

The Ecological Footprint of a Dole Banana

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The Ecological Footprint of a Banana

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The banana is the world's largest herb, and a member of the lily family. After nine months, it produces fruit throughout the entire year. The fruit was officially introduced to North America in 1876 and 86 million tons are grown annually in Africa, South Asia and Latin America. Fourteen percent of this is traded on the global market and Ecuador, Costa Rica, and Columbia provide 64% of all exports¹. No external inputs are required for successful banana growth, however, for competitive export chemical inputs are required. Companies must produce cash crops and intensive mono-cultural systems to be successful in global markets. Finding the resources it requires to trace a Dole banana from its primary source stage to Victoria's marketplace requires a close look at influential factors such as politics, economy, location, and environment.

Economics of the Banana Trade

The worldwide production of bananas in 1996 was estimated to be 56 million tons². This makes bananas one of the most important cash crops in the world, particularly for developing countries.

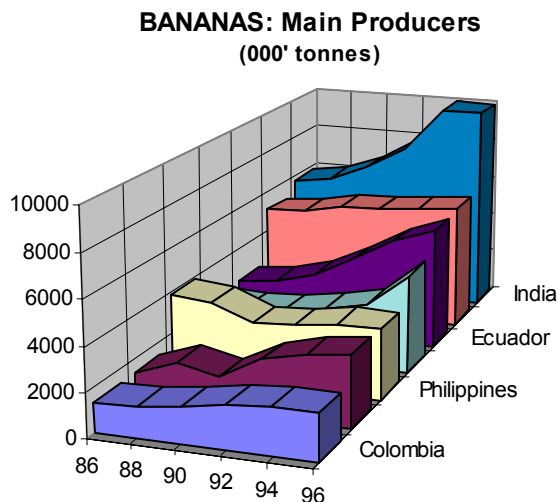
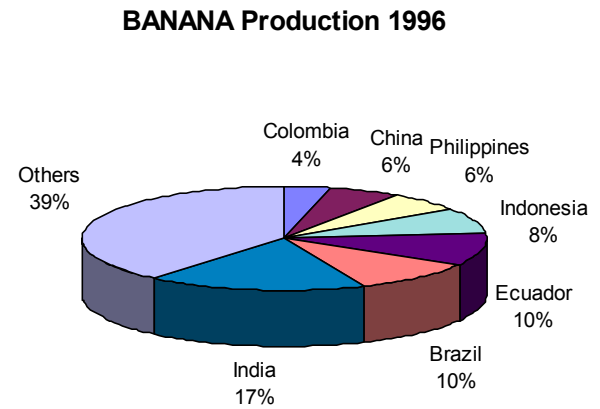


Figure 1: Banana production

Source FAO 1997 Figure 2: Banana production 1996



Source FAO 1997

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Ecuador is one of the leading banana producers in the world, exporting \$821 million worth of bananas in 2000³. The economy of Ecuador depends heavily on the sale of bananas, generating more income only through the export of oil and manufactured goods³.

Major Exports of Ecuador				
Trade (\$U.S. Millions)	1960	1990	1999	2000
Total Exports	1 901	2 724	4 451	4 927
Oil	1 021	1 268	1 312	2 144
Manufactures	-	380	1 063	1 229
Bananas	162	471	954	821

(figure 3: World Bank Group. Data and Maps. 2002.)

Dole Fresh Fruit Company is the largest fruit-related company on the planet; its revenues for the year 2000 were \$4.76 billion (\$U.S.)⁴ employing 61 000 people full time around the world (as of December 30, 2000). In contrast, the GDP of Ecuador is \$13.6 billion (\$U.S.), with a population of 12.6 million³. Dole is involved in everything from

growing and marketing fruits, vegetables and flowers, to real estate and ocean transport. The company is composed of 30 subsidiaries, each controlling a specific aspect of Dole's operations⁵ (See appendix F). In Honduras, Dole bottles for Coca-Cola, controlling 75% of the Honduran soft-drink market².

Dole is a significant player in the Ecuadorian economy. It takes full advantage of the low minimum wage and lax environmental standards. Dole does not own many plantations directly, but does source from independent growers. This allows Dole to indirectly exert control through quality-control and purchasing. Thus, Dole does not deal with the messy social and political implications that plantation ownership can bring.

