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A HOT PEPPER INDUSTRY IN THE CARIBBEAN: A VISION AND REQUIREMENTS OF A SUSTAINABLE AND PROFITABLE INDUSTRY

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ABSTRACT: Hot pepper (*Capsicum chinense* Jacq.) is indigenous to the Caribbean region between latitudes of approximately 1°-23° north or south of the equator. It has been consistently shown that in the region the cultivation of the hot pepper cultivars with Scoville (Heat) Test units of >200,000 (super hot group) for pungency is profitable and internationally competitive. The paper would offer a definition of “industry” and the hot pepper industry of the Caribbean would be defined. An outline of the requirements for the development of the industry would also be given. The presentation would highlight the comparative advantages of the hot pepper cultivars traditionally grown in the region and advance their international acclaim for distinct flavour, highly aromatic and super hot (*capsaicin* acid derivative).

INTRODUCTION

Hot pepper (*Capsicum chinense* Jacq.) is indigenous to the Caribbean region between the latitudes of approximately 1°-23° North and South of the equator (McDonald, 1999a). Hot pepper of the region is distinguishable for its high pungency, aroma and flavour. These peppers (*C. chinense*) are in the super-hot group, which is known to measure > 200,000 heat test units (Scoville) (McGlashan MSc Thesis, 1993). They are also highly adaptable to the climates of the region and it has been shown that hot pepper can be profitable and internationally competitive (FAO/IICA, 1998). However, for the hot pepper crop of the Caribbean to truly develop and become a sustainable and remunerative industry, specific development strategies have to be developed. The Caribbean hot pepper industry can be realised with the recognizable cultivars ‘Scotch Bonnet’ and ‘West Indies Red’ along with other developing lines or established cultivars grown specifically in some countries in the region. This peculiarity can be seen as a strength whereby each country having its own specific pepper(s) with special flavour and aroma and still be a *bona fide* participant of the Caribbean hot pepper industry.

MARKET FOR HOT PEPPER

Hot pepper (*C. chinense*) has been known to have an export potential in the United States of America, Europe and Canada. Since 1993, West Indian hot peppers are considered an elite member of the chilli pepper family and fetch premium prices in these markets (Cooper et al., 1993). In the early 1990s, there has been an upsurge in the use of spicy foods in USA and United Kingdom though there has been little evidence of crossing-over in the consumption of the super-hot pepper from the Caribbean. The Caribbean hot pepper still remains largely a niche market product in these countries. From 1995 to 1998 imports of hot pepper to the US market grew from 87,779 to 128,920 tonnes with Mexico accounting for 99% of total imports. Suppliers making up less than 1% of imports included Canada, India, the Netherlands, the Dominican Republic (DR), St Lucia and others. The United States import market for dried, crushed and ground hot pepper in 1998 was valued at US\$84 million, which was the result of a 110% growth over the 5-year period 1993 – 1998 (Medlicott, 1999). The United Kingdom with its large and diverse ethnic populations is another potentially large market. Inputs of hot fresh pepper increased 134% from 1994 to 1997 with the largest suppliers being the Netherlands and Spain.

Very recent studies of the US markets in Miami and New York (Brooklyn, Bronx and Queens) were illuminating. These findings can be found very useful in the process of developing a Caribbean hot pepper industry. The studies showed that the markets in Miami and New York, particularly the former,

are unsophisticated in terms of product differentiation. All Caribbean hot peppers are lumped either as “Scotch Bonnet” or as ‘Habanero’. This product “ignorance” can be used as a motivating factor for Caribbean producers to take the necessary steps in first forming a hot pepper industry association which can collectively address the issue of “ignorance”. Scott (2001) proposed a programme to show off the distinguishing characteristics of hot peppers of the Caribbean in contrast to Mexican peppers and others as well as educating the market intermediaries as to what product (s) they are carrying. The pay off can be enormous if the market trend in US of increasing demand continues for the Caribbean hot peppers.

The second elucidating point is the presence of a counter-seasonal hot pepper market in both Miami and New York which is supplied by Caribbean imports during the period October to April. This period is complementary to local production in southern New Jersey plains, Florida and Texas. The development of counter-seasonal markets has enhanced produce availability almost all year round in these markets.

