge to address the growing problem of invasive alien species and of mitigating the threat of these organisms? This latter question is particularly relevant when these institutions are supported wholly or partially by public funds.

It is the view of the author that national and regional research and academic institutions must, in the first instance, be critically supportive of any official governmental policy and action in identifying and mitigating the threats of invasive alien species. Additionally, such institutions must take a major, if not the leading, role where there is a lack of national capability and capacity, in spearheading relevant research in the mitigation and management of introduced invasive alien species. Preferably, such research would be in collaboration with national research institutions when the capability exists. Academic/research institutions can provide, for example:

- Taxonomic assistance in the identification of newly introduced invasive alien species
- Research on the biology, ecology and management of invasive alien species
- Training of national plant protection and quarantine (PPQ) personnel in the identification of invasive alien species
- Training of national plant protection and quarantine (PPQ) personnel in the management of invasive alien species
- Training of national plant protection and quarantine (PPQ) personnel in modern plant quarantine procedures including (but not limited to) detection surveys for invasive alien species, inspections at ports of entry and treatments
- Pest risk analysis (PRA) training, inclusive of pathway risk analysis, to national PPQ personnel
- Development of relevant national and/or regional databases on invasive alien species
- Assistance with the development of national pest lists
- Assistance with the development of national emergency action plans to deal with the introduction of those invasive alien species with grave potential to have major impact on agro-ecosystems and natural habitats

Activities at the St Augustine Campus of the University of the West Indies (UWI)

While there is no formal programme on invasive alien species, several activities exist. These include:

Research activities (ongoing or planned):

- Studies on fresh water and marine invasive alien species – Invasiveness of guppies, *Poecilia reticulata* (in collaboration with University of Edinburgh); green mussel (*Perna viridis*)
- Revision of the flora of Trinidad and Tobago, in collaboration with Oxford University. It is expected that this study will identify any new invasive alien plant species in the country

- Biology and management of invasive alien pest species affecting agriculture, *e.g.*, hibiscus mealybug (*Maconellicoccus hirsutus*); red palm mite (*Raoiella indica*); citrus blackfly (*Aleurocanthus woghumi*)
- Preventing the entry of *Moniliophthora roreri* (causal agent for Frosty Pod Rot of Cocoa) into Trinidad and Tobago (in collaboration with the Cocoa Research Unit and the Ministry of Agriculture)
- The maintenance of the native biodiversity of the ESA – Nariva Swamp by the production and transplanting of IAS-free palm seedlings
- Managing the spread of *Acacia mangium* as an invasive alien species within natural forests in Trinidad

Teaching

- MSc Crop Protection: modules on invasive alien species as crop pests and the various related international agreements, *viz.* IPPC and WTO SPS Agreement.

Outreach

- UWI is a member of the Caribbean Invasive Species Working Group (CISWG) and, hence, is an active collaborating partner in the ongoing work on the development of strategies to mitigate the impact of invasive alien species in the Caribbean sub-region.

CONCLUSIONS

The Caribbean region continues to be vulnerable to introductions of invasive alien species. Over the past decades and, increasingly more so, this region has experienced the introduction and establishment of several invasive species which have had severe impacts on the agriculture sector. Disturbingly, governments in the region have done too little to deal with these threats. More surprisingly, is the relatively scant effort that regional academic institutions, especially in the CARICOM region, have paid to this problem. While individual researchers have tackled those invasive species problems in which he/she might have had a particular interest, there has seemed to be no effort to develop a comprehensive national or, more preferably, regional programme to address this major problem.

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