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# Spirit Level Farm

## Pastured Poultry Feasibility Study

MBA 549 Supply Chain Management Practicum Project

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## A. Executive Summary

Increased consumer interest in locally produced and environmentally sustainable meat products has created an opening in the market for North Carolina poultry operators who utilize a pasture-based production model. Spirit Level Farm is located in Rutherfordton, North Carolina, and currently sells fresh pastured poultry meat to wholesalers and directly to restaurants in North Carolina. Spirit Level birds are antibiotic-free, non-GMO, and pasture-raised. Chicks are purchased from a hatchery and are grown for two months before being delivered to Foothills Pilot Plant, an Animal Welfare Approved processing center located in Marion, 30 miles from the farm. At Foothills the chickens are slaughtered, processed, and packaged. Spirit Level then retrieves the product to deliver to customers. Spirit Level Farm is considering the possibility of growing its size from a current 7,000 birds harvested per year to 45,000 birds annually. Two farmers that contract with Spirit Level to raise birds will help the farm reach its expansion goals of 15,000 birds in year 1, 30,000 birds in year 2, and 45,000 birds by year 3.

The Center for Environmental Farming Systems (CEFS) Poultry Team was tasked with preparing Total Cost of Ownership (TCO), profitability analyses, and a feasibility report to inform Spirit Level's growth plans. The first task was to create a TCO to assist poultry farms, specifically Spirit Level Farm, in organizing their current costs and projecting their costs over the course of an expansion. In addition to this tool, the team also created a profitability analysis to calculate a net present value, payback period, and rate of return for the project based on projected cost and sales data for the three-year time period. Lastly, the team created a feasibility study to report the financial outlook of a transition to a pastured poultry flock of 45,000, with market trend information to support this growth. The Profitability Analysis spreadsheet<sup>1</sup> can be used by other poultry operations to track costs and returns and used as a basis to analyze business changes.

To project variable costs and revenue, the team used the number of birds as an indicator because chickens are both a cost driver and a source of revenue. After completing a TCO and profitability analysis, it was found that very few economies of scale exist for Spirit Level Farm. The result is that costs increase at a higher rate than volume and revenue, which contributes to a declining margin over time. Although net income increases each year, the percentage at which it increases declines each year. It was found that after three years Spirit Level Farm's margin had decreased from 13% to 9%. To maintain its current 13% margin Spirit Level needs sources of chicks and, in particular, feed, that offer better pricing as volume increases. Although the margin declines when volume increases, a pastured poultry enterprise still offers a relatively high profit margin for small and mid-scale farmers. The profitability analysis finds a

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<sup>1</sup> Profitability Analysis spreadsheet: [www.cefs.ncsu.edu/ncgt/profitability-analysis-container-rental.xlsx](http://www.cefs.ncsu.edu/ncgt/profitability-analysis-container-rental.xlsx)

return of 19% annually on the investment.<sup>2</sup> As such, it presents a relatively attractive alternative or supplemental farm enterprise for these farmers.

## **B. Introduction**

Spirit level farm is located in Rutherfordton, NC, and is owned and operated by Will Carter. Mr. Carter decided to pursue pastured poultry farming five years ago when he realized the damage that unhealthy food can cause to the human body. The farm offers pastured poultry meats, pastured pen equipment, and consultations to other farming families. Mr. Carter sells the pastured meats directly to consumers and wholesalers, including two restaurants in the Raleigh-Durham metro area.

Spirit Level Farm's philosophy is "Changing the world, one meal at a time" (The Spirit Level Farm). Spirit Level Farm's birds are all non-GMO and antibiotic-free. All the chickens are raised in the forest and pasture on the farm in Western North Carolina. A wide variety of product offerings exist at Spirit Level. Pastured meats include whole chickens, thighs, wings and drumsticks, boneless skinless breasts, livers, hearts, and feet. Pastured meat prices range from \$2.00 per pound to \$12.75 per pound depending on item. All the orders are available for pickup, but returning customers who purchase from the farm regularly can set up a monthly delivery for a fee of \$15.00 per month. The meat offered by the farm is USDA inspected and approved.