The third important point is that the major supplier of hot pepper from the region is Trinidad which produces at this point in time a preferred large red pepper locally known as ‘Faria’. Belize has shown to be the second major supplier, but of the cv. West Indies Red. Jamaica has been a traditional producer and exporter of the ‘Scotch Bonnet’ but in the past two years exports have significantly declined. Jamaica hot pepper has been reported of low quality and exacerbated by the mandatory methyl bromide fumigation due to the gall midge complex infestation on the two cultivars Scotch Bonnet and West Indies Red. The USDA/APHIS requirement is presently enforced for all Jamaican hot pepper exports on entering any port in the United States.

Production in the Caribbean region showed the concomitant increase, as the market demand, during the period 1987 to 1997. These increases, however, have shown to be erratic and due to several factors: drought, crop production technology, pests and diseases and post harvest problems. Over the period 1991 – 1999 using data for the USA, UK and Canada, it was reported by Stewart and Fletcher (2000) that there was a 7-fold increase in the quantity of fresh hot pepper exported from the CARICOM region, with a corresponding 9.7-fold increase in value. Jamaica despite its difficulties remained the main supplier accounting for an average of 60% of the total amount exported.

AGRICULTURAL RESEARCH NEEDS IN THE DEVELOPMENT OF THE HOT PEPPER INDUSTRY

The advancement of science and technology certainly in the last century in agriculture and specifically in crop agriculture has led to the development of many agriculture-based industries. It is therefore necessary to identify the essential areas requiring research and technological advancement for the development of a hot pepper industry in the Caribbean. There have been recent publications which denoted the need for research in hot pepper (McDonald, 1999d; McDonald, 2000).

Germplasm development and improvement should be given top priority with the purpose of supplying varieties to satisfy the market demand. This should be seen as an on-going process. Breeding for resistance/tolerance to viral diseases must be undertaken using conventional breeding methods in combination with molecular biology techniques. There is the need also for identifying and breeding other varieties that are known for flavour and less pungency.

Research on agronomic improvement and efficiency in production and processing of the hot pepper produce must continue. Using advanced techniques, there is the possibility of increasing yields from 25,000 kg/ha to 50,000 kg/ha. Better understanding of spacing, fertility and the use of hormones can contribute to reaching these high production levels that would reduce cost of production. The use of plant hormones and increased plant density have shown to have the potential to raise present production of the cv. West Indies Red at least by two-fold (M. Mycoo, personal communication, 2001).

Irrigation to the hot pepper crop has shown to be critical for all year round production. Post harvest including handling, packaging and transportation must be considered for sustainability and profitability.

All these technologies new and advanced must be planned for the immediate, medium and long term achievements. This then demands a holistic approach based on the fundamentals of industry development.

DEVELOPMENT THE HOT PEPPER INDUSTRY IN THE CARIBBEAN

Stewart (2001) provided an adequate definition of “industry” as follows: “an industry can be described as consisting of the firms, institutions and individuals whose policies, decisions, actions, products and services have a direct effect on the production, processing and marketing of a specific product, service or specific group of products and services.” The specific product/service affected by these entities is referred to as the industry and the firms, institutions and individuals are referred to as industry participants. Thus we can speak for example of the banana, hot pepper or tourism industry.

In summary, an agricultural based industry represents the sum activities involved in the production, marketing and processing of a specific agricultural commodity or product. Therefore by extension, a Caribbean hot pepper industry should comprise the various activities of production, marketing and processing of several products in each hot pepper producing country.

There are several theses on industry development and who can best engineer the process. It is not intended in this presentation to establish any hypothesis, but to offer considered opinions on a possible path of development of the hot pepper industry in the Caribbean and the roles of the various external agents such as CARDI to play.

The industry needs to be stabilized by moving an agriculture based industry from simply involving production to one which is characterised by elements such as well-defined markets, regulatory bodies, value-added and on-going product innovation (Harris et al., 1999). The goal of industry development is to expand the market of a particular product or group of products by: raising the demand; investing in primary supply expansion and; reduction in transaction costs.

All three approaches are important to industry development but I feel at this time that the first and second are very relevant to the hot pepper industry development in the Caribbean.

RAISING THE DEMAND

This approach is to raise the demand for hot pepper (*C. chinense*) through efforts such as product differentiation to satisfy a highly varied market with consumers of peppers of high pungency to moderate and mild.

