

Ecological Footprint: Eggs

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An ecological footprint or, the environmental impact a product has on the global environment, measured in terms of acres varies for each product depending on the inputs and outputs of the product. In this particular case we will be discussing the ecological footprint of eggs, an assumingly simple idea, or so it would seem from the surface. There are many inputs into this industry that everyday consumers would never even think about. We take an in-depth look at the poultry and egg industry, discussing topics ranging from the processes involved in the production, the wastes, and the social impacts of the industry. We look at the products we use on a daily basis, which makes us truly understand that our actions effect the environment more than one would assume.

The main inputs of the industry are chickens, which are either transported from another farm or produced on site (Canada Egg, 2005). Most chickens that are used in high quantity production environments are exhausted after 2 years of egg production so the amount of chickens needed are high, being that each chicken produces around 200 to 300 eggs per year and each year we consume 29 million dozen (AEB, 2002). For each of these stages of life a different food type is needed which will be discussed at length later. This leads to another one of the greatest impacts, which is the production of food for the chickens (BC Egg, 2004). High quantities of water are used in these agricultural processes and possibly pesticides depending on the inorganic or organic status of the farm where the feed is grown (AEB, 2002). Packing materials also have a main impact, including boxes for shipping, cardboard, plastic and foam egg cartons and other products used. Transportation also enters into the equation, especially in an area like Vancouver Island, that is big enough to produce its own eggs but not large enough to produce all of the materials needed in the process.

Egg Production

Egg production has a fairly large ecological footprint considering how simple eggs appear to be. To accurately judge the environmental impacts one must look at the food used to keep the laying hens alive, the containers and cartons used to store and sell eggs, the energy used by the broiler houses, the waste generated by the laying hens and the transportation effects.

Chicken Feed

The production of chicken feed is an intensive process. There are two main types of chicken feed: meat-meal and non-meat meal or vegetarian. Chicken feed is also unique to each type of chicken for example; a layer and a hen raised for slaughter are fed totally different types of feed. Even within a laying hen the feed can vary depending on what stage of development it is at. The chick, pullet and layer stages all require different variations of feed (D. Hopkins, personal communication, 28 February, 2005). The feed varies because at different stages chickens require certain nutrients. The layer requires so much calcium that Excel Feeds (based in Abbotsford) uses crushed up oyster shells (D. Hopkins, personal communication, 28 February, 2005).

Although it was hard to find conclusive information as each feed provider has their own recipe a typical layer feed consists of 88 percent grains and grain by-products such as corn, canola and wheat. In a meat-meal feed, 10 percent is meat (most commonly bovine and poultry) or in a vegetarian feed it would be other protein sources such as vegetable fats or soybean. The feed producers claim that meat is added to improve the nutritional content, taste and texture of the feed. Most of the producers contacted claim

they use two separate mills for producing meat and not meat feeds although this is not required by government standards (R. Smith, personal communication, 28 February, 2005). Approximately, 1.5 percent is mineral and vitamin supplements such as thiamine, lysine, lime, calcium and vitamin E.

Chicken Feed – Disease Prevention

The other 1 percent consists of antibiotics to help prevent disease and digestive problems (“Antibiotics: your questions answered”, 2004). Crowding creates a prime atmosphere for disease; therefore, hens on factory farms are sometimes fed antibiotics (such as Lasalocid), which remain in their bodies and are passed on to the people who eat their eggs, possibly creating serious human health hazards. Daily doses of Lasalocid are regularly given to chickens in their feed as a preventative treatment against Coccidiosis. Coccidiosis is an infectious disease caused by a parasite, which damages the birds’ intestines and causes illness and sometimes death. When large numbers of animals are crowded together (up to 100,000 birds may be kept in one unit at a time) in moist and warm conditions, outbreaks of Coccidiosis are more likely to occur. Lasalocid is not prescribed by vets but sold as a feed additive directly to producers by pharmaceutical companies and feed merchants.

Essentially, a farmer may choose to treat a whole flock of chickens with a preventative antibiotic rather than treat an individual infected bird with a stronger dose. Interestingly, both of the feed producers contacted had different information concerning antibiotic use and legal practices. Excel Feeds claimed that antibiotics are used only when in conjunction with a veterinarian prescription similar to the way antibiotics are used in

humans. They also stated that a Canadian inspection officer does regular checks to ensure proper documentation of prescriptions used. Ritchie-Smith Feeds Co. claimed there were no antibiotics used in laying hen feed at all as it was not approved by government standards yet (R. Smith, personal communication, 28 February, 2005). Nevertheless, it was extremely hard to find convincing evidence of antibiotic use in feed and hard to draw any conclusions regarding the environmental impacts. Luckily, hormones have been banned when used in chickens since the 1960's in Canada ("The story of chicken", 2003).