In addition to pastured meats, the farm also offers custom pasture pen equipment. The item list includes poultry crate handles, poultry crate sleds, water adaptors, brooder feeders, finish feeders, brooding pens, finishing pens, and a full pen set. Prices for the different products necessary for the start-up of a pastured poultry farm ranges from \$25 to \$8,500. The farm also offers consultation services for a fee. The services range from telephone advice to on-site consultations, and the price ranges from \$155 to \$1,700. Most of these consultations are performed for farming families who desire to make the transition to a pasture-based poultry farming model and need guidance from an experienced producer (The Spirit Level Farm). Mr. Carter is currently considering scaling up operations to support the farm's growth from 7,000 to 45,000 birds by December 2018.

## **C. Project Scope**

The purpose of this project was to assess the feasibility of Spirit Level's growth from 7,000 to 45,000 birds by December 2018 given its current capacity and constraints. The deliverables for this project included an investment plan, profitability analysis, and Total Cost of Ownership (TCO) Analysis pertaining to the scale up in flock size. The

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<sup>2</sup> This is total return, with no discount rate applied (i.e., the opportunity cost of other investments is not included).

investment plan will aid the farm in understanding if the increase to 45,000 birds is feasible given its current size and capacity constraints. Profitability analysis will afford Spirit Level the opportunity to view financial statistics pertaining to different capacity levels and costs. The TCO Analysis will give the farm an idea of the total cost of scaling the operation up to 45,000 birds. This includes major costs from the initial purchase of the chick to the delivery of the processed bird.

## **D. Industry and Market Research and Analysis**

### **D.1 Industry Overview**

According to the North Carolina Poultry Federation, the economic impact of the poultry industry on North Carolina is \$34.4 billion. The poultry industry also supplies over 109,000 jobs for North Carolinians. Poultry is the number one ranked agricultural industry in North Carolina and the state is ranked third nationally for total poultry production. Over 5,700 farm families make their living in the poultry industry, which makes up 40% of North Carolina's total farm income (North Carolina Poultry Federation).

According to the Meat Product industry, the market capitalization is \$56 billion, which indicating that the market is very large. Net profit margin is 3.3%, and return on Equity is 10.9%. The top four companies in the field are Tyson Food at market capitalization of \$25.5 billion, Hormel Foods at market capitalization of \$20.2 billion, BRF SA at market capitalization of \$11.1 billion, and Bridgeford Food at market capitalization of \$109.3M (Yahoo Finance 2016).

Spirit Level Farm offers a product differentiated from commodity poultry in several ways. Birds are raised in outdoor pens, consume only non-GMO feed or insects and the like from the pasture environment, and receive no antibiotics. The competition facing Spirit Level Farm stems from other pastured poultry farms with the same production characteristics, and from commodity production that avoids antibiotic use.

The barrier to new entrants in small poultry farming is very low. It doesn't take much capital to start a hobby poultry farm by purchasing chickens and the housing necessary for them to be healthy. However, if the farmer desires to sell the birds to the wholesale market and produce at higher volume in order to achieve a profit, the amount of work and capital involved can be intensive and costly. Spirit Level Farm is currently considered a small to mid-size farm, but desires to scale up their production to achieve a greater share in the local market. Spirit Level has strong demand from current customers for its uniquely differentiated product, but the cost of the final product, at two to four times commodity prices, limits the size of the market.



Major market trends include strong consumer demand for meats raised without antibiotics. Vertically integrated poultry operations like Tyson and Perdue have vastly increased their supplies of chickens raised without antibiotics. Major retailers like Chick-fil-A have also made promises to their customers to provide only antibiotic-free chicken in the next five years (NRDC 2015).

