

# Jamaica's Beekeeping Industry – Threats and Challenges<sup>1</sup>

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Dr. Robinson, fellow presenters, colleagues and friends in apiculture, ladies and gentlemen all:

It is a privilege and with mixed feelings that I am here to share some of my views about the local beekeeping industry. Beekeeping pays all my bills. It is going to provide my pension and based on certain things that I am putting in place, it will do well for my children and grand children. Being in the business for 30 years, I know the potential of the industry. I have seen growth; some development; lost opportunities; good servants and satisfied beekeepers; frustrators and the frustrated.

## OVERVIEW

**Origins:** The honeybee is not native to Jamaica. In articles on bees and beekeeping, in the journal *Bee World* (1) and in the *Livestock Manual for the Tropics* (8), credible authors report that the first colonies are thought to have been brought by early English settlers. The exact date of introduction is not known. These were “Black German bees which were later crossed with yellow Italian bees” imported from the USA and present strains are mostly descended from these crosses.

**Development:** It is reported that local beekeeping was “primitive and wasteful” prior to 1896, when the first “modern apiary” with moveable frame hives was established (1). Subsequently, with initiatives from the Jamaica Agricultural Society modern methods were widely adopted and the industry took off. By 1958 the apiary registration records showed 569 beekeepers and 65,885 hives, according to a report by CAWTRAN International Limited (10) in 1983. Elsewhere (1) it is reported that the 569 beekeepers had 1,065 apiaries with 45,882 hives.

For reasons that are still not adequately explained, after 1958 the industry went into decline and by 1968 the Ministry's Apiary Registration Records showed 228 beekeepers, 469 apiaries and 19712 hives (1). In 1983 Mr. Nelson Wedderburn, Chief Bee Officer of the Ministry, wrote that the industry had undergone “a dramatic decline” and was in “crisis position.” He observed that the number of colonies registered had fallen “from 50,000 to less than 20,000” at the time (8). Corrective measures were initiated by the Ministry and with interventions from myriad sources, rebuilding of the industry has been underway for the past 30 years.

**Size:** The Census of Bee Farmers 2009 report, by the Data Bank and Evaluation Division of the Ministry of Agriculture and Fisheries (5) is the most complete and reliable status report on the industry. It describes the situation as at 2008, the base year of the census. The Executive Summary points out that the industry had recovered from (another) serious decline, which was revealed by a similar census, for which the base year was 2004 (4). That census found 714 beekeepers. They owned 15,673 hives and produced 534,383 liters (26,720 kegs) of honey. The 2009 census found 1,202 beekeepers. They owned 31,416 hives and produced 630,354 liters (31,518 kegs). The recovery continued and by any standards, with respect to the number of beekeepers and number of hives, describing it as phenomenal is not an exaggeration. Current estimates place them at about 2,500 and 42,000; increases of 108% and 34% respectively.

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## VALUE OF THE INDUSTRY

There are at least five clear components to the economic value of the beekeeping industry. These are the dollar value of beekeepers' investments, value of products, contribution to employment, tax paid by producers and pollination – a value to the greater economy, which is not reaped directly by beekeepers.

**Investments:** The increase in number of hives, since 2008, translates to total investment of more than US\$2.5 million; the exchange rate being US\$1.00 = J\$110.00. This brings total investment – hives of bees and related assets – that beekeepers have in the industry to about US\$15.2 million.

**Products:** The primary interest and product of the industry, probably accounting for more than 95% of the resources, is liquid honey; most of which reaches end-users as bottled honey. There are disagreements as to current national hive productivity. However, using data from the 2009 census (5), at 20 liters (1 keg) per hive, national production should be in the region of 840,000 liters (42,000 kegs). The value of this honey is \$US5.73 million at the farmgate; and about \$US10.0 million when it reaches consumers in bottles.

**Employment:** If one extrapolates from the findings of a 2010 internal study of members' beekeeping businesses by Jamaica Federation of Commercial Apiculturists (7), based on a multiplier of 3 for the use of labour, these 2,500 beekeepers that there are provide employment for about 10,000 people including themselves. That is, full-time, part-time and seasonal work.

**Tax Paid:** Given the low level of tax compliance by self employed people in Jamaica, it is difficult to know how much tax is paid by those in any sector. However, everybody pays GCT which is inescapable and adds 16.5% to the cost of goods and services purchased. When beekeepers spend the money that they earn from honey sold at the farmgate, the government gets at least J\$103 million. Therefore, the industry is not a burden on the national coffers, because the amount of GCT paid by beekeepers, out of income earned from honey, is far more than the government's annual budgetary allocations for beekeeping.

**Pollination:** Most people, even beekeepers, do not know that the value of beekeeping, to an economy, is far greater than the value of the honey which is harvested. This is because honeybees are the most efficient pollinators for several crops and environmentally important non-crop plants. In a publication of the Food and Agriculture Organization of the United Nations (FAO) (3), Dr. Nicola Bradbear reported that for Western Europe the value of bee pollination is 30 – 50 times the value of honey and beeswax harvested. Also, similar estimates for Africa place the value as high as 100 times the value of honey harvested, depending on the crop. If the multiplier is as low as 15 for Jamaica, a half of the bottom figure for Western Europe, pollination by honeybees contributes about US\$86.0 million to the local economy. This would be from both kept hives of bees and feral colonies, which share a symbiotic relationship.

## POTENTIAL

The tremendous potential of Jamaica's beekeeping industry is widely acknowledged. This partially explains recent increased investments and growth in numbers of beekeepers and hives.

**Profitability:** Although beekeepers hesitate to disclose details of their production costs, it is estimated that with reasonable management they are able to make upwards of 50% profit from sale of bulk liquid honey; and for the past 30 years honey prices have been moving in one direction – up. Today, “he who has honey is king” especially because 2014 is the third consecutive very bad year for honey production. Producers have been demanding and getting up to 64% more than 2013 prices for bulk honey.

**Market:** There is no shortage of local buyers for honey. One indicator of this is that the norm is for buyers to go to beekeepers for the honey. For most beekeepers the main honey season runs from January to June. More than 75% of the national crop is reaped during this period. In the best years enough is not produced to satisfy local interests. Therefore, there is always a shortage of bottled honey in the last quarter to January. In normal to good years consumers begin feeling this shortage around October to November. In bad years it is felt from as early as late August to September. Last year (2013) it was evident from July; and it is still short, despite being in the last third of the 2014 season. Producers have a captive market because importation is illegal and there are very few or no acceptable substitutes for the purposes for which honey is popular.

**Export:** CAWTRAN International Limited (10) cited an estimate, by an FAO provided consultant in 1982, that Jamaica has a carrying capacity for 102,500 hives. Most local authorities agree that it is between 60,000 and 80,000; 43% to 90% more than the current estimate. Every spoonful of honey that can be reaped from these hives can be exported, because of the international repute of Jamaican honey. With reasonable apiary management and normal weather, hive productivity could be 40 liters per hive and national production, from 60,000 hives, would be 2.4 million liters per annum. That is 3.26 million kg. Internationally, honey is traded by weight, not volume. If the present consumption rate holds, at least one half of this honey would be available for export. This would move local beekeeping from being a net user of foreign exchange, albeit a small amount, to a net earner. At current world market prices, the industry could therefore earn US\$6.53 million more by exporting this surplus as bulk liquid honey. There is a worldwide shortage of honey, prices have been going up and this trend is expected to continue for some time.

**Other Hive Commodities:** Jamaica's population of 2.7 million people cannot consume all that the country can reap from honeybee hives. Liquid honey is the easiest, least expensive and least profitable hive commodity to produce. Aside from beeswax, which is an unavoidable by-product of honey production, comb honey, pollen, propolis, royal jelly, bee venom, package bees and queen bees are immediately attractive prospects. There are export markets for all. Regrettably, nothing dramatic is likely to happen with any of these other commodities in the short term. Because they all require significantly greater resources than liquid honey, better support services and infrastructure and an industry which is generally more well developed and better organized.

**Value-Added Products:** There are also hundreds of value added products of beekeeping and there is nothing secret about them. An excellent source of information about such products is another FAO publication, Value-Added Products from Beekeeping (9), which has been out since 1996. It is a 400-page 'cookbook' with 'recipes' for more than 100 products. Every beekeeper who has dared to dream big knows of at least three or four of these products. Samples of examples are almost always on display at local agriculture and trade shows. This is proof that both interest and technical competence are present in the industry. There are encouraging signs from a few beekeeping businesses that seem to be making serious efforts to diversify operations into these products. However, from an industry standpoint, there will be no meaningful development or commercialization of these products in the short to medium term; for the same reasons that non-honey hive commodities are untapped.

## THREATS AND CHALLENGES

Interested non-beekeepers and others who may be considering investing in beekeeping, or a related business, need to know that there are so many 'threats' to the local industry that beekeepers only stay with it for love and money.

**Local Pests:** Jamaica already has five significant beekeeping pests, which are endemic; American Foulbrood Disease (AFB), European Foulbrood Disease (EFB), Chalkbrood, Small Hive Beetle (SHB) and the Varroa mite. All, except varroa, are adequately controlled if individual beekeepers are vigilant and rigorous in their application of prescribed hive and pest management procedures.

Varroa is an enigma that requires serious research interventions, which individual beekeepers cannot afford. This pest was first discovered in local hives in 1999. It wiped out about a third of the colonies in the first year. For the 15 years since, the industry has relied on the same pesticide treatment, (Apistan®). Despite this extended use, abuse, misuse and non-use of the treatment by beekeepers, and their experimentation with alternatives, varroa is largely not a problem. Considering experience with the mite in other countries, one would have expected widespread signs of resistance to the pesticide and other problems by now. There is work to be done.

**Exotic Pests:** There are several major honeybee pests that are not present in Jamaica – broadly referred to as pests of quarantine importance. Beekeepers need to know them and maintain rigorous vigilance against them being introduced into the island. The Ministry of Agriculture and NEPA (National Environmental Planning Agency) are the most critical regulatory agencies for keeping out these pests. They include two other mites, the Tracheal mite (*Acarapis woodi*) and the devastating *Tropilaelaps clarae*. There are also dozens of viral diseases. A few have been associated with varroa. However, recent research is showing that the path by which most of these viruses enter a country is importation of honeybee queens and package bees. Fortunately, the local beekeeping industry is not into that and beekeepers must reject all efforts to bring any bees or “new genetic material” into Jamaica, for the time being.

Africanized European Honeybee will cause sweeping and undesirable changes to beekeeping in Jamaica, if it gets here and spreads. Fortunately, direct introduction, by a swarm, is unlikely because of the island’s distance from other land masses. However, they could hitchhike on a ship. Only rigorous monitoring of the ports and nearby areas, to promptly detect and destroy suspicious swarms, will suffice. This is a job for the Ministry and it is not being done.

**Man:** The most serious threat to beekeeping in Jamaica (and most other places) is man. Many of them are thieves and theft is fast approaching epidemic proportions in local beekeeping. They steal everything that is moveable; and that is almost everything in beekeeping – honey, bees, equipment, hives of bees and entire apiaries. There is also a growing cohort of unscrupulous suppliers of goods and services. They prey on new investors, who they use as ‘feeding trees,’ charging them exorbitant fees for goods and services, which are usually of inferior standards. This group is only surpassed, as threats to the industry, by a handful of ignorant, selfish and/or careless individuals who would sneakily bring queen bees and other beekeeping contraband into the island. Such persons are responsible for the problems beekeepers are having with AFB and varroa, and probably SHB as well. They need to be educated and other beekeepers have to be vigilant, because a slip by any of them could well result in Africanized honeybees, *Tropilaelaps* or another pest of quarantine importance being introduced.

**Adverse Weather and Climate:** When a beekeeper has done all that he can and all that he must, with his hives, the profitability of the business is left entirely to the vagaries of the weather. A nectar flow may be truncated or wiped out by a spell of prolonged rainfall or dry weather, a cold front or extended windy conditions. Generally, anything that impacts the flowering trees and other plants, from which honeybees collect nectar or pollen, within a 3 km radius of an apiary will affect hive productivity; negatively or positively. For Jamaica, the major disruptors are hurricanes and droughts; and these have been frequent in recent years. Indeed, local beekeepers have very good reasons to be concerned about global warming and climate change.

**Urbanization and Deforestation:** Several reports confirm the obvious; that deforestation is a problem in Jamaica. It reduces availability of nesting sites for feral colonies and diminishes the amount, variety and quality of forage for honeybees. The net effects on beekeeping are reduced colony carrying capacity of the area and reduced hive productivity. In the past the main drivers were old traditional activities like charcoal burning and cutting yam sticks. The impact of these activities is soft, when compared with several other drivers which have near permanent or irreversible effects. These include the mushrooming squatter communities, middle and high income housing developments in the hills, mining and new beach front hotels and attendant facilities that destroy mangroves and other natural vegetation around the coast. There is very little that beekeepers can do about these things.

**Pesticides:** Wherever there are kept hives of honeybees, the use of synthetic chemical pesticides on nearby crops has always been a problem for the beekeeper, whether he recognizes it or not. It is a result of crop farming models that the respective communities and wider society have bought into. This is not going to change any time soon. Still, the world is coming to realize that reliance on these pesticides is not a healthy option. Therefore conscious beekeepers, even to protect narrow self interests, must join whatever efforts there are for reduced use of these substances.