Ecuador has a

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competitive advantage over many Latin American countries in that the production costs per box are quite low. It is estimated that these costs are \$2.95 (\$U.S.) per box, compared with \$3.25 (\$U.S.) in Costa Rica².

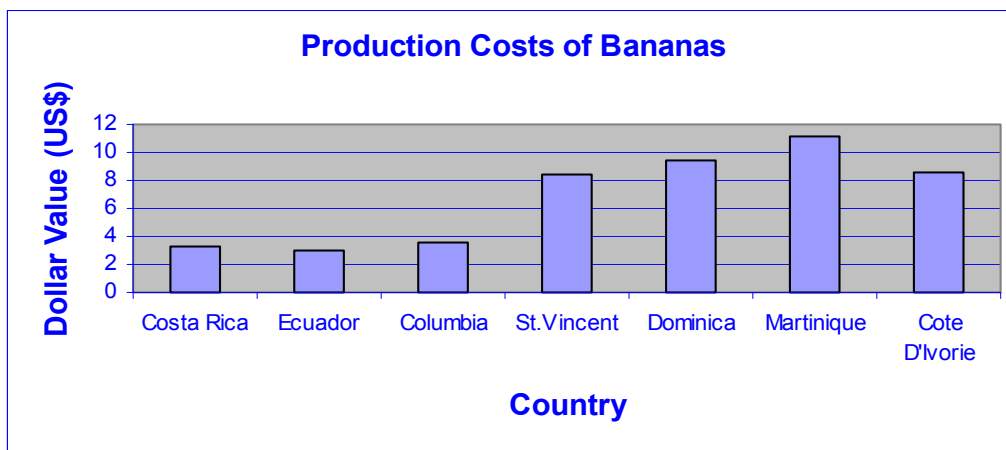
The US filed a complaint against the EU for the banana policy that favored African, Caribbean, or Pacific (ACP) bananas over Latin American bananas. This resulted in the "Banana War," that ended in 2001, when the First Come First Serve (FCFS) policy was implemented. This policy will eliminate the tax-free quota that the ACP countries received in the European Union (EU) market by 2006; this involves countries with higher wages and benefits competing with cheaper Latin American bananas. The US market is saturated with cheaper Ecuadorian bananas because there are no quotas set. It is a First Come First Serve market place where price and quality rule. Ecuador is expected to double its share in exports to the EU market, devastating the economies of several ACP countries. In Saint Vincent, 70% of the population make their

living in the banana trade and in Saint Lucia one out of every three people are employed in the banana industry⁶.

Wages and Working Conditions

Dole, Chiquita, and Del Monte account for 65-70 % of world banana exports⁷. These companies source Latin America for their bananas because of the low production costs. As the graph below shows, the production costs per box from US\$ 4.75/box up to US\$ 8.17/box is cheaper than any ACP country⁸.

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(Figure 2: Production costs for Latin American and ACP countries: Martin, 1999)

Reasons for these huge savings in production costs are large-scale plantations, higher productivity (through the heavy use of agrochemicals), cheaper labour, and poor working conditions and regulations.

Within Latin America, the wages show a huge disparity; in 2001, Ecuador only paid its workers an average of US\$ 4.00/day. This is less than half of the wages paid in Costa Rica, and Columbia (about US\$ 10/day), and only a third of the wage of Panama

(about US\$ 15/day)⁹. Benefits such as housing, healthcare and education for their children are also included in the wages for Panama, Columbia and Costa Rica. Missing from the Ecuadorian banana worker's wage are the latter benefits, and also benefits that are protected under Ecuadorian Law, such as overtime pay, fair wages, job security, and healthcare¹⁰.