In addition to the antibiotic-free designation on meats, non-GMO classification is also increasingly demanded by consumers. Forty-three percent of consumers consider non-GMO a very important characteristic of their food purchases (Neilson 2015). These trends in the meat market lend credibility to the fact that Spirit Level's non-GMO and antibiotic-free pastured poultry model has a market, though of uncertain size, which plays to the demands of health-conscious American consumers.

### **D.3 Poultry Supply and Demand**

Over the next five years, revenue in the poultry industry is expected to grow at an annual rate of 2.6% to \$46.4 billion by 2020. Additionally, per capita consumption of poultry is predicted to grow at a rate of 1.5% annually over the next five years (Curran). Over the past 50 years, per capita consumption of chicken has seen a generally increasing trend and has surpassed both pork and beef in annual pounds consumed per person (Exhibit 1) (National Chicken Council). These trends will continue over the next five years. Poultry will also continue to be less expensive than other meats like beef or pork. This lends credibility to the fact that consumer demand for poultry will remain strong when compared to the demand of other types of meat. Price of conventional chicken in 2020 will be half of the price of beef in 2020. The difference in price between chicken and beef stems from the reduced cost of processing chicken when compared to beef (Curran 2015).

## **E. Total Cost of Ownership and Profitability Analysis**

### **E.1 Assumptions**

There were multiple assumptions taken into consideration when assessing the estimated total cost and determining the profitability of the farm. It was assumed that the survival rate of birds would be 95% (based on production history at Spirit Level) and that the cost of purchasing each chick from the hatchery and the cost of processing the bird would remain the same from 2016-2018. In order to achieve maximum profitability, it would behoove the farm to seek out a discount from the hatchery and feed provider when it begins to purchase a greater volume of both feed and chicks in the coming years. It was also assumed that Spirit Level's wholesale price per pound for chicken would remain at \$3.80 from 2016-2018. Depending on the level of increasing demand for non-GMO and antibiotic-free meats, Spirit Level might have the justification necessary for adjusting their price point.

In addition to assumptions made about the birds themselves, assumptions were also made about Spirit Level's operational actions. The farm's land capacity to raise birds is capped at 5,000 birds, and thus the growth of any additional birds is outsourced to other farms. Based on knowledge about the costs of pastured-pen equipment, we assumed a \$.20 cost of equipment per bird per season. We also assumed that Spirit Level would maintain a Net Working Capital of 10% of their sales. This means that the farm will keep cash equivalent to 10% of their sales on hand at all times to spend on day-to-day operations. Another assumption was that Spirit Level's sale of bird parts that cannot be sold for consumption would increase at a rate consistent with their volume growth. It was also assumed that feed containers would continue to be rented, instead of being purchased. Lastly, it was assumed that Spirit Level would maintain their deliveries from 2016-2018 with one truck and driver and that feed would exhibit an increase in price each year due to an estimated 1.30% inflation rate (InflationData 2016).

## **E.2 Total Cost of Ownership**

The Total Cost of Ownership (TCO) gives a detailed view into all costs involved in the operation from the initial purchase of the chick to the delivery of the processed bird. The analysis provides a detailed breakdown of each cost incurred as the annual expansion takes place. The cost for each year is individually detailed as there will be a number of dynamic factors that contribute to the operation as it expands.

Considering the previously mentioned assumptions, the estimated total cost for 15,000 birds in 2016 is \$183,454, which is a 116% increase from 2015. This 116% increase correlates with a bird volume increase of 114%. For 2017, the estimated total cost is \$374,915 when the operation expanded from 15,000 birds to 30,000 birds. Finally, for 2018 when the farm reaches its target flock size of 45,000 birds, the estimated total cost is \$573,961. Therefore, the combined estimated total cost of expansion from 2016 to 2018 is \$1,132,329.

One area that was explored was the breakdown of the areas of spends of the farm. Initial purchase of the chick was 8% of the total cost, the cost of raising the bird was 54%, the cost of processing the bird was 34%, and delivery of the bird was 4% of the total cost (Exhibit 2). The cost of raising the bird was the main cost driver for Spirit Level Farm's total expense. 76% of the cost of raising the bird stemmed from the purchase of feed (Exhibit 3). Seeking economies of scale in this area of spend would afford the farm savings as they scale up production.