As far as environmentalists and other ‘green advocates’ of the day are concerned the urgent issue at hand is stopping the use of the class of pesticides known as neonicotinoids (neonics). These are the most potent and advanced class of insecticides yet. Though mostly disputed by people who support continued use of the neonics, for whatever reasons, a growing body of research is showing that these insecticides have far-reaching negative effects on honeybee colonies that are exposed to sub-lethal concentrations. That is, dosages that do not kill honeybees quickly after exposure. Indeed, they have been blamed for causing or contributing greatly to Colony Collapse Disorder (CCD), which is responsible for annual loss of tens of thousands of colonies of bees in Europe and North America since 2006. CCD is a condition of ill-health in honeybee colonies, which is characterized by sudden and inexplicable disappearance of the adult bees from the hives.

Farmers have been using neonicotinoids in Jamaica for about 10 years and information gleaned from the website of the Pesticides Control Authority of the Ministry of Health (PCA) show that at least 14 such pesticides are registered for use in the country. However, based on year-to-year reports on colony numbers and other indicators, it is safe to conclude that CCD is not present in the island. This does not rule out other effects which neonics, or other pesticides for that matter, may be having on local honeybees. Furthermore, developments elsewhere in the agriculture sector are likely to result in greatly increased and more widespread use of these insecticides.

Note for example, recent plans by the two large producers of chicken meat, Caribbean Broilers and Jamaica Broilers, to plant 6,000 ac (2,430 ha) each, of sorghum and corn respectively, for animal feed purposes. These are highly desirable import substitution initiatives, which have received the Ministry’s endorsement; and which every well-thinking Jamaican should support. The problem is that the sorghum and corn production technologies, which are likely to be used, rely heavily on neonicotinoids. The big challenge, for the beekeeping industry, is getting growers to use alternative technologies which have been shown to work.

The EFSA (European Food Safety Authority) recently, and a number of European countries before and since then, found good cause to impose bans and/or severe restriction on the use of some of these insecticides. Therefore, considering local resource constraints, a reasonable expectation is that Jamaica’s regulatory agencies – the PCA, Ministry of Agriculture and NEPA in particular – would opt to err on the side of caution and take similar positions against the neonics. This has not happened and it is not going to happen for any amount of lobbying and pressure from local beekeepers. Those who don’t understand this should read the column written

by Bishop Howard Gregory in the Observer newspaper, Sunday, May 18, 2014 (6). The simple fact of life is that it is not our culture for policy makers to do not do anything about anything if they are not pressured by powerful interests; mostly interests that are external to Jamaica.

This is not to suggest that beekeepers must accept the status quo or give up. They must put their money and energies where their interests lie. Self and community education, involvement in due process, lobbying and advocacy must continue. These things keep designated regulatory and support agencies on their toes. They encourage others who would help the cause to give whatever support they can, when they see the beneficiaries of their support doing something for themselves.

## CONSTRAINTS TO DEVELOPMENT

In 1985 the Planning and Policy Division of the Ministry of Agriculture reported estimates of 33,000 kept hives and 1,650 beekeepers in Jamaica, for 1983 (2); with average holding per beekeeper being 20 hives. It observed that there were only 15 to 20 “large bee farmers with just over 200 colonies (hives) each” and that the majority of beekeepers owned fewer than 50. In the 30 years since then there have been several development interventions and tens of millions of dollars spent on the industry – by the Ministry, other government and quasi government agencies, almost every imaginable NGO (Non Government Organization), foreign Aid Agencies, and embassies. The three signal successes for these efforts are: 51% more beekeepers; 27% more hives; approximately 100% increase in hive productivity.

Therefore, the industry has grown since 1983 – more hives, more beekeepers. There has been meaningful development; as evidenced by increased hive productivity, which suggests widespread adoption of improved technologies. However, it is yet to be determined and debatable as to whether these are reasonable returns on the total investment made since 1983. Furthermore, at least three key indicators show that beekeeping is still largely underdeveloped, struggling with continued decline in certain key areas and far from being globally competitive.

- Low average hive holdings: The last census (5) found that two of every three beekeepers owned fewer than 20 hives in 2008 and average holding was less than 27. That could not provide a livable income for a beekeeper then, and it cannot do so today. By present estimates average hive holding is 17 and in 1983 it was 20 according to the Planning and Policy Division of the Ministry (2).
- Low level of commercialization: Conventional wisdom is that 50 hives is the minimum required for a beekeeping business to qualify as ‘commercial.’ According to one report, by G. P. Chapman *et al* (1), approximately 55% of registered beekeepers owned fewer than 50 hives each in 1968. This seems typical of the wider industry in 1983 as another report (2) asserted that the “majority” did not meet this standard. There was considerable slippage by 2008. The census (2) found that 86.9% of beekeepers had fewer than 50 hives.
- Negligible export: In 1942 a “record” 4,200 barrels of honey were exported. That is about 1.26 million kg or 46,270 kegs, which is more than present production. In their paper (1), Chapman *et al* showed exports declining from 63,313 gallons (14,400 kegs) in 1958 to 22,411 gallons (5,100 kegs) in 1968. By 1983 it was down to 50 tonnes (1,840 kegs), according to estimates by the Planning and Policy Division of the Ministry (2). Today Jamaica exports so little of anything from beekeeping that such records are either not kept or are lumped with miscellaneous other exports.