The major reason for this disparity in wages is the lack of an independent banana workers union in Ecuador, not allowing the workers to have voice or power. Also, a loophole exists, which does not protect the worker through the legal system. In this loophole, the plantations sever the formal link between the managers/owners of the

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plantation and the workers. This happens by way of the *jefe de cuadrillas*, or team leaders. The company employs the *jefe de cuadrillas*, and they hire a crew of 12-15 *eventuales*, or workers, to work the plantations. The *eventuales* do not work for the plantation owners/managers; they work for the *jefe de cuadrilla*, who pays their wages. Since the companies do not officially employ the *eventuales*, they are demoted to temporary workers status. Temporary workers are not allowed to join a union, can not register with the Ecuador Social Security Institute (IESS), and are not allowed to accrue benefits such as severance pay, vacation pay, legally mandated annual bonuses, or formal rights if they become injured or sick¹⁰. Male *eventuales* work 12-13 hour days for about US\$4, while female (20% of the packing force) *eventuales* only receive US\$2-3/day. There is no overtime pay, yet they are expected to work weekends during the busy season. In the slow season, they work two to three days a week, but are on call seven days a week¹⁰. Chiquita reports that there were some 500 temporary workers in

Guatemala in 2000 that have held temporary worker status for several years and have not earned any benefits in that time¹.

In 2000, the US/LEAP program conducted a survey and interviewed 25 workers from approximately a dozen plantations that produce for Dole in Ecuador¹¹. The survey found signs that warn the worker to leave the fields for aerial spraying and to remain away for at least two hours after, but only one plantation was in compliance with this, and only after a union fight. Some were told to leave for the spraying but to return immediately afterwards and others were told to stay throughout the spraying¹⁰. In many

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cases the housing, most of which was built decades ago, is located close enough to the fields to expose the workers and their families to spraying¹.

Environmental Effects of Banana Plantations

Agricultural Procedures

Banana cash-crop plantations require intensive land, labour, and chemical inputs to grow. Bananas are indigenous to tropical regions, and require large amounts of rich tropical rainforests to be slashed-and-burned. Rainforests are cut down and then burnt to release the fertile nutrients of tropical plants into the soils so large banana plantations will be successful. These slash-and-burn procedures affect global climates, and result in soils that will quickly be depleted and eventually abandoned. Once the land is cleared, ploughing loosens the compact soil and turns up the topsoil, which is immediately followed by harrowing the soil, to ensure soil aeration and tilth. The bananas are then planted in 7m x 7m squares at the onset of the rainy season. The planting involves

placing leaf suckers, growths from the roots of mature plants, in holes 30cm deep. The banana plants are then ready to bear fruit within 9 months. These plantations require intensive human labor inputs for attention to plant de-leafing, de-suckering, and maintenance¹¹.

Plantation land is altered enough through drainage, watering systems, and soil disturbance enough to kill surrounding biodiversity and disrupt surrounding human communities. Plantations alter ground water as shallow canal systems and drainage ditches are built to

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control water supply. The loss of surrounding groundwater and resource systems affects the local water supplies of the surrounding communities. Plantation expansion, forces communities and biodiversity off of the land. Irrigation ditches and underground piping systems for water transport change the water balance of the land, prolonging deforestation after the plantation is abandoned. This abandonment occurs due to soil depletion, erosion, and absence of seeds to re-generate growth¹¹. Sedimentation processes change because of the hydrology alteration and the removal of previous protective topsoil covering, leading to erosion. Because the banana plant requires high humidity and temperatures, and diverse nutrients, the soil is quickly depleted of minerals such as calcium, iron, magnesium, nitrogen, phosphorus, potassium, and zinc. In addition, high volumes of artificial and solid vegetal waste yield negative agro-ecological effects such as fertility changes in surrounding soils¹².

Chemical Input Impacts of Banana Industry

Dole's banana plantations are located primarily in Central and South America. For the purpose of this report the plantations in Costa Rica will be used to describe the impacts of pesticides, as this has been the most heavily studied country. Dole currently exports 33% of their bananas from Costa Rica, the second major exporting banana country in the world¹³.

While the Industrialized World consumes the majority of bananas, it is those that produce the bananas in the Third World that truly suffer. Nearly 85 percent of world pesticide production is consumed in industrialized countries while the incidence of

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pesticide poisoning is 13 times higher in the Third World¹⁴. The farm workers of these plantations are often hardest hit. These farm workers are in direct contact with the pesticides being used on a daily basis. There is such high unemployment and poverty in these countries that citizens often have no choice but to work on plantations as they provide much needed employment opportunities.

The Industrialized World demands a banana that is aesthetically pleasing, i.e. one that is free of abnormalities and is of perfect shape and size. To produce these 'perfect' bananas, plantations must use high levels of pesticides¹⁵. According to the Banana Action Net website, in 1992 the average use of pesticides on banana plantations in Costa Rica was as high as 44kg/ha/year, compared to an average of 2.7 kg/ha/year for most crops in the Industrialized World.

The pesticides used on the plantations include pre and post harvest fungicides, nematicides, herbicides and insecticides¹². Fungicides are sprayed from the air between

40 and 50 times per year. Some fungicides, like mancozeb, are suspected carcinogens. Nematicides are sprinkled directly onto the soil once or twice a year. They are used to kill parasitic worms and are extremely dangerous. DBCP (Di-Bromo-Chloro-Propane 1,2,3) is a nematicide and has resulted in the mass sterilization of tens of thousands of plantation workers from Central America and the Caribbean to the Philippines and West Africa⁸. Herbicides are applied in cycles of approximately 8 to 10 weeks. The herbicide glyphosate is a suspected carcinogen. Also used in the production process of bananas are disinfectants, which are used after the harvest. The fruit is washed with tisabendazol and aluminium sulphate, which can cause severe dermatitis in direct contact with human skin⁸.

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Plastic bags that are used to protect the roots of the banana tree are coated with the insecticide chlorpiriphos, and plastic bags used in the packaging of bananas are also sprayed with insecticides to protect from insects while the bananas are stored and being transported. The following chart outlines the pesticides used and the frequency of their application.

Pesticides Used in Banana Cultivation - Methods and Frequency of Application:

Nematicides (organo-phosphates)	Knapsack-sprayer: 2 or 3 times per year in cycles
Insecticide (organo-phosphate)	Plastic bag covering: Constantly
Herbicides	Knapsack-sprayer: Constantly
Fungicides	In field aerial spraying: 47 times per year
Fungicides	In packing: Constantly

Source: Astoga, Yamileth. 1998.

The effects of pesticides can be devastating to those that work with them. Often workers on banana plantations are given insufficient training for the use of pesticides. This insufficient training most likely leads to the large number of workers who fail to wear the protective equipment provided because of the warm weather. It has even been reported by Duane Miller, a Sacramento attorney and DBCP expert who has been assisting plaintiffs in a case against Dole, that Dole provided its workers with nothing more than a t-shirt against the harmful effects of DBCP. It has been recorded that pesticides poison at least two workers every day¹⁵. This is a huge concern for the

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countries that produce bananas like Costa Rica where pesticide poisoning is occurring. The rates of pesticide poisonings are three times higher in the banana regions than in the rest of Costa Rica¹³. They are currently at the top of the list of countries with a high incidence of pesticide poisonings¹³. According to the authors of the Banana Action Net website, occupational poisonings in Costa Rica are currently occurring at the rate of 4.5%. This means that 4.5% of all agricultural workers suffer from some kind of pesticide poisoning every year. This is well above the World Health Organization estimate of 3% for developing countries¹³. The following chart outlines the rate for occupational accidents in Costa Rica, which includes pesticide poisoning.

Rates for Occupational Accidents in Costa Rica:

Banana Production	72%
Decorative Plant and Flower Production	7%
Sugar Cane	6%

Coffee	5%
Pineapples	4%
Pesticide Manufacturers	2%

Source: Banana Action Net

Although the greatest impact of pesticide use occurs in those who work directly with them, they can also have an effect on those who are in close proximity or even live great distances away. The average consumption of pesticides in Costa Rica per capita is 4kg per person per year. This is eight times as high as the world average of 0.5 kg and twice as much as the average in Central America¹³.

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The use of pesticides not only has an effect with those who come in contact with them but also on the surrounding environment. Plantations need an array of drainage ditches for optimum consumption, which eventually empty into rivers and finally the sea¹³. In the mid 1980s in the plantations of Valle de la Estrella it was proven that the Chlorotalanil used by Dole was contaminating the neighbouring wells and rivers¹². Land can be left permanently sterile by copper and other residues that accumulate on plantations, and the fragility of exposed soils combined with concentrated water flows in irrigation systems, can cause severe soil erosion and increased flooding during tropical storms⁸. Also effected by the use of pesticides is the biodiversity found within the plantations. Large amounts of plant, fish (including coral) and animal life are lost from the intensive use of chemical agents. Nematicides used to kill parasitic worms are highly toxic for distinct types of fauna (fish, birds, reptiles, bees, livestock, etc.) and high death rates of fish have been detected after spraying and after heavy rains¹². Surrounding

wildlife simply cannot adapt to the massive amount of pesticides used in the growth of bananas.

