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# REDCO EGG FARMING FEASIBILITY STUDY

by

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# Egg Farming Study

## Overview

The objective of this feasibility study is to provide an overview of the egg farming infrastructure needs and challenges of the client, and to offer potential options and practical advice. It provides a framework of the investment and infrastructure required to start an egg farming operation sized and scaled appropriately for the client; it also makes recommendations for the equipment required, estimates what it might cost to operate such a farming operation including pricing and markets, and establishes whether there would be a market for the farming operation, as well as the financial feasibility of such a venture.

## Conclusions

### Market Background

In 2015, avian influenza subtype H5N2 was identified in several poultry operations across the Midwest. In early February of 2022, the first case of avian influenza since 2015 was confirmed in a turkey operation in Indiana. At this point, flock numbers still had not reached that of previous years, including years prior to the COVID-19 pandemic (2017-2019). Avian influenza can be carried by several types of birds, including turkeys, chickens, and other domestic poultry, though according to the USDA, commercial egg-laying hens are disproportionately affected by bird flu viruses. In March of 2022, 16.9 million birds were lost to Highly Pathogenic Avian Influenza (HPAI); in April of the same year, the U.S. table-egg layer flock estimated at 305.2 million, reflecting the proportion of poultry losses. More recently published statistics from the USDA show that, by the end of 2022, 43 million egg layers had been lost or killed by the avian influenza and connects this to the 29% decrease in U.S. egg inventories over the course of the year. This decrease in inventory caused the price to be more than double the price it was the previous year. The 2022 total national table-egg production dropped just over 3% from 2021. As inventories rise and egg-laying chicken flocks are restored in 2023, prices are expected to fall following the winter holiday season.

### South Dakota

The number of layer hens in South Dakota in June 2022 was 120,000 fewer than in June 2021, a 6.25% decline in laying flock across the state. The productivity per 100 layers also dropped. The average productivity of 100 birds in June 2022 decreased 6.5% from June 2021. Together, total egg production in June of 2022 was 6.4 million eggs less than the 51.3 million in June of 2021. As of January 5, 2023, current effects of the avian influenza on South Dakota include just under 4,000,000 birds, 61 commercial flocks, and 15 backyard flocks. Total South Dakota table egg production dropped 14% in 2022 compared to annual total of 2021.

## Egg Farming Operation: Based on Flock of 100 White-Egg Hens

A small-scale egg farming operation based on a flock of 100 hens producing for 82 weeks of production

| | |
|---|---|
| **Total Revenue** | $10,292 |
| **Total Costs** | $11,299 |
| **Total Revenue Less Total Costs** | ($977) |

**Total Yield (Eggs)**

| Item | Quantity (in Dozens) |
|---|---|
| Jumbo and Extra Large | 1,560 |
| Large | 1,805 |
| Medium | 752 |
| **Total Egg Production** | 4,117 |

Note: This is a fairly average estimate, with these numbers we estimate roughly

**Total Revenue**

| | Quantity | Price | Net Revenue |
|---|---|---|---|
| Total Eggs | 4,117 | $2.50 | $10,292 |
| Fowl Sold | 90 | $1.00 | $90 |
| Total Revenue | - | - | $10,382 |

## Variable Costs

The following are variable costs associated with 100 Hens

**Pullet Costs (18 Weeks Old)**

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Pullets** | 100 | $4 | **$400** |

**Note: While $4 per pullet may seem cheap, local highly rated sellers seem to offer pricing that coincides with this estimate**

### Labor Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Maintenance Labor (Hours)** | 180 | $10 | $1,800 |
| **Collecting and Packaging Labor (Hours)** | 60 | $10 | $600 |
| **Total Cost** | - | - | **$2,400** |

### Feed Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Feed Cost (Pounds)** | 15,336 | $0.26 | **$3,987** |

### Coop Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Bedding Costs (Wood Shaving Bales)** | 68 | $6 | $408 |
| **Electricity Costs (Total Flock Costs)** | 1 | $56 | $56 |
| **Total Cost** | - | - | **$464** |

### Operating Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Repairs And Maintenance (Total Flock Costs)** | 1 | $50 | $50 |
| **Advertising Cost (Total Flock)** | 1 | $100 | $100 |
| **Total Cost** | - | - | **$150** |

### Egg Cartons and Packaging Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Egg cartons and packaging (Dozen Cartons)** | 4,117 | $0.20 | **$823** |

### Miscellaneous Supplies

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Misc. Supplies (Total Flock)** | 1 | $175 | **$175** |

### Interest Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Interest on Operating Capital (Total Flock)** | 1 | $334 | **$334** |

### Total Variable Costs

| | Total |
|---|---|
| **Total Variable Costs** | **$8,733** |

## Fixed Costs

Note that certain fixed costs, such as building and equipment, may increase with larger flocks as the equipment and buildings in this scenario are only designed to support a flock of 100 chickens.