It was hard to find conclusive information about pesticide use in the grain chicken feed is with. However, the Egg Producers of Canada did state pesticides, (including herbicides, insecticides and fungicides) are used in grain production and are registered for use; therefore, one can conclude pesticides would be present in the chicken feed (personal communication, 1 April, 2005). The pesticides may contain toxic chemicals such as dioxins. Dioxins are slowly transformed in the body and are not easily eliminated. They tend to accumulate in fat and in the liver. Exposure to dioxins can lead to a wide array of adverse health effects including cancer, birth defects, diabetes, learning and developmental delays, endometriosis, and immune system abnormalities.

Egg Consumption – Health Concerns

In addition to the previously stated health concerns, eggs are the single largest source of cholesterol among the foods most commonly eaten in the Canadian diet (Health Canada, 2004). A large egg contains about 213 milligrams (mg) of cholesterol – more than two-thirds of the recommended daily maximum of 300 mg (Health Canada, 2004). More specifically, the yolk of an egg contains the cholesterol; the white contains none.

Excess cholesterol in the diet can raise the level of cholesterol in the blood, causing major health problems including heart disease. Since the body produces all of the cholesterol it needs for normal functions, eating large quantities of cholesterol rich foods may be hazardous to human health.

Environmental Stewardship

A large amount of land is required to produce chicken feed and hold layers; nonetheless, the BC Sustainable Poultry Farmers are making efforts towards environmental stewardship. They are creating fertilizers out of the excess chicken effluent, promoting more efficient land use practices and educating farmers on proper waste management techniques (“Today's solutions to environmental problems”, 2004). In addition to effluent, a producer must also deal with the high mortality of the layers and the disposal of dead layers at the end of the production cycle. In some cases, these hens are shipped for further processing as a food product or may be disposed of on-farm (Egg producers of Canada, personal communication, 1 April, 2005).

Wastes Produced

Eggs at the farm level are gathered and placed into plastic trays. Trays are assembled on skids (wood pallets) and shipped to a grading station where they are washed, candled and packaged into various sized cartons for retail sale. The plastic trays and skids are washed, disinfected and returned to the farm. The Egg producers of Canada claim waste in this process is minimal (personal communication, 1 April, 2005).

The poultry industry in British Columbia is quickly increasing in size. Management and disposal of poultry manure has become an issue in the Lower Mainland, where most of BC's industry is located. The poultry industry produced 745,000 cubic yards, or about 240,000 tonnes, of manure in 2001 and is expected to produce an additional 80,000 tonnes of manure annually by 2010, for a total of 320,000 tonnes annually (2003). This is based on industry and government supplied estimated growth figures of 3% per year for the poultry industry as a whole (2003).

A study was conducted by Timmenga & Associates Inc. (2003), commissioned by the four "feather associations" (Broiler Hatching Egg Producers' Association, BC Chicken Growers Association, BC Turkey Association and the Fraser Valley Egg Producers' Association) to review the technologies and practices for handling and helpful reuse of poultry manure produced in the Lower Mainland. The results of the study show that a large nutrient surplus was present in the Lower Mainland in 2001 for the three primary nutrients: nitrogen (4,000 tonnes), phosphorus (5,700 tonnes) and potassium (7,300 tonnes) (Sustainable Poultry Farming Group, 2003).

The poultry industry is currently the largest source of manure-based nitrogen and phosphorus in the Lower Mainland. The Lower Mainland manure based nutrient surplus is expected to grow by 37 percent for nitrogen, 23 percent for phosphorus and 2 percent for potassium by 2010 (Timmenga & Associates Inc., 2003). This estimated growth is entirely based on increased production by the poultry industry. These nutrients in excess make it a challenge to safely dispose of or reuse poultry manure. Since this study took place in 2003, The Environmental Farm Plan Program was introduced which is expected

to decrease the amount nutrients used in crop production by as much as 50% (Timmenga & Associates Inc., 2003).

Technologies that remove manure and nutrients in the land base are ideal; however, do not seem economically possible in the Lower Mainland. Small-scale technologies like on-farm gasification of raw or processed poultry manure could be a cost effective way to transform poultry manure into heat and energy rich products such as charcoal. Depending on the price of natural gas and the current source of energy, this could be a cost-effective solution for both the poultry industry and the greenhouses in the Lower Mainland.

Egg Cartons

There are two main types of egg cartons: polystyrene foam cartons and pulp molded fiber cartons. Polystyrene foam cartons are very popular and actually use only five percent polystyrene and the rest is foam. Polystyrene only accounts for less than one percent (by weight) of the total municipal solid waste disposed in landfills. Paper and paperboard products make up the largest category of material (about 31 percent) disposed in our landfills. Since the Montreal Protocol in 1987, no chlorofluorocarbons have been used to manufacture polystyrene products in Canada (“Polystyrene facts”, 2005). There are many bias opinions regarding polystyrene products and their environmental impact. Many websites and companies we contacted are trying to promote and sell polystyrene products; therefore, want to convince the public it is better than the paper alternative. Interestingly, polystyrene is not biodegradable. CKF Inc. is the main supplier of egg cartons within Canada and produces both types of cartons. Ron Humphreys is the

Director of Product Development at CKF Inc. and was unavailable to speak with. The average North American family uses approximately 40 polystyrene egg cartons per year generating one kilogram of polystyrene per year (“Recycling Information”, 2005).

Polystyrene can only be recycled safely at the Canadian Polystyrene Recycling Association plant in Mississauga, Ontario. The website states that if a person would like to recycle their egg cartons or other polystyrene products they have to send them to Mississauga, Ontario (“Recycling Information”, 2005).

The pulp molded fiber egg carton is less common and generally made by 100 percent reclaimed paper. Many producers claim it takes three times more material to make pulp cartons than it does to make polystyrene cartons (“Facts you might find Interesting”, 2004). However, pulp cartons are biodegradable and recyclable in most communities.

Methods of Egg Production

Obviously different methods of egg production have different environmental impacts. Some methods have less of an impact such as free-range eggs. Although Canada does not have set guidelines or standards for free-range chickens they generally have less of an environmental impact than a flock kept in a broiler house. Free-range chickens are usually kept in a barn and let out for sometimes only a few minutes per day; however, the electrical consumption is lower because the broiler houses are energy intensive.

Approximately 25 percent of the gross farm income is required to pay the annual propane and electricity bills on farms with broiler houses (C. Breukelman, personal communication, 29 March, 2005). Broiler houses generally hold up to 16,000 caged hens

and require constant heating and lighting to get the maximum egg production out of the laying hens.

Transportation Effects

Currently there is no feed producer on Vancouver Island and although some small-scale farms will make their own feed most of it is imported from the mainland. Therefore, transportation effects also include boat transportation to Vancouver Island. Once the feed reaches the island it is then transported by truck to the farms. Trucks are also used to transport eggs to the grocery stores. The large trucks are a major contributor to green house gases such as: carbon dioxide.

Social Impacts

When it comes to the ethical treatment of chickens, sources were all contradictory and seemed somewhat biased and unreliable. The only consistency in our findings was the uniform housing methods of the chickens. The factory farming system of modern agriculture strives to produce the most eggs as quickly and cheaply as possible, and in the smallest amount of space possible. The laying hens live in battery cages stacked tier upon tier in huge warehouses. Confined seven or eight to a cage, they rarely have enough room to turn around or spread even one wing. The average leghorn chicken has a wingspan of 26 inches and on average is only provided with 6 inches of space in egg factories (PETA, 2003). Conveyor belts bring in food and water and carry away eggs and excrement. To prevent stress-induced behaviors caused by overcrowding, such as pecking their cage mates to death, hens are kept in semi-darkness, and the ends of their beaks are cut off

with hot blades (without pain relief) (PETA, 2003). The wire mesh of the cages rubs their feathers off, chafes their skin, and cripples their feet. Chickens can live for more than a decade, but laying hens on factory farms are exhausted and unable to produce as many eggs by the time they are two years old, and are slaughtered. This information has been provided by PETA, an organization openly ostracized by the Egg Producers of Canada.

Conclusion

The research done on this report was gathered from personal communications, peer reviewed journal articles, internet sources, and books. Within any industry where there is an ability to make large profit many of the people were clandestine with their information. For example, there was conflicting information regarding the ingredients of chicken feed and what exactly each ingredient is used for. There has been conflicting information about the purpose of meat meals in feed, whether they are used for fillers or for extra proteins. Also, the topic of hormones and antibiotics in the sources we found were very contradictory. In some areas it was said that the substances had been banned and others said that only hormones were. The most popular idea was that hormones are not used whereas antibiotics are used based solely on a need to use basis, so that was the conclusion we drew.

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