

## RESEARCH ARTICLE

# PERFORMANCE AND COMPETITIVENESS OF BROILER CHICKEN FARMS IN THE AREA OF FREE TRADE AGREEMENTS: THE CASE OF TIZI-OUZOU (ALGERIA)

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**Original submission:**

29 July 2020

**Revised submission:**

27 October 2020

**Accepted:**

13 November 2020

## ABSTRACT

The aim of this work is to identify the technical performance and evaluate economic competitiveness of broiler chicken farms in the conditions of the free trade agreements in the region of Tizi-Ouzou (Algeria). Methodology: A random sample of 120 farms spread over the entire territory of the wilaya (district) was investigated. Results: The results of the principal component analysis showed five groups of farms according to the size and the number of the broiler belt. The average size of the flock was 3,850 broilers with five flocks per year. The broiler buildings do not meet all the standards. The overall quantity of feed consumed by broiler chicken was 6.03 kg. The average live weight was 2.84 kg reached in 58 days. The production index was 207. The average production cost was 158.67 AD/kg (1.20 €/kg), of which 67% was represented by feed costs. These economic performances would allow breeders to generate a gross margin of 21.72 AD/kg (0.17 €/kg). Conclusion: The present study suggests that despite the introduction of Algeria into the free trade agreements and the poor performance of broiler farms, these poultry farms are still retaining significant shares of the national market.

**Keywords:** Broiler chicken, breeding conduct, performance, mountain area

## INTRODUCTION

In several developing and emerging countries, demand for animal protein has increased. The main reasons for this increase are population growth and improved incomes. However, according to OECD/FAO (2016), annual world meat consumption is projected to reach 35.3 kg/capita/year by 2025, an increase of 1.3 kg compared to the baseline period 2016. It would be expected to increase by 17.9 kg in 2030 (Tiwari et al., 2014).

A protein deficiency in the diet of the Algerian consumer seems to persist long enough, about 16.5 g/inhabitant/day (Khaled and Diaf, 2019), whereas the norm recommended by the FAO is fixed at 20 g/inhabitant/day (FAO, 2014). However, these rates remain above the developing country average of 33.7 kg/capita for 2014 period (FAO, 2020).

In Algeria, the present livestock farming systems prove unable to meet the increasing animal protein needs of populations. This can be explained by the extensive production of farms and their low productivity. To remedy the problem of supply of animal protein populations, the public powers moved towards the importation of meat (Kirouani, 2015).

In the 1970s, Algeria decided to initiate the development of the poultry sector in order to reduce the dependence on imports. The choice of this type of breeding is justified by its short production cycle and low investment required (compared to other breeding). Since its launch, poultry industry is seen as a mechanism capable to make animal protein available to a large social tranche (Kirouani, 2015).

In Algeria, the supply of poultry meat was 7.4 kg/capita/year (FAOSTAT, 2013). However, this availability is less than that in countries such as Brazil, the USA, France and Morocco, which are

respectively; 40.6; 51.4; 23.1 and 20.2 kg inhabitant year (FAOSTAT, 2013). To the European level, the supply of poultry meat remains sustained with an average of 23.35 kg/capita/year (FAOSTAT, 2013).

Furthermore, the development of the poultry industry has reduced imports of finished poultry products, but these development policies have increased the dependency and overlooked the imports of production factors (Kaci and Cheriet, 2013).

The new economic policy adopted by Algeria is oriented towards imports. The liberalization of trade has increased the vulnerability of the Algerian poultry industry (broilers) by making it more dependent on inputs from the world market. In addition, since 2005, the Association Agreement with the European Union (Zlem) has come into effect with a gradual dismantling of customs tariff (Ministry of Commerce, 2010). Through this agreement, the poultry industry (broiler chicken) persists in its weakness in competitiveness against European poultry enterprises, despite the different upgrade programs of Algerian enterprises. As a result, Algeria represents a real market opportunity for the EU.

The objective of this work is to identify the technical and economical performance of Algerian broiler farms, and to show their level of competitiveness with foreign companies.

The question then arises: would Algerian broiler farms resist against foreign breeding more efficient in the context of market opening and free trade agreements? The region of Tizi-Ouzou is chosen to carry out this study.

## MATERIALS AND METHODS

### Study area

Tizi-Ouzou region is located in the northern part of the country. It covers an area of 2 975.8 km<sup>2</sup>, or 0.13% of national territory. The Wilaya (District) of Tizi-Ouzou has a population of 1 133 349 inhabitants. The slope varies from 12% to over 25%, what gives to the region a mountainous character. The climate is of a Mediterranean type, characterