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# TURKEY PRODUCTION COSTS IN SANTA CATARINA STATE, BRAZIL

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## ABSTRACT

In 2010, the world production of turkeys was 5.02 million tons. The exports were 544.000 tons. The USA is the largest producer (2.8 million tons) followed by EU (27) with 1.81 million tons. USA is also leader in exports and its market share is 45%. Brazil holds the third position in the world production with 377.000 tons (6.71%). In the exports Brazil has the second position and trades around 158.000 tons which represents 28.9% in the world market share. Santa Catarina is the second most important state with regard to the slaughter (19.61%) and exports (21.3%). This study aims to present the main technical coefficients and the costs of turkey production in Santa Catarina State. Data were obtained from panels attended by representatives of producers and slaughtering and processing plants. Visits to farms were also carried out. The cost was calculated under the integration logic considering only the farmers responsibilities. Four production systems that produce different market needs were considered in this study. The results (US$/kg) were: Initiator- 0.2848; Ligth Female - 0.0848; Heavy Female - 0.1017; Heavy Male- 0.1028. The study gathers important information for the management of production, and provide a reference point for negotiations between the players of the productive chain.

**KEYWORDS**: Turkey Production Costs, Turkey Production Systems

## INTRODUCTION

Turkeys world production was a little over 5 million tons in 2010. The most important producers are USA (2.48 million tons; 49.5%), EU-27 (1.815 million tons; 36.2%) , Brazil (0.337 million tons; 6.7%), Canada(0.165 million tons; 3.29%), and Russia (0.045 million tons; 0.9%). The world exports were 544,000 tons. The main players are, in that order, USA (247,000 tons; 45.4%); Brazil(157,820 tons; 29%); EU-27 (110,000 tons; 20.2%) and Canada (22,000 tons; 4,23%). Brazil exports 46.6% of its production and supplies 68 countries. The main purchaser is the European Union (87.240 tons; 55.3%) followed by Africa (46,589 tons; 29.5%). In 2011 the exports decreased 10.5% resulting in 141.200 tons. Although there was a decrease in export volume over the last two years the average growth of exports between 1996 and 2010 was 21.5%. In 2011 European Union remained as the main importer with 74.737 tons (52.9%). The average price of exports was US$ 3,149 per ton in 2011, which means 17% growth over 2010. In the domestic slaughtering the most important state is Paraná that holds 31.7%. Santa Catarina remains in the second position with 19.61%. In the sequence, Minas Gerais has 19.11% followed by Goiás 15.78% and Rio Grande do Sul with 13.81% (UBABEF, 2011). In Brazil the production chain is organized in an integrated system between industry and farmers in which the former assumes the role of coordinating and provides animals, food, technical assistance and transport. To the farmers the main requirements are investments in buildings and equipment, providing electric power, heat, substrate to deep litter and labor. In early 2011, both industries and producers demanded a negotiation process in order to improve their relationships and the economic balance in the supply chain. The target was to calculate a turkey´s production cost as a reference point. Embrapa Swine and Poultry played its role aiding this processes by applying its production costs calculation methodology as can be seen in Martins *et al*., 2011. In Brazil, there are hardly any studies on the turkeys production systems and production costs. This study aims to present the main technical coefficients and the costs, considering the farmers responsibilities, of turkey production in Santa Catarina State resulting from this negotiation process.

## MATERIAL AND METHODS

Data were obtained from 2 technical panels attended by technicians from Embrapa and representatives

of industries(slaughtering and producers associations. After gathering information in the panels visits to 2 farms that produce in the scale defined in the previous meetings were carried out. In these visits, it was possible to get more detailed information about the production systems as well their demands for inputs. Also, it was possible to verify the strategies in production management in order to get the best efficiency in the use of inputs and comply with the industrial and legal requirements. Both panels and visits occurred in March, 2011. At the first, 4 production systems were identified. The first one is the "Initiator" where the birds are raised to the age required to entry in the other production stages. These systems have different targets regarding the market needs that imply in specific technical coefficients. The finishing systems are: "Ligth Female"; "Heavy Female" and "Heavy Male". There are 455 producers in Santa Catarina State – 42 initiators and 413 finishers - concentrated in the western region. All parameters were estimated based on the criterion of most occurrence in the production areas. In initiation systems house temperature is controlled by moisturizing and ventilation that is minimal. The curtains open and close automatically. In the finishing systems the house temperature is also controlled by moisturizing and ventilation works under positive pressure. The curtains are operated manually. Both systems have compacted dirt floor. The roof is constructed with 6mm thick fiber cement tiles. The lateral nets are anti-bird. The drinkers are designed in the nipple system and the feeding process is automatic. The heater works with butane and firewood. The houses also have an automatic device to protect workers against problems in the electric system, office, bathroom and a refectory. Bio-safety measures are taken according to legislation. The cost was calculated based on the Embrapa Swine and Poultry methodology applied to the calculation of chicken production costs described in Miele *et al*., 2010. The prices of inputs were obtained at Embrapa´s database and from the panels.

## RESULTS AND DISCUSSION

Table 1 shows the zoothechnical parameters. The systems differ, mainly, in the growing periods, final weights and stocking rates. In any of the finishers system the bird enters 26 days old. Thus, the final age in each system is 26 days plus the specific growing period. Table 2 presents the initial investment, the life span, and the salvage value for building and equipment. The useful lives are results from weighted calculations regarding the life span of different assets. The costs include environmental rates that are charged for the installation and it must be renewed every four years. Table 3 shows the demand for inputs. Table 4 shows the composition and the total costs. Taking the final weight per bird the costs in US$ per kilogram are: 0.2622 for Finishers, 0.0720 for Light Female, 0.0847 for Heavy Female and 0.0854 for Heavy Male.

Table 1 - Zootechnical parameters for turkey production in western Santa Catarina.

| Parameter | Initiator | Finishers | | |
|---|---|---|---|---|
| | | Light Female | Heavy Female | Heavy Male |
| Growing period (days) | 26 | 35 | 84 | 114 |
| Interval between lots (days) | 12 | 12 | 15 | 18 |
| Interval for disinfection (days) | 20 | 25 | 25 | 25 |
| Lots per year | 9,39 | 7,49 | 3,59 | 2,71 |
| Birds/$m^2$ | 21 | 6 | 4 | 3 |
| Building size ($m^2$) | 1.200 | 1.200 | 1.200 | 1.200 |
| Mortality (%) | 4,0 | 1,5 | 2,8 | 7,3 |
| Live birds per lot | 24,192 | 7,092 | 4,665 | 3,339 |
| Final Weight per bird (kg) | 0,750 | 4,2 | 10 | 18 |
| Final Weight per lot (kg) | 18.144 | 29.786 | 46.656 | 60.070 |

Table 2 - Initial investment, life span and salvage value for buildings and equipment.

| Assets | Parameters | Initiators | Finishers |
|---|---|---|---|
| Buildings | Initial Investment (US$) | 65,352 | 54, 996 |
| | Life span (years) | 24,2 | 24,4 |
| | Salvage value (%) | 8,0 | 7,9 |
| Equipment | Initial Investment (US$) | 103,295 | 73,668 |
| | Life span (years) | 14,2 | 15,4 |
| | Salvage value (%) | 4,9 | 5,1 |

Table 3 - Techinical Coefficients.

| Item | Unit | Initiator | Finisher | | |
|---|---|---|---|---|---|
| | | | Ligth Female | Heavy Female | Heavy Male |
| Substrate -first lot deep litter | m³/house | 72 | 72 | 72 | 72 |
| Substrate - following lots | m³ /house | 20 | 15 | 15 | 15 |
| Butane | kg/lot | 817 | 13 | 13 | 13 |
| Firewood | mst/lot | 22,2 | 8 | 8 | 8 |
| Electric Power | kWh/lot | 650 | 492 | 1.179 | 1.600 |
| Calcim Oxide | kg/lot | 20 | 20 | 20 | 20 |
| Labor | person/lot | 1,5 | 1 | 1 | 1 |
| Maintenance | % per year | 1,00 | 1,00 | 1,00 | 1,00 |
| Insurance | % per year | 0,36 | 0,36 | 0,36 | 0,36 |
| Others | % per year | 2,0 | 3,0 | 3,0 | 3,0 |