There is an alternative to the current pesticide intensive growth procedures that dominate the banana plantations. Organic banana plantations are now starting to take hold in the banana industry. By growing bananas through organic methods, there is no need for pesticides. With the use of organic fertilizers, soil fertility is maintained and enhanced. Those in the Dominican Republic use coffee husks mixed with animal dung

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(poultry/cattle) as fertilizer, while elsewhere guano, fish bones and seaweed are used¹². In some areas crop residues are also returned to the soil. Weed control is manual and is sometimes done with machetes. From time to time a green legume cover-crop is grown between bananas¹². Pest problems are dealt with using a variety of non-chemical methods. These methods can include proper spacing and manually eliminating infected banana plants. There is hope for the future of bananas, but to ensure this future, the consumer must support the organic trade.

Waste

The banana industry produces a significant amount of waste that can have a detrimental effect on the environment. The waste products associated with plantations in Ecuador were not found, but information from Costa Rica is representative of the industry as a whole. The following table summarizes the waste produced in Costa Rica in 1993¹⁶.

Description	Tons of Waste Generated per year	Tons Exported 1993	Tons of Waste per 100 tons exported – TW / (Te X.01)
Banana Production 1993 in Tons	-	952 776	-
Twine	2100	-	0.22
Plastic Bags	2801	-	0.29
Packing Materials	3211	-	0.34
Total non-degradable	8112	-	0.85
Crown and Flowers	24 505	-	2.57
Raceme's Stems	143 528	-	15.06
Fruit Rejected	317 592	-	33.33
Pesticides	2 369	-	0.25
Nitrogen	771	-	0.08
Agrochemical Containers	Info not available	-	-
Sub-total	502 620	-	-
Total Waste Requiring Treatment:	502 620	-	52.75
Stems and Leaves	2 553 310	-	267.99
Total Waste	3 055 930	-	320.74

(Hernandez and Witter, 1996)

The bananas are shipped in cardboard boxes, averaging 500 boxes per week

(26 000 per year) according to Thrifty's Foods on Hillside Avenue, Victoria B.C.⁵.

Pesticides represent a large and potentially dangerous portion of wastes. Plantations typically use mixtures of chemicals, the concentrations of which are considered trade secrets and are not made public. This results in potentially dangerous concentrations or mixtures being released into the environment, particularly in rivers and other water sources¹⁶. Alternatives to this problem lie within the organic banana movement, where chemical pesticides are not used. Stricter government regulations and more efficient monitoring systems are necessary. Companies are able to take advantage of lax environmental standards and the lack of any sort of health or environmental impact monitoring. Hernandez and Witter (1996) suggest that a tax be added onto the price of bananas to be

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paid by the international consumer to fund an organization to hold companies accountable for pesticide use.

Twine, plastic bags, and packing materials are usually dumped in landfills or in the case of plastic bags and twine, simply left on the plantation. The herbicide-laced bags often end up in rivers, releasing harmful pollutants. The twine can cause animals in the rivers to become entangled and die, and it is not bio-degradable, creating a major problem in landfills¹⁷. Plastic bags are currently bought only in one size, creating a large amount of excess waste. Plastic bought in rolls and cut to size on the plantation has proven to decrease the amount of plastic by 25%¹⁶. These bags can be re-cycled and re-used, and Chiquita has developed a system to make plastic wood out of plastic bags and twine. Dole and Del Monte have developed plants to make plastic fence posts out of the twine and bags.

Waste from the banana plants themselves, such as stems, leaves, raceme's stems, and discarded fruit, make up a huge component of waste generated. Often they are simply sent to large landfills where they rot, releasing harmful leachates into the soil and creating a health risk. These by-products are increasingly being used as fertilizer, providing a cheap, environmentally friendly alternative to manufactured fertilizers. Some companies are using the waste bananas to make baby formula, banana chips, juice, puree, and animal food¹⁶.