In 2015, Spirit Level Farm's costs are 86% of their revenue. These costs are forecasted to consume up to 90% of the revenue by 2018. The rate of increase in incremental cost is closely correlated with the rate of volume increase. This means that over time Spirit

Level's margin decreases, given the assumptions about costs of inputs and sale prices (Exhibit 4).

Currently, Spirit Level Farm is renting feed containers on a monthly basis. A cost analysis was performed on this rent or buy situation and showed that the farm would have greater savings in the long run if they begin to purchase the containers as they scale up their production levels. The estimated three-year total cost of the operation from 2016 to 2018 if the farm purchases containers as they grow is \$1,133,481. This is only \$1,152 more than if the farm rented the containers necessary for feed storage for all three years. The saving impact from the decision of purchasing the containers as they scale up is \$8,424 annually after 2018.

## **E.2 Profitability Analysis**

Using data from Spirit Level Farm, a profitability analysis was constructed in order to determine projected net income for 2016-2018, cash flows, NPV, IRR, payback period, and profitability index. When developing the profitability analysis, the previously mentioned assumptions were taken into consideration.

The first step in developing a profitability analysis was determining the projected net income for the farm based on cost and projected sales data that was provided by the farm. Although the farm's net income exhibited strong growth year over year, growing from \$23,800 in 2016 to \$60,961 in 2018, the percentage increase in net income each year is generally projected to be less than the percentage increase in volume. Production units are added in fixed increments, and feed and chick costs remain the same per unit; thus no economies of scale are achieved. The owner of Spirit Level noted that he had sought price breaks for larger volumes of feed and chicks, but that his current supplier was unwilling to provide volume pricing.

Cash flows are calculated by subtracting the assumed increase in Net Working Capital from the net income amounts. The IRR is then calculated using all of the cash flows. The IRR for this project is extremely high, nearing 171%. The returns are very high when compared to the small initial investment in equipment required. The net present value is the present value of all future cash flows. It compares the investment to what the amount gained in the future after it is discounted at a selected rate of return. The NPV for this project is high when compared to the initial investment, but it becomes lower as the potential discount rate is increased. At a discount rate of 10%, the NPV of this project is \$51,390. The discount rate accounts for the opportunity cost that the funds are estimated to have in an alternative investment. Note that the total returns for the project are 19% on investment, if this rate is included. The profitability index is also a measure of financial attractiveness. A profitability index lower than one relates that the



project's present value is less than the initial investment. As values on the profitability index increase, so does the financial attractiveness of the proposed project. At a discount rate of 10%, the profitability index of this project is 6.18. Lastly, the payback period is determined using the cumulative cash flows. For this project, the initial investment in the project is recouped within 0.80 years, or about 9.6 months. Each of these profitability measures reflects that the growth from a 7,000 to 45,000 bird flock would be a profitable investment for Spirit Level Farm.