Table 4 - Turkey´s production costs in Santa Catarina State – US$/lot .

| Itens | Initiator | Finisher | | |
|---|---|---|---|---|
| | | Ligth Female | Heavy Female | Heavy Male |
| Substrate for the first lot deep litter | 167,25 | 215,03 | 501,74 | 752,61 |
| Additional substrate- following lots | 371,66 | 268,79 | 209,06 | 156,79 |
| Butane | 1.473,76 | 22,91 | 22,91 | 22,91 |
| Firewood | 530,41 | 191,14 | 191,14 | 191,14 |
| Electric Power | 97,06 | 73,47 | 176,06 | 238,92 |
| Calcium Oxide | 4,78 | 4,78 | 4,78 | 4,78 |
| Labor | 918,91 | 519,20 | 1.084,39 | 1.433,74 |
| Beak trimming | 149,33 | ---------- | ---------- | ---------- |
| Maintenance, prev. security, insurance | 220,20 | 179,90 | 375,74 | 496,78 |
| Others | 78,67 | 44,25 | 76,97 | 98,93 |
| Implantation and renewal licenses | 7,98 | 9,06 | 18,91 | 25,01 |
| Depreciation | 737,43 | 619,03 | 1.292,89 | 1.709,41 |
| Variable Cost | 4.012,02 | 1.519,46 | 2.642,77 | 3.396,59 |
| Fixed Cost | 745,41 | 628,09 | 1.311,80 | 1.734,42 |
| Total Operational Cost | 4.757,42 | 2.147,54 | 3.954,57 | 5.131,00 |

As this work was conducted in such a way as to support a negotiation between industry and producers the cost of capital was calculated separately. In order to calculate it, different rates were applied to the

average capital invested in buildings and equipment (Table 6). These rates represent different expectations of profitability based on the market conjuncture. In the Embrapa´s methodology the usual rate is 6% per year. The capital cost that should be added to the operating cost considering this rate in the calculations is (US$/kg): 0.0226 for Initiator; 0.0127 for Light Female; 0.0169 for Heavy Female and 0.0174 for Heavy Male. Thus, the increased final costs are US$/kg 0,2848; 0,0848; 0,1017; and 0,1018, respectively.

Table 5 - Cost of capital for different interest rates US$/lot.

| Interest rate (per year) | Initiator | Finisher | | |
|---|---|---|---|---|
| | | Ligth Female | Heavy Female | Heavy Male |
| 1% | 68,27 | 63,04 | 131,66 | 174,08 |
| 2% | 136,54 | 126,08 | 263,33 | 348,16 |
| 3% | 204,82 | 189,12 | 395,00 | 522,25 |
| 4% | 273,09 | 252,16 | 526,66 | 696,33 |
| 5% | 341,35 | 315,20 | 658,33 | 870,41 |
| 6% | 409,63 | 378,24 | 789,99 | 1.044,50 |
| 7% | 477,90 | 441,28 | 921,66 | 1.218,58 |
| 8% | 546,14 | 504,32 | 1.053,33 | 1.392,66 |

## CONCLUSION

This work provided knowledge about the turkey production systems, identifying its main technical coefficients and the producer's costs within the integration system into a supply chain. The study brings important information for the productive sector as well as to institutions that provide technical and economic data. The final costs, wich include the cost of capital, considering an interest rate of 6% per year, were: Initiator - 0.2848; Ligth Female- 0.0848; Heavy Female - 0.1017; Heavy Male - 0.1028. The results served as reference for negotiations between producers and slaughtering and processing industries. Similar work in other regions could allow comparative studies that support decision making in the pursuit of competitiveness and sustainability of the production chain and its segments.

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