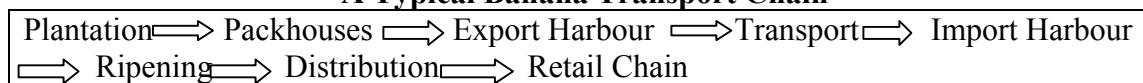
EARTH College is an organization in Costa Rica that has developed many new techniques to improve efficiency and decrease the environmental and social costs of the banana industry. Many of the above-mentioned innovations were developed by the

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EARTH College, and they continue to push for and provide solutions to the problems the banana industry now faces.

Transport

A Typical Banana Transport Chain



Source: van de Kastelee, Adeliën (1998)

The Transport chain studied in this report concerns how a Dole banana gets from a plantation in Ecuador to Thrifty's Foods in Victoria. The bananas are grown on a plantation in Ecuador that Dole sources from, where they are sorted and then transported by truck to a packaging plant. At the plant the bananas are cleaned and packaged, then sent by truck to the export harbour. The bananas are placed in sealed, refrigerated containers and loaded onto a large container ship. From Ecuador, the ship sails to San Diego, where containers are either placed in a warehouse or loaded directly onto trucks

from Thrifty's Foods, and delivered to a Thrifty's warehouse in Victoria, a two-day trip. At the warehouse, the bananas are ripened then shipped to individual stores. The bananas spend about 8-10.5 days at the ripeners¹⁷. The whole process is guaranteed by Dole to take no longer than twenty days.

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Alternatives



There is the Fairtrade label that supports small-scale plantations from the ACP countries. This label offers an alternative to conventional trade and empowers consumers to take responsibility for their role in buying products from third world countries. It also protects the farmers from increasing production cost and decreasing commodity prices by guaranteeing a certain price for their product that covers the cost of production and a basic living wage¹⁸. In 2000, the Rainforest Alliance's Better Banana Project (BBP)

announced that Chiquita has been approved for all of their Latin American banana plantations, 127 in total¹⁹. Annual inspections are conducted by independent auditors and criteria is based on occupational health, water quality, programs for recycling and safe waste disposal, decreased agrochemical use, environmental education, and improved quality of life of the workers²⁰. Chiquita has spent US\$ 20 million since 1992 getting their plantations up to the BBP standards and now they can bear the Better Banana Certification label¹. Dole has made improvements in these areas as well, but not with the aid of independent non-government organizations²¹.

Selective logging of the tropical land, and bananas planted amongst other plants, would protect seeds and young trees and be efficient in regenerating forests, as well as

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providing continually fertile soils¹¹. However, it may take generations to convince large corporate powers of benefits such as workers and environmental health, when they are mainly interested in intense agricultural systems for quick profits. However, there are more realistic and empowering alternatives for the consumer, such as buying certified organic bananas from smaller-based companies who follow strict regulations. The best choice for buyers is therefore bananas that are certified organic and are not distributed by large corporations such as Dole, Chiquita, or Del-Monte. The more that small farms are supported, the more the large corporate powers will be pressured into altering their harmful practices.

There are many organizations involved in educating others on produce concerns. Geneaction in Victoria puts stickers on bananas in supermarkets in hopes of educating

buyers of the concerns of buying genetically modified bananas. As more consumers support local certified organic suppliers, the standards of workers and environment may change within corporations to meet the expectations of concerned consumer demands.

Conclusion

The ecological footprint of a banana from its primary source stage to its sale in Victoria's marketplace involves a continual flow of resources and influential factors such as politics, economy, location and environment. Because the Industrialized World consumers buy massive amounts of bananas weekly from plantations, the Underdeveloped World often suffers due to low regulations and competitive, profit oriented global markets. Industrialized nations consumption rate is not less of an impact

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at specific times of the year because bananas grow year round, and because the transport distance is always large. It is therefore extremely important to research alternatives and promote certified organic purchases. Through supporting small-scale certified organic businesses there is hope for change from within as corporations such as Dole are pulled to comply with the higher standards that consumers must demand.

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