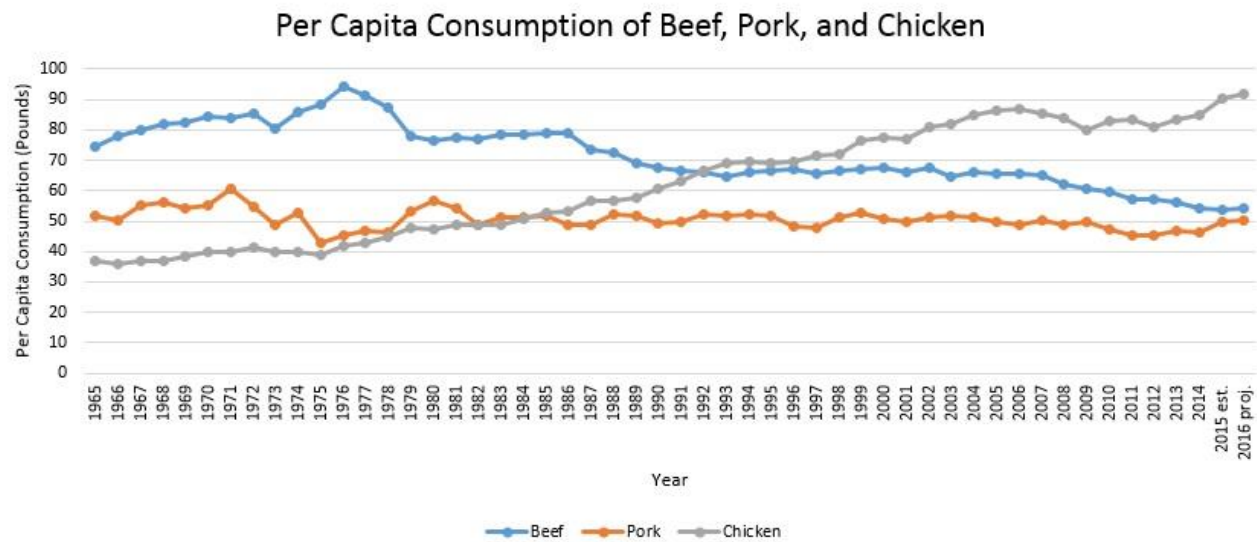
## **F. Conclusion, Assumptions, and Recommendations**

Overall, it is feasible for Spirit Level Farm to expand given the favorable market trends surrounding consumers' purchase of non-GMO and antibiotic-free meats and given the positive profitability measures calculated by using data provided by the farm. Although Spirit Level's margins decline over the three year expansion period, they never dip below nine percent, which is the margin that large producers like Tyson achieve (Yahoo Finance 2016). This 9% is also net of the additional 10% discount rate. In other words, the investment in the operation yields an annual return of 19%. Additionally, scaling up to a volume of 45,000 birds would give increase market stability for this small producer and afford him the opportunity to more stably supply larger retail and restaurant markets.

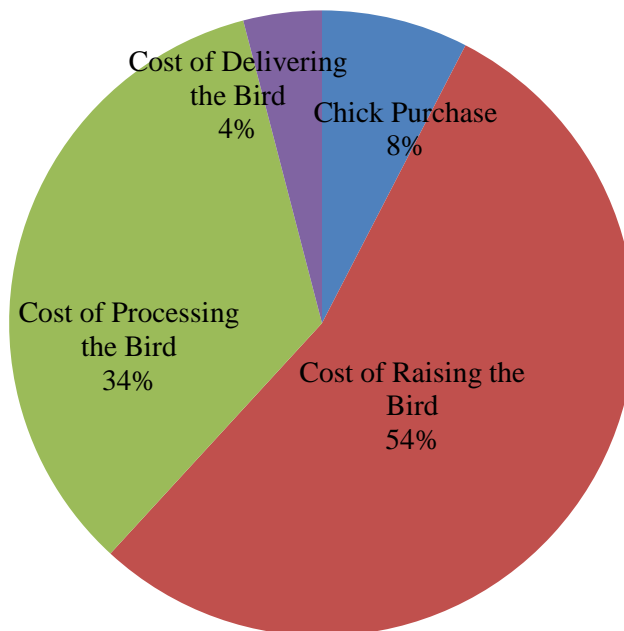
Spirit Level Farm would experience greater returns if economies of scale were achieved in the procurement of feed. Additionally, it is recommended that Mr. Carter purchase his containers for feed, rather than rent them. As a result of the capacity expansion, an additional two containers should be purchased each year from 2016-2018. The purchase of these six containers would result in an annual savings of over \$8000 after three years. The savings experienced as a result of purchasing feed *annually* in bulk at the beginning of the growing season do not justify purchasing these containers. However, when feed is purchased *semi-annually*, the purchase is justified through the savings experienced.

