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The History of Cocoa Production in Trinidad and Tobago

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Abstract

Cacao (*Theobroma cacao* L.) has contributed to the socio-economic development of Trinidad and Tobago for over 200 years, and the history of the local cocoa industry has undoubtedly been illustrious. The Spaniards first planted the *Criollo* variety in Trinidad in 1525. Trade in *Trinitario* cocoa, derived through hybridisation between the original plantings and introduced *Forastero* cacao, began in earnest in the 18th century when cocoa was traded at a very high price. By 1830, Trinidad and Tobago was the world's third highest producer of cocoa, after Venezuela and Ecuador, producing 20% of the world's cocoa. This was before Ghana began its large-scale cultivation of cacao. The cocoa industry eventually dominated the local economy between 1866 and 1920 during which time the world demand for cocoa products increased, and cocoa prices remained stable at an appreciable level. Subsequent to 1921, when local cocoa production peaked at 75 million lbs (34,000 tons), a combination of events led to the gradual decrease in production. World cocoa prices declined due to a glut on the market resulting from over-production, particularly in West Africa, then came the onset of the *Great Depression* of the 1920s, the appearance of Witch's Broom disease (WB) in Trinidad and Tobago in 1928, the increase in world sugar prices, and the development of the local oil industry, which competed for agricultural labour. The agrarian system changed from plantation to largely smallholder. In an effort to rehabilitate the industry, the Cocoa Board of Trinidad and Tobago was established in 1945. However, despite the government's efforts to sustain the industry, there was a decline in cacao cultivation thereafter, from an estimated 46,000 ha in 1969 to 20,000 ha by 1986. By the 1970s, the shortage of labour for agriculture had become a serious liability for the industry. Over the last three decades, cocoa production, exports, acreage under cultivation and farmer participation in Trinidad and Tobago have been declining steadily. Production seems to have stabilised at 1.2-2.3 million kgs (3-5 million pounds) per annum. Currently, it is estimated that there are about 3500 farmers growing cocoa and coffee locally. Without proper intervention, cocoa production in Trinidad and Tobago may diminish further. It is desirable to develop the local cocoa industry since there is a ready market for all of the cocoa the country can produce because of its high quality and lack of restrictive quotas. At every level of the industry, it is agreed that Trinidad and Tobago should not lose the benefits of a crop well suited for its soil and climate. A programme for revitalisation of the cocoa industry is required urgently before niche markets are lost due to an insufficient and unreliable supply. Furthermore, with proper planning, a resurgence of the cocoa industry could result in unprecedented revenue generation due to down-stream processing.

The early years of cocoa production in Trinidad and Tobago

Cacao¹ (*Theobroma cacao* L.) has contributed to the socio-economic development of Trinidad and Tobago for over 200 years. It has been reported that the Spaniards first planted the *Criollo* (native) variety in Trinidad in 1525 (Shepard, 1932), cacao plants were introduced for commercial purposes from Venezuela around 1678, and the cocoa trade became operative in the colony at the beginning of the 18th century. The industry was almost completely destroyed in 1727 by a blast (a hurricane or *Ceratocystis* wilt or bark canker, a *Phytophthora* infection). Consequently, *Forastero* (exotic) cacao was introduced from Venezuela in 1757, and eventually inter-bred with the remnant *Criollo* to produce hybrid cacao referred to as *Trinitario*.