### Overhead Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Insurance and Taxes (Total Flock)** | 1 | $52 | **$52** |
| **Interest (Total Flock)** | 1 | $287 | **$287** |
| **Total Overhead Costs** | - | - | |

### Egg Cooling Costs

| | Years | Cost Per Year | Total Cost |
|---|---|---|---|
| **Egg Cooling Costs (Years)** | 2 | $100 | **$200** |

**Note: These figures reflect the cost of egg cooling for each production cycle**

### Equipment/ Building Costs

| | Useable Life (Years) | Total | Price/ 2 Years |
|---|---|---|---|
| **Building (Years)** | 10 | $9000 | **$1800** |
| **Equipment (Years)** | 1 | $287 | **$287** |
| **Manure handling equipment (Years)** | - | - | |
| **Repairs and Maintenance (Total Flock)** | | | |

**Note: These figures are adjusted to reflect the cost distributed across each production cycle (roughly 2 years)**

### Total Fixed Cost

| | Total |
|---|---|
| **Total Fixed Cost** | **$2,626** |

**Scenario 1 Net Income**

| | |
|---|---|
| **Total Revenue** | $10,382 |
| **Total Costs** | $11,359 |
| **Net Income (Total Revenue less Total Costs)** | ($977) |

Food Sovereignty

| | Population | Net Income | Gain/ Loss Per Person |
|---|---|---|---|
| **Food Sovereignty Feasibility** | 10,000 | ($977) | (0.0977) |

With this data in mind (depending on how strictly they can maintain the sample budget), the client may expect to lose roughly 9 cents per person. While no loss is ideal, in the interest of furthering the food sovereignty initiative, an egg farm may be a valuable addition.

If the client wishes to increase the total hens to 250 to increase production, we can simply divide the total revenue and total cost by the 100 hens to find the revenue and cost per hen, then multiply the cost per hen by 250. This will assume that the fixed cost will also increase, as a significant increase in the number of hens and egg production warrants increased housing capacity and production equipment

**Increases Capacity to 250 Hens**

| | |
|---|---|
| **Total Revenue per 100/100** | $103.83 |
| **Total Costs per 100/100** | $113.59 |
| **Net Income (Total Revenue less Total Costs per Hen)** | ($9.76) |
| **Net Income per hen * 250** | ($2,440) |

We can see the net income generated from the 250 hens is again a negative return, however, now produces nearly 10,300 dozens of eggs, as opposed to the 4,117 the 100 hens would produce.

**Conclusion**

In this sample budget of 110 weeks (or just over 2 years), we see a small loss. The profitability would not significantly increase over the years as these fixed costs are distributed over the effective life of the equipment, thus the fixed cost for every 110-week cycle would be roughly the same (after adjusting for inflation).

## Egg Farming Operation: Based on Flock of 100 Brown-Egg Hens

A small-scale egg farming operation based on a flock of 100 hens producing for 52 weeks

| | |
|---|---|
| **Total Revenue** | $7,538 |
| **Total Costs** | $11,299 |
| **Total Revenue Less Total Costs** | ($4,002) |

**Note: The cost of brown eggs is higher due to the fact that brown egg hens tend to lay fewer, but larger eggs. This also explains why the overall loss is significantly higher than that of the white egg feasibility study.**

**Total Yield (Eggs)**

| Item | Quantity (in Dozens) |
|---|---|
| Jumbo and Extra Large | 801 |
| Large | 926 |
| Medium | 386 |
| **Total Egg Production** | 2,113 |

**Total Revenue**

| | Quantity | Price | Net Revenue |
|---|---|---|---|
| Total Eggs | 2,113 | $3.50 | $7,395.50 |
| Fowl Sold | 95 | $1.50 | $90 |
| Total Revenue | - | - | $7,538 |

## Variable Costs

The following are variable costs associated with 100 hens.