It has been suggested by Scott (2001) that any attempt to develop a hot pepper industry must address product development and utilization with the view of end-point solutions in high-end product development and usages. It is suggested that there should be a phased development. In Phase I (years 1-5), emphasis should be placed on development and improvement of the following: Peppers for the fresh market; Sauces and seasoning; Salsa; Jerk seasoning; Flavouring.

In Phase II (years 3-10) the following areas must be developed: Dried powder; Processing of extracts for food ingredients; Processing extracts for industrial/Pharmaceutical uses

Demand expansion is not always easy to accomplish. On the other hand, if the demand is enlarged but the industry is not able to fulfill that demand, customers may become discouraged and more hesitant to buy in the future. Thus timing of promotion becomes important in demand development.

PRIMARY SUPPLY EXPANSION

The second approach in enlarging the industry is to invest in primary supply expansion. Research needs already identified in this presentation can lead to increased efficiency, thus allowing the primary supply curve to shift out or rotate outwards. When the investment in primary supply expansion is successful the industry is more efficient and supply will have increased. This approach to industry

development has been used often in the past and may be the most commonly used of the three approaches (Harris et al. 1999).

INSTITUTIONAL ARRANGEMENTS

Industry development requires the institutional arrangements between the industry participants. These arrangements as occurring: (a) horizontal, along one level of the industrial chain (Figure 1) e.g., the formation of industry association; (b) vertically, between different levels of the industrial chain e.g. a long term supply contract between a producer and an input supplier; or (c) in a combination of both horizontal and vertical links.

It is posited here that it is important at this stage of the process of developing a Caribbean hot pepper industry that a Caribbean Hot Pepper Industry Association should be formed. A sustainable industry association should future the following (Harris et al., 1999):

- Clearly defined boundaries
- Well trained appropriation and provision rules (who are the members, benefits, how products and services are accessed, etc.)
- Collective – choice arrangement (low cost mechanism to allow modifications of the rules by the users)
- Monitoring
- Graduated Penalties
- Conflict resolution mechanisms

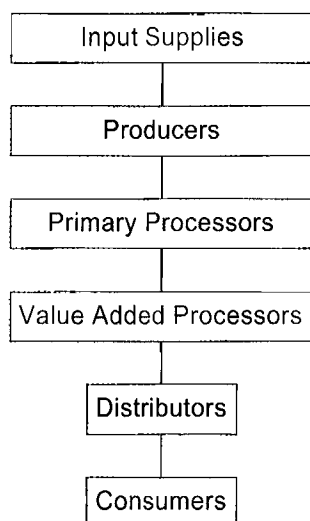


Figure 1. Illustration of a Typical Industrial Chain for Agricultural Products (Harris et al. 1999)
ROLE OF CARDI

The Role of external agents such as CARDI are definitive:

- To encourage and facilitate on-going relationships among industry participants
- CARDI can reduce the costs involved in identifying and communicating with other participants
- CARDI can encourage the development of “networking” opportunities (i.e. trade fairs, industry associations, arrange consultations and other events) and communication tools (i.e. newsletters, industry directories, and electronic bulletin boards).

These activities which foster the creation of a critical mass within the industry (i.e. a group of highly motivated individuals enthusiastic about a development initiative) can become an important component in inspiring others to act collectively.

- Providing credible information (production, processing and market information; information on alternative institutional arrangements, and information on feasible development initiatives)
- Facilitating collective action
- Identifying, communicating and developing relationships with other industry participants
- Identifying and evaluating activities which would promote the development of their industry
- Assisting in the identification of the problems and needs of the group; the development of strategies to address these problems or needs; and the mobilization of resources both from within and outside of the group
- Acting as consultant to community groups; building and reinforcing leadership within the group and integrating the efforts of the group
- Assisting industry participants in putting a management structure and systems in place, a set of rules, systems for monitoring, conflict resolution and penalties.

CONCLUSION

We can all glean that in addition to technological innovations and advances in the scientific and biological fields a hot pepper industry development requires also socio-economic considerations. Institutional arrangements, raising demand for the product and that the role of external agents such as the Caribbean Agricultural Research and Development Institute (CARDI) are equally important elements in industry development.

It would be apposite to conclude that to play any role in the development of a Caribbean Hot Pepper Industry is breaking new grounds even reaching epoch proportions unless you do realise. I am unaware of any sustainable and profitable agriculture based industry developed in this region in the last century by the indigenous population except coffee, rice, coconut and banana, and you may even wish to contest this view or add to the meagre list.

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