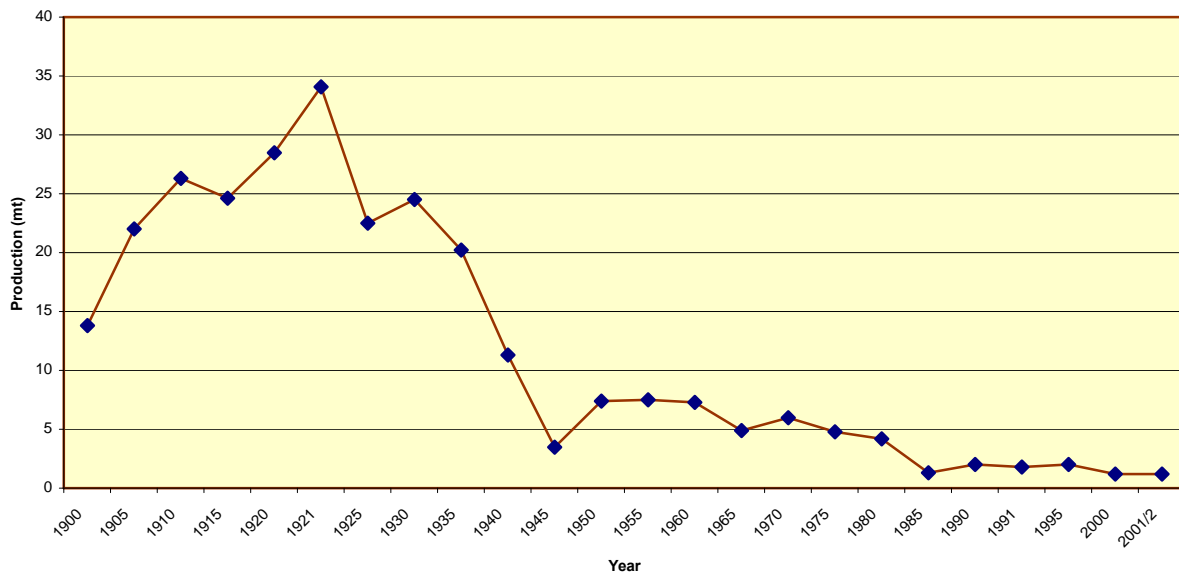
Cacao cultivation and cocoa production expanded in earnest with the introduction of the Spanish *Cedula of Population* in 1783. The resultant influx of French migrants, who were granted agricultural lands, accounted for this expansion, and the implementation of the *Negro Code* of 1789 consolidated it. The economics of cocoa in this period was thus dictated by land grants, slave labour and export prices. The plantation system of agriculture flourished under the extant conditions.

After the abolition of the slave trade in 1807, there was a *Crown Lands Utilisation* programme in which Crown lands were distributed at low cost. Many freed slaves occupied these lands due to squatter's rights. Most of the Crown lands occupied in this way were cultivated in cacao. A large class of small farmers, who farmed marginal cacao lands, thus emerged.

The cocoa industry was moderately prosperous between 1840 and 1866. However, it experienced a tremendous boom between 1866 and 1920 (Figure 1) since cocoa was traded at a very high price at that time (Shepherd, 1932; 1937), and eventually dominated the economy (Brereton, 1981). Many small and medium businesses mushroomed with the expanding cocoa trade, new villages were established and some measure of prosperity was enjoyed by a fairly large section of the society.

¹The word *cacao* is used for the tree and its parts, and the word *cocoa* for the dried beans and products of manufacture.

Figure 1. Trinidad & Tobago's Cocoa Production (historical data)



The Golden Years (1866-1920) of cocoa production in Trinidad & Tobago

In 1828, chocolate manufacture became possible when van Houten, a Dutchman, developed a method to extract butterfat thus facilitating the development of eating chocolate. By the 1840s, Britain was manufacturing chocolate bars, and by 1866, Cadbury Brothers were also manufacturing cocoa essence. Consequently, the demand for cocoa products increased in Europe and North America, and cocoa prices remained stable at an appreciable level. This served as an impetus for further cocoa production worldwide. In 1830, Trinidad and Tobago was the third highest producer of cocoa in the world after Venezuela and Ecuador. This was before Ghana began its large-scale cultivation of cacao.

The local industry continued to prosper between 1870 and 1920. In 1870, when the second phase of internal colonisation (this time by the English) began in the country, the annual production of cocoa beans was 6,800 tons. The demand for cocoa in Europe had increased along with the price, and the availability of labour was not a limiting factor in Trinidad due to the existence of the *indentureship* system. Cocoa soon replaced sugar, which entered a period of depression at this time (1884), as the leading agricultural commodity and became the financial barometer of the country (Shepherd, 1932). Much land was transferred from sugarcane to cacao cultivation. Thereafter, the cocoa industry expanded in tandem

with the expansion of *Trinitario* plantings in several areas on the islands. The area under cultivation rose from 2,400 ha in 1856 to 90,000 ha by 1917 (Shepherd, 1932).