**Pullet Costs (18 Weeks Old)**

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Pullets** | 100 | $7 | **$700** |

**Note: While $7 per pullet may seem cheap, local highly rated sellers seem to offer pricing that coincides with this estimate**

**Labor Costs**

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Maintenance Labor (Hours)** | 180 | $10 | $1,800 |
| **Collecting and Packaging Labor (Hours)** | 60 | $10 | $600 |
| **Total Cost** | - | - | **$2,400** |

### Feed Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Feed Cost (Pounds)** | 8,321 | $0.63 | **$5,242** |

### Coop Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Bedding Costs (Wood Shaving Bales)** | 34 | $6 | $204 |
| **Electricity Costs (Total Flock Costs)** | 1 | $56 | $56 |
| **Total Cost** | - | - | **$260** |

### Operating Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Repairs And Maintenance (Total Flock Costs)** | 1 | $50 | $50 |
| **Advertising Cost (Total Flock)** | 1 | $100 | $100 |
| **Total Cost** | - | - | **$150** |

### Egg Cartons and Packaging Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Egg cartons and packaging (Dozen Cartons)** | 2,113 | $0.20 | **$423** |

### Miscellaneous Supplies

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Misc. Supplies (Total Flock)** | 1 | $175 | **$175** |

### Interest Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Interest on Operating Capital (Total Flock)** | 1 | $247 | **$247** |

### Total Variable Costs

| | Total |
|---|---|
| **Total Variable Costs** | **$9,597** |

## Fixed Costs

Note that certain fixed costs, such as building and equipment, may increase with larger flocks as the equipment and buildings in this scenario are only designed to support a flock of 100 chickens.

### Overhead Costs

| | Quantity | Price/ Unit | Total |
|---|---|---|---|
| **Insurance and Taxes (Total Flock)** | 1 | $52 | **$52** |
| **Interest (Total Flock)** | 1 | $287 | **$287** |
| **Total Overhead Costs** | - | - | **$339** |

### Egg Cooling Costs

| | Quantity | Total Cost | Price/ Unit |
|---|---|---|---|
| **Egg Cooling Costs (Years)** | 10 | $1,000 | **$100** |

### Equipment/ Building Costs

| | Useable Life (Years) | Total | Price/ Year |
|---|---|---|---|
| **Building (Years)** | 10 | $9000 | **$900** |
| **Equipment (Years)** | 1 | $287 | **$287** |
| **Manure handling equipment (Years)** | - | - | **$214** |
| **Repairs and Maintenance (Total Flock)** | 1 | $103 | **$103** |

### Total Fixed Cost

| | Total |
|---|---|
| **Total Fixed Cost** | **$1,943** |

### Scenario 1 Net Income

| | |
|---|---|
| **Total Revenue** | $7,538 |
| **Total Costs** | $11,540 |
| **Net Income (Total Revenue less Total Costs)** | ($4,002) |

Food Sovereignty

| | Population | Net Income | Gain/ Loss Per Person |
|---|---|---|---|
| **Food Sovereignty Feasibility** | 10,000 | ($4,002) | ($0.40) |

With this data in mind (depending on how strictly they can maintain the sample budget), the client may expect to lose roughly 40 cents per person. This option is a larger loss for a smaller production of eggs than the white egg farming, therefore the white egg option would likely be ideal.

If the client wishes to increase the total hens to 250 to increase production, we can simply divide the total revenue and total cost by the 100 Hens to find the revenue and cost per hen, then multiply the cost per hen by 250. This will assume that the fixed cost will also increase, as a significant increase in the number of hens and egg production warrants increased housing capacity and production equipment.

**Increases Capacity to 250 Hens**

| | |
|---|---|
| **Total Revenue per 100/100** | $75.38 |
| **Total Costs per 100/100** | $115.40 |
| **Net Income (Total Revenue less Total Costs per Hen)** | ($40.04) |
| **Net Income per hen * 250** | ($10,005) |

We can see the net income generated from the 250 hens is again a negative return; however, now they produce nearly 5,282 dozens of eggs, as opposed to the 2,113 the 100 hens would produce.

## Conclusion

The two egg farming feasibility studies, based on brown egg and white egg farms, result in drastically different results. There are a number of reasons contributing to this difference. The main reason for this discrepency is the fact that brown egg hens lay less eggs than their white egg hen counterparts. That being said, there is no break-even flock size based on research. The white egg flock simply produces a smaller loss. With this in mind, if the client is looking to expand their food sovereignty initiative, a white egg farm could prove to be a fair addition to the food production. Based on a population of 10,000, a loss of only $0.09 per person would be incurred, while also producing approximately 4,100 dozen eggs.