Considering how much has been invested these deficiencies point to a serious failure of policy; neglect of fundamental constraints to development of the industry. Three come readily to mind.

***The Structure of the Industry:*** Big business is almost alien to local beekeeping. The overwhelming majority of the operations are hobby or sideline activities. They remain small because everything depends on the owner's personal involvement and wellbeing. They are almost all sole proprietorships, registered or unregistered and subject to all the weaknesses that are associated with this form of business. The business is the man and the man is the business. It rises and falls with his personal interest and health. They die with the owners or have to be sold before they can provide them with meaningful pensions. More important, knowledge and expertise gained by the owners and the wealth created by their labour very rarely survive them.

Such businesses are not attractive to financiers. It is therefore not surprising that the 2009 census (5) reported that the three most frequently named "constraints" to realizing plans to increase production, which 91.5% of beekeepers had, were related to funding. These were lack of finance/inadequate funds (66.5%); lack of equipment/input/bees (21.8%); the cost of equipment/supplies/bees/input (17.7%).

***Inadequacy of Institutional Support:*** Institutional support, for an industry, refers to the formal structures and systems that are in place for its protection, and to facilitate its growth and development. Naturally, the range and quality of support, which is provided and sustainable for an industry, is largely determined by the level of development of the sector. Beekeeping is no exception. The Ministry of Agriculture is by far the major support agency for the sector; and this support is channeled through the Apiculture Unit, in the Research and Development Division, at Bodles Research Station. It has done very well with the things that it considers most important; increases in number of hives, beekeepers, and hive productivity.

All other agencies, government and otherwise, have followed the lead of the Ministry, because it is easy and they get good publicity for it. Hardly a month passes without a public relations article in one of the major local newspapers about a beekeeping project. The stock story is: *'With funding from so and so, we have trained so many poor youths and women, from such and such at risk community and given them so many hives of bees, etc.; etc.'*

The dangerous outcome is a 'bang belly' sector. Its viability depends on indirect subsidy from the government, through the Ministry, and there is no indication of conscious intent, on either side, to change this state of affairs. Local groups hardly have or find a life if there is not a 'sponsor' or a "Project" that is being funded by a 'donor agency.'

Adequate institutional support calls for provision of services and physical facilities which make it possible for producers, and excite them, to better adopt improved technologies, diversify their operations, access available markets and find the means to increase investments in their business. Such support enables a sector to wean itself from subsidies and attain global competitiveness.

***Weakness of Beekeepers' Organizations:*** Producers – and this means along the entire value chain – should not be mere recipients of 'institutional' or any other kind of support; from external providers. Such are relationships of dependency and "he who pays the piper calls the tune." Development of an industry requires organization(s) of stakeholders. The key stakeholders in beekeeping are beekeepers. The absence of their organizations – physical and otherwise – and the inadequacies where they exist are the greatest constraint to development of the local industry.

Producers' organizations are their most important support institutions and there are at least four good reasons why the local beekeeping industry needs them now.

- Without strong organization(s) of beekeepers, the industry will never be able to effectively deal with the threat of neonicotinoids or any other pesticide (real or perceived); or with any other threat or challenge for that matter.

- Beekeepers need such organizations to determine and meaningfully influence the kind and quality of institutional support which the industry gets.
- The overwhelming majority of beekeeping operations are so small that they cannot directly access export opportunities and the owners will not benefit much from export of hive commodities or products of beekeeping, if they are not joined in organizations.
- The learning curve for beekeeping is long and steep and it is has been long established that sharing of experience and knowledge is among the most efficient means by which beekeeping expertise is built. Beekeepers have no better opportunities for such sharing than through their organizations. Presently there are at least 1,200 beekeepers, most of whom entered the industry after 2008, who need such opportunities.

Having considered the issues, it is the presenter's firm opinion that beekeepers building their own organizations, for themselves, is the most critical requirement and challenge; for protection, development and promotion of beekeeping in Jamaica today.

Thank you all.

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