There were also other stimuli for the industry in the second half of the 19th century. With the emancipation of slaves, a contract system evolved, whereby a contractor entered into a five-year contract with a large landowner, was granted cleared land and established cocoa estates of approximately 10 acres. He was subsequently paid 24¢ for each bearing tree. Contractors were able to become small proprietors at the end of the contract period with the income generated by their service. At this time, cacao mortgages were also attractive investments. The Spanish *peons* moved from area to area to select the best virgin soil in new districts for cacao cultivation, and sold the resulting estates when the highest yields were obtained. Previously unpopulated areas such as the valleys of the northern range such as Matelot, Sangre Grande in the east, and parts of central and south Trinidad as well as some of the hillsides of Tobago were converted to cocoa production centres. High cocoa prices, high yields and low wages combined to make this period the *Golden Age* of the local cocoa industry (Shepherd, 1932).

World War 1 (1914-1918) adversely affected cocoa trading along with other economic activities. Shipping lines were disrupted resulting in spoilage of beans. Germany, a major consumer, was involved in the war, and there was prolonged drought (1911-1916). However, after this war, the cocoa industry recovered. In 1920, the value of cocoa exports from Trinidad and Tobago was £3,226,215 per annum, representing 20% of the world's supply (63 million lbs) (Griffith, 1989). In 1921, the country reached its peak production with 33,590 tons (75 million lbs), largely in response to the favourable market price, and was the fourth or fifth largest producer in the world.

The decline

Unfortunately, world cocoa prices declined thereafter partly due to a glut on the market resulting from over-production (from TT\$23.90 per fanega (110 lbs) in 1919-1920 to \$9.50 in 1921), and local production decreased while production expanded elsewhere in the world such as in West Africa. The *Great Depression* of the 1920s was another major setback, and uneconomical fields were abandoned on the islands. Many properties reverted to *lastro* due to neglect. The appearance of Witches' Broom disease (WB) caused by the fungal pathogen, *Crinipellis pernicioso* Stahel, in May, 1928 further precipitated the decline. By September of that year, this disease had affected 28% of land under cultivation. Furthermore, the price of sugar became attractive once more, and the oil industry began to develop resulting in a

diminishing labour supply for agriculture due to competition. Nevertheless, production for 1925-1929 was on average above that preceding World War 1.

In the 1930s, the main problems affecting local cocoa production were inefficiency in the production system (Jolly, 1939), and the unfavourable market prices (Dos Santos, 1940). The situation deteriorated as WB spread, reducing yield and increasing labour costs. Improved planting materials with resistance to WB were developed by the Ministry of Agriculture specialists (Montserin *et al.*, 1957) and by scientists from the Imperial College of Tropical Agriculture and, later, the University of The West Indies (Posnette, 1986).

In the early 1930s, F.J. Pound, a scientist with the Ministry of Agriculture, selected 100 Imperial College Selections (ICS) for good yield potential and apparent field resistance to WB, and these were distributed to farmers with some success. In 1937/38 and 1942/43, Pound travelled to Ecuador and the upper Amazon region of Peru, South America, respectively, in search of WB resistant material (Pound, 1938; 1943). Some 2000 clones, resulting from Pound's expeditions, were established in the 1940s at Marper Farm, east Trinidad, an area heavily infected with WB.

Despite the success of the Ministry's intervention, the high cost of cocoa production and low cocoa prices led to the abandonment of many estates and a concomitant drop in cocoa production. Yields also declined because trees on active estates had passed the most productive age. Some owners of low-yielding cocoa estates replaced cacao with sugarcane. In addition, a more restricted labour supply developed due to the repatriation of 10,000 indentured labourers back to India between 1920 and 1932. The Second World War later exacerbated the labour situation. The value of cocoa exports fell to £1,136,056 in 1930, and in 1940 represented only 1.6% of the world's supply (25 million lbs) (Figure 1). By 1945, cocoa production had fallen to 10 million lbs, and mean production per acre had declined by 50% from 360 lbs/acre. The industry was faced with extinction when the government of the day stepped in to salvage it by introducing Subsidy and Rehabilitation schemes.

Rehabilitation Scheme (1945-1965)

In 1938, the Government appointed a team of experts to recommend measures, which could benefit the industry (Dos Santos, 1940), and had launched the Cocoa Research Scheme (CRS) in 1931. In 1945, the Cocoa Board of Trinidad and Tobago was established, and had as its principal objective the rehabilitation of the cocoa industry. An intensive cocoa rehabilitation scheme was thus initiated in that

year. Its main goal was to replace clones susceptible to Witchesø Broom disease with improved, locally bred hybrids selected for high yield (low pod index), large bean size, early maturity, flavour and resistance to WB and *Ceratocystis* wilt (Montserin *et al.*, 1957). The Ministry undertook hybridisation work (1949-1980) involving Trinitario and Amazonian Forastero parents and had great success (Freeman, 1975 and 1982; Montserin *et al.*, 1957; Shripat, 1993; Gonsalves, 1996). Millions of plants were produced and distributed at subsidised cost. The annual distribution of this planting material to the farmers increased from 650,000 in 1955 to 1,552,324 trees in 1965. Several propagating centres were established throughout the country. Generous subsidies for replanting were provided to farmers. A government-appointed committee closely monitored the Subsidy Scheme. Guidelines for replanting were also provided by the Ministry of Agriculture

The years following the launching of the Schemes

There was a recovery from the World War II levels of production, which reached its peak between 1953-1956 at 22 million lbs (10,000 tons) (Figure 1). This increase was attributed to fairly high, stable prices, and the impact of the Cocoa Rehabilitation Scheme. However, a downward spiral soon followed with exports in 1961 being two-thirds of those in 1956. The severe drought conditions of 1957-62 partly accounted for this. In 1964, Hurricane Flora struck the islands leaving a trail of destruction. In addition, the Cocoa Rehabilitation Scheme was suspended in 1967 because of the poor returns on investments, and other factors. Subsequent to that year, it was only in 1968, 1970, 1972 and 1975, when world prices were fairly attractive, that exports exceeded 10 million lbs. By the 1970s, the shortage of labour for agriculture became a serious liability for the industry. With further contraction of the industry and due to abuse of the Subsidy programme, the distribution of planting material declined to 330,000 plants by 1981 (Griffith, 1987).

A *National Rehabilitation Programme* was then launched (1979-1988) in order to again avert the collapse of the industry. The aim was to double the production of cocoa on existing acreage within a ten-year period. Incentives, in the form of subsidies, credit and grants, were provided to cocoa farmers.

In 1980, local production was less than 0.1% of the world's production (4,200 tons) (Griffith, 1987). In 1981, Trinidad and Tobago produced 7,800 tons of cocoa. Despite the government's efforts, there has since been a sustained decline in the area under cocoa cultivation, which was estimated at 46,000 ha in 1969, and fell to 20,000 ha by 1986 (Economist Intelligence Unit, 1989).

Other efforts to resuscitate the industry

1. Conducting of periodic surveys of the cocoa industry.
2. WitchesøBroom disease control (Jones, 1968).
3. Establishment of the Cocoa and Coffee Industry Board (CCIB) in 1962 to *ōmake better provision for the regulation of, and to secure the most favourable arrangements for purchase, sale, handling, exportation and marketing of cocoa and to encourage improvements and development of the cocoa industry generally* (Act 20, 1961).
4. Formulation of Strategic Plans by the Cocoa and Coffee Industry Board.
5. Preparation of reports on rehabilitation by experts appointed by the Ministry of Agriculture.
6. Various agricultural incentive programmes, the most recent being initiated in 1999.

Factors favouring the sustainability of the local cocoa industry

Since 1930, Trinidad has been looked to as a source of new cocoa production technology (Imle, 1975). In that year, cocoa research was initiated as a five-year scheme at the Imperial College of Tropical Agriculture. In 1955, the Regional Research Centre was specially established to devote more time to improving cocoa production. The cocoa research scheme continued uninterrupted until 1963 when the Cocoa Research Unit (CRU) was established. In the intervening years, major studies were conducted on agronomy, breeding and genetics, nutrition, propagation, screening for WitchesøBroom and wilt diseases, physiology, and fermentation, among other areas (Posnette, 1986). CRU has maintained to date a multi-disciplinary research programme in conservation, characterisation, evaluation and utilisation (germplasm enhancement) of cacao genetic resources (Spence, 1991; Iwano *et al.*, 2003). The results of the various research activities are well documented and have been of enormous value to cocoa researchers worldwide, and thus the global cocoa industry. In addition, CRU manages one of the most diverse collections of cacao germplasm in the world, and utilisation of the genetic resources therein should redound to the benefit of the local and international cocoa industries.

The Ministry of Agriculture also conducted the only successful cocoa-breeding programme in the world to date (Kennedy *et al.*, 1987; Anon, 1992), which resulted in the production of the Trinidad Selected Hybrid (TSH) clones. This was the result of over 50 years effort with the late W.E. Freeman playing the lead role in the programme. Common among most TSH cultivars are the parents ICS 1, SCA 6, IMC 67,

ICS 95 and POUND 18. Genes for WB and *Ceratocystis* wilt resistance were incorporated through the use of SCA 6 and IMC 67 as parents, respectively. ICS 1 and 95 were selected for heavy bearing, large bean weight and flavour (Freeman, 1969).

Recent history and current situation

Over the last three decades, cocoa production, exports, acreage under cultivation and farmer participation in Trinidad and Tobago have been declining steadily (De Vries, 2000). Currently, production seems to have stabilised at 1.2-2.3 million kgs (1,200 ó 2,300 MT; 3-5 million pounds) per annum. For 2001/2002, 1.0 million kgs of cocoa (1,000 MT) (about 90% of that produced) were exported with a value of US\$ 2,668,029.66.

Trinidad and Tobago produces a superior quality cocoa, which fetches a premium price on the world market. This cocoa is known in the cocoa trade as fine or flavour cocoa, and is produced from Trinitario beans. It is characterised by a full cocoa flavour with pleasant ancillary flavours such as molasses, liquorice, caramel and raisin, and is simply described as fruity. Some manufacturers consider this cocoa as superior and of the highest quality. There is a niche market for such cocoa, which is mainly used in specialty products. It thus commands a premium price, but there are higher production, processing and material costs associated with the production of such cocoas.

Grade 1 cocoa beans are properly fermented according to a six to eight-day routine with turning every other day. The flavour potential of the resulting product is thus fully exploited, and astringency and bitterness are reduced. Traditionally, beans are carefully sun-dried (hence no smoke contamination) with regular turning on the drying floor and protection from excessive temperatures. The moisture content is reduced to 7-8%. There are usually less than 1 % defective or broken beans, and 90-95 beans per 100 g.

Trinidad and Tobago's cocoa has developed a reputation for purity. There are low levels of contaminants from pesticides and organic and inorganic materials such as wood, stones, metal etc. It is important to safeguard this reputation especially since, in November 2002 at the 18th Session of the CODEX Committee, cocoa producers recognised the health hazard posed by lead, and agreed to identify the sources of contamination (<http://www.copal-cpa.org/>). A preliminary study of the presence of heavy metals in Trinidad was recently conducted within the Department Analytical Chemistry, the University of The West Indies on the recommendation of the author and colleagues.

Old plantation trees, Imperial College Selection (ICS) clones, have been replaced on some farms by newer commercial varieties (Trinidad Selected Hybrids) with increased resistance to diseases and

favourable agronomic traits. However, the Ministry of Agriculture has also considered quality as a selection criterion in its breeding programme. Twelve TSH selections and their progenies have been made available to farmers. Two of these clones, now widely distributed to farmers, are TSH 919 and TSH 1095, which have been tested abroad for flavour and are described as possessing the aristocratic character of good Trinidad and Tobago cocoa. TSH 1076 and 1104 reportedly have fruity properties (Mooleedhar, 1995).

The outlook for the industry has been bleak in recent years. Currently, there are approximately 3,500 farmers (45 in Tobago) growing cocoa and coffee in Trinidad and Tobago (CCIB, personal communication) compared to 10,000 in 1966. Less than 9.8 % of the labour force is involved in agriculture *per se*. During the last five years, total local production has not exceeded 1.6 million kgs (1,600 metric tonnes) per annum. With low cocoa yields (less than 200 kg/ha), production costs are cited as TT\$7-11/kg (Anon, 1999). Currently, farmers receive TT\$18/kg for Grade 1 cocoa. It is obvious that without proper intervention, the illustrious history of cocoa in Trinidad may be heading to an abrupt end.

Future prospects for cocoa in Trinidad

Many authorities have described the prospects for cocoa in Trinidad and Tobago as very promising, and numerous recommendations such as those below, and several reports, including those of Shepherd (1932), Griffith (1987), Barrow *et al.* (1992), Spence (1998), De Vries (2000), St. Clair P. Barker (2001) and Abdul-Karimu *et al.* (2003) have been prepared over the years to demonstrate how the industry may be resuscitated. There have been several attempts to institute some of these recommendations in the past, but success has been limited. In 2003, a committee, appointed by the government and chaired by Prof. John Spence, prepared another report with recommendations for securing the future of the industry.

Some recommendations to increase cocoa production in Trinidad and Tobago proposed by directors of the Cocoa and Coffee Industry Board of Trinidad and Tobago (1998)

1. Increase productivity (yield/ha) through high density planting, replanting with superior varieties, and the adoption of optimal cultural and manurial practices. Minimum yields of 600kg/ha should lead to viable production systems. Yields of 1000kg/ha are desirable and not unrealistic.

2. Increase the acreage under production. It has been postulated that an increase of 7,500 ha could lead to more than doubling of the present production (to 3,000 MT) within 3-4 years with proper management. The rehabilitation of abandoned estates (with prime cacao soils) will assist this production thrust.
3. Provide education for farmers, extension officers, buying agents and all key players in the industry so as to promote productivity and the production of high quality cocoa. The use of demonstration models (plots) should assist in this effort. Farmer and Extension Officer Training should cover:
 - a. use of superior planting materials;
 - b. adoption of effective farming practices including pruning and disease and pest control;
 - c. application of modern technology; and
 - d. proper handling and processing techniques for beans.
4. Ensure that buying agents are constantly reminded of the proper grading techniques and buying criteria so that farmers are fairly compensated and quality is maintained.
5. Establish co-operatives (or pursue the feasibility of this) to allow the acquisition of consumables (fertilizers, pesticides) and implements at affordable prices. This can also promote cohesion in the farming communities, facilitating the dissemination of information and problem solving.
6. Establish central fermentaries to address the existing problem of poor quality cocoa resulting from inadequate processing by small farmers.
7. Introduce an incentive plan to promote the industry (as that presently being formulated by the Ministry of Agriculture, Land & Marine Resources). Provision for infrastructure such as access roads, bridges, and dams/reservoirs *etc.* will facilitate the establishment of new farms and the functioning of existing ones.

It is desirable to develop the cocoa industry since Trinidad and Tobago has a ready market for all of the cocoa it can produce because of its high quality and lack of restrictive quotas. At every level of the industry, it is agreed that Trinidad should not lose the benefits of a crop well suited for its soil and climate (Shepherd, 1932). The goal of the cocoa industry of Trinidad and Tobago could be to increase national bean production to 4.6 million kgs (4,600 MT; 10 million lbs.) over a ten-year period (Spence, personal communication). Superior varieties available from the Ministry of Agriculture should be used in an expansion programme. The application of socio-economic and agro-economic aspects of cocoa

research and extension as well as a guaranteed minimum price for dried cocoa are essential for the development of the industry (Anon., 1999). Cocoa production has to be made attractive to existing farmers and to the younger generation (De Vries, 2000). Any rehabilitation programme should establish entrepreneurship as the fulcrum (Griffith, 1987; 1989), and must incorporate the required infrastructural, technological and training modifications to promote efficiency. More skilful exploitation of conditions existing on many properties, and a more intensive and consistent policy of cultivation should lead to greater profits in the future. Problems associated with access to capital and land tenure have to be addressed. This approach will offset the constraints of labour, and the high per capita costs (Pemberton, 1986) associated with the primary processing of cocoa.

The Cocoa and Coffee Industry Board undertook a *Pilot Fermentary Project* in 1998 to determine the feasibility of setting up central fermentaries in strategic locations to assist small farmers. The results were encouraging, and currently small farmers can sell wet beans to the Fermentary operator in Sangre Grande. The lack of proper facilities by these farmers had previously led to improper processing of beans with an attendant drop in quality. Central processing ensures that beans are of a consistently good quality. This along with increased production and productivity will hopefully lead to a resurgence of the cocoa industry. With increased production, it will be possible to add value to the product through down-stream processing. This should include the use of by-products and wastes such as the pod wall or husk to produce livestock feed. There is also a potential to produce specialty products such as cocoa juices, liquors, jams, and jellies among others. The requirements for these activities should be investigated. A list of potential value-added products has been compiled at the Cocoa Research Unit.

To achieve success, all bodies concerned with the cocoa industry² should become aligned in a concerted effort to rehabilitate the industry. A programme for revitalisation of the cocoa industry in Trinidad and Tobago is required urgently before niche markets are lost due to an insufficient and unreliable supply.

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References

²The Ministries of Agriculture, Land & Marine Resources, Planning & Finance; The Cocoa & Coffee Industry Board of Trinidad & Tobago; Farmers Groups, the Cocoa Research Unit etc.

Abdul-Karimu, A., Butler, D.R., Iwaro, A.D., Sukha, D.A., Bekele, F., Mooleedhar, V. and Shripat, C. (2003). Farmers' perceptions of cocoa planting material and factors affecting the cocoa industry in Trinidad and Tobago. *Tropical Agriculture (Trinidad)* Vol. 80 (October 2003): 261-266.

Anon (undated). The Cocoa Industry. Filed at Central Experimental Station Library, Centeno (633.74:338.9(729.87)).

Anon (1992). Freeman honoured. *Extension Newsletter* 23: 1. The Department of Agricultural Extension, The University of The West Indies, St. Augustine, Trinidad and Tobago.

Anon (1999). Extracts from the Agri-sector Policy and Public Administration Reform Project- Trinidad Agricultural Sector Reform Programme, Ministry of Agriculture, Land and Marine Resources, Government of Trinidad and Tobago. Coffee and Cocoa Industry Board Needs Assessment. December 25, 1999.

Barker, S-C. P. (2001). Cocoa Investment Facility for the Cocoa Rehabilitation Programme in Trinidad and Tobago. Report of a field survey among cocoa farmers in Trinidad and Report of a rapid rural appraisal.

Barrow, R.M. (1992). Report of the task force for accelerating development of the cocoa industry in Trinidad and Tobago. AGRIN 395.

Brereton, B. (1981). A history of modern Trinidad 1783-1962. Heinemann Educational Books Inc. 262 pp.

De Vries, H. (2000). Proceedings of the Project Planning Workshop of the Cocoa Rehabilitation Programme for Trinidad and Tobago. 9-12 October, 2000, Port-of-Spain, Trinidad.

Dos Santos, E. (1940). Final report of the Committee appointed to enquire into the needs of the cocoa industry together with a memorandum by Sir Frank Stockdale. Trinidad and Tobago Council Paper 61 of 1940. A.L. Rhodes M.B.E Government Printer, Port-of-Spain, Trinidad and Tobago. Filed at Central Experimental Station Library, Centeno (633.74:338.9(729.87)).

Economist Intelligence Unit (1989). Cocoa to 1993. A commodity in crisis. Special report No. 1185. EIU Commodity Outlook Series, London, 112pp.

Freeman, W.E. (1969). Some aspects of the cocoa breeding programme. Proceedings of the Agricultural Society of Trinidad and Tobago, December 1968, pp. 1-15.

Freeman, W.E. (1975). A possible new approach to cocoa growing. A Publication of the Ministry of Agriculture, Lands, & Fisheries, Extension Division. Trinidad and Tobago.

Freeman, W.E. (1982). The Breeding Programme of the Ministry of Agriculture, Lands and Food Production,

- Trinidad and Tobago. Paper presented during the visit by the Cocoa Producers Alliance, March 1982.
- Gonsalves, C. (1996). History of cocoa breeding in the Ministry of Agriculture, Trinidad. Cocoa Research Unit Newsletter 3: 4-6.
- Griffith, R. (1987). A programme for the rehabilitation of cocoa and coffee in Trinidad and Tobago. Prepared for the 1986 Committee for the rehabilitation of cocoa and coffee.
- Griffith, R. (1989). The prospects for cocoa in a modern economy of Trinidad and Tobago. Paper presented to the Agricultural Society of Trinidad and Tobago, August 24th, 1989. Filed at Central Experimental Station Library, Centeno (633.74(729.87)).
- Imle, E. (1975). Summary - A national programme for cocoa bean production for Trinidad and Tobago (unpublished).
- Iwaro, A.D., Bekele, F.L. and Butler, D.R (2003). Evaluation and utilisation of cacao (*Theobroma cacao* L.) germplasm at the International Cocoa Genebank, Trinidad. *Euphytica* 130: 207-221.
- Jolly, A.L.(1939). Some economic aspects of the depression in Trinidad's cacao industry. *Tropical Agriculture* Vol XVI, No. 12: pp. 272-274.
- Jones, M.R. (1968). The approach to cocoa rehabilitation in Trinidad and Grenada. Thesis submitted in partial fulfilment for the Diploma in Tropical Agriculture. Library of the University of the West Indies, St. Augustine, Trinidad.
- Kennedy, A. J., Lockwood, G. Mossu, Simmonds, N.W. and Tan, G.Y. (1987). Cocoa Breeding: Past, Present and Future. *Cocoa Growers Bulletin* 38: 5-22.
- Mooleedhar, V. (1995). 'Fine' flavour cocoa - a Trinidadian and Tobagonian tradition. *Cocoa Research Unit Newsletter* 2: 6
- Montserin, B.G., de Verteuil, L.L, and Freeman, W.E. (1957). A note on cacao hybridisation in Trinidad with reference to clonal selection and hybrid seed. *Caribbean Commission Publications Exchange Service* No. 33, Paper 8, pp. 156-164.
- Pemberton, C.A. (1986). Removing constraints within the cocoa industry of Trinidad and Tobago. In: *Proceedings of the 17th West Indies Agricultural Economics Conference*, St. Augustine, Trinidad and Tobago. The University of The West Indies 1984, pp. 43-49.
- Posnette, A.F. (1986). Fifty Years of Cocoa Research. Cocoa Research Unit, Port-of-Spain, 131 pp.
- Pound, F.J., (1938). Cacao and Witches' Broom Disease (*Marasmius perniciosus*) of South America with Notes on

other Species of Theobroma. Yuille's Printery, Port of Spain, Trinidad and Tobago.

Pound, F.J., (1943). Cacao and Witches' Broom Disease (*Marasmius perniciosus*). Report on a recent visit to the Amazon territory of Peru, September, 1942 - February, 1943. A.L. Rhodes, M.B.E, Government Printer, Port-of-Spain, Trinidad and Tobago.

Shepard, C.Y. (1932). The cacao industry of Trinidad - some economic aspects. Part 1. The Government Printing Office, Port of Spain. Reprinted from Tropical Agriculture Vol IX 4 pp. 95-100.

Shepard, C.Y. (1937). The cacao industry of Trinidad - some economic aspects. Part V. The Government Printing Office, Port of Spain, Trinidad and Tobago.

Shripat, C. (1993). The recent cocoa (*Theobroma cacao* L.) germplasm conservation initiatives. The Ministry of Agriculture, Land and Marine Resources, Central Experimental Station, Cocoa Research Unit, Trinidad and Tobago. In: Proceedings of The Workshop on Conservation, Characterisation and Utilisation of Cocoa Genetic Resources in the 21st Century. September 13-17, 1992. Port-of-Spain, Trinidad, pp. 239-243.

Spence, J.A. (1991). A historical background of the Cocoa Research Unit, University of the West Indies, Republic of Trinidad and Tobago. Cocoa Grower's Bulletin No. 44: 13-17.

Spence, J. (1998). Cocoa revival in T&T. In: Sunday Express of June 21, 1998 ó Supplement on Cocoa and Coffee prepared by the Cocoa and Coffee Industry Board of Trinidad and Tobago.