## G. Exhibits

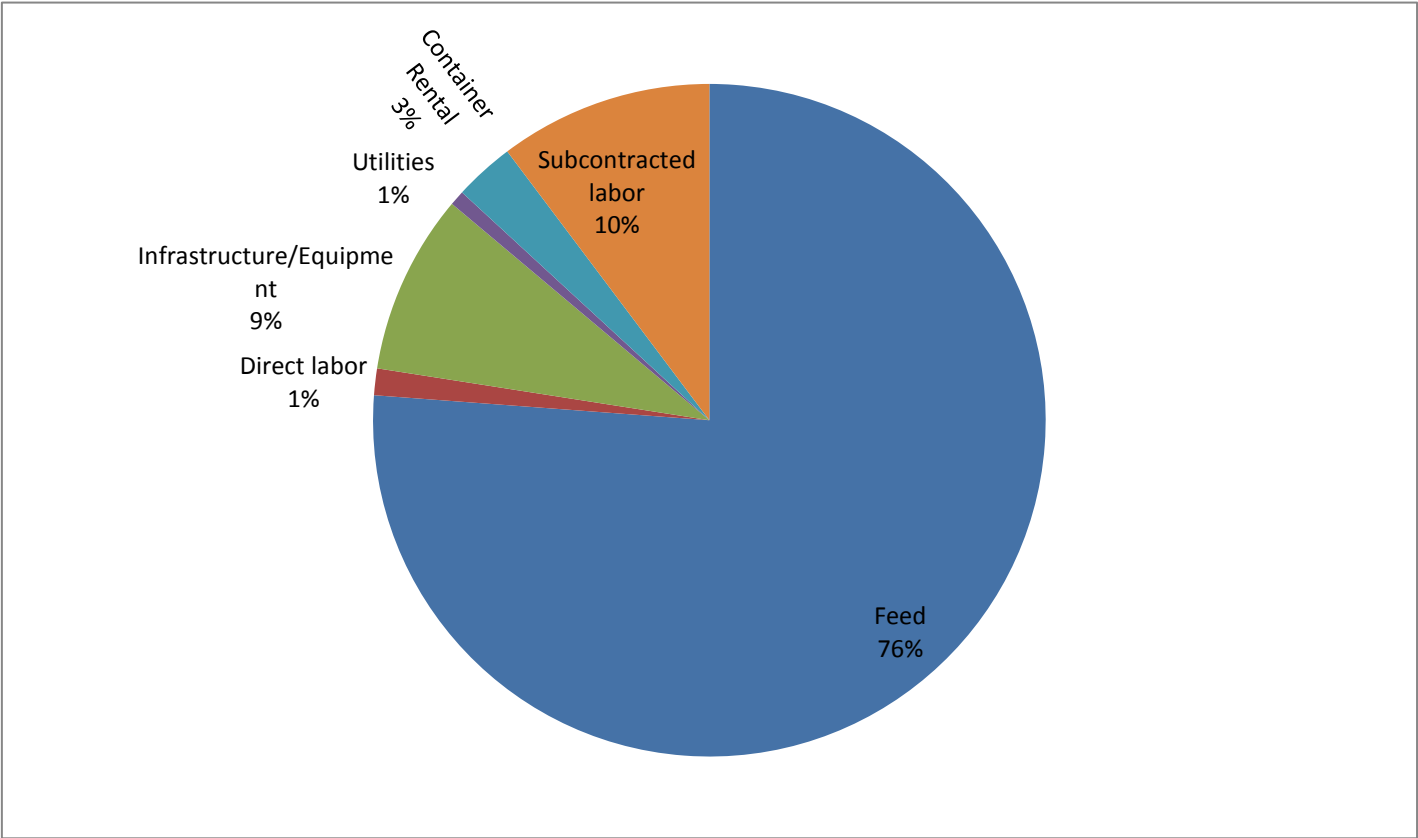
**Exhibit 1:** Per capita consumption of beef, pork, and chicken (National Chicken Council, 2015)



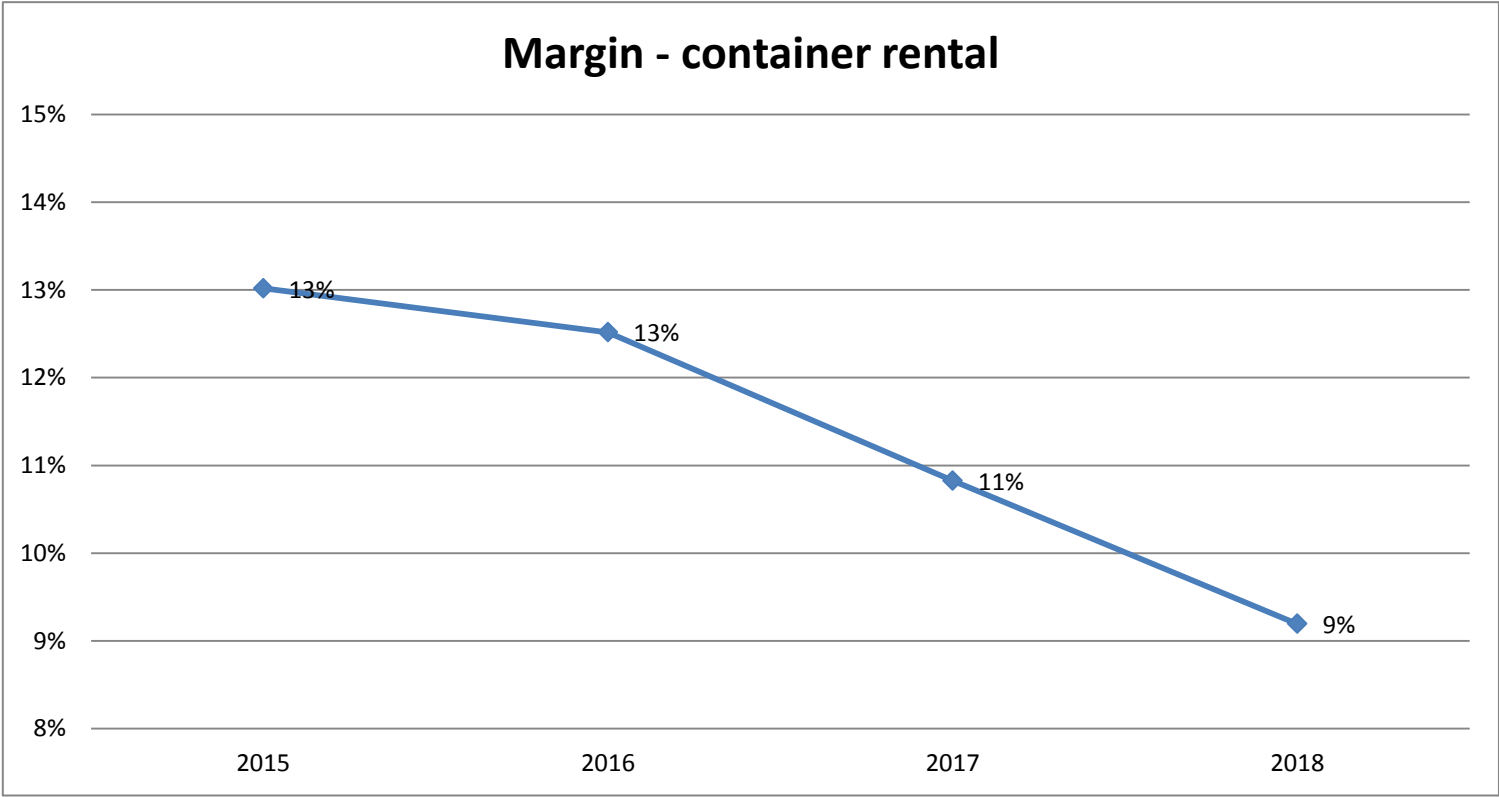
**Exhibit 2:** Total Cost of Ownership breakdown



**Exhibit 3:** Breakdown of Total Cost of Ownership of Raising a Bird



**Exhibit 4:** Marginal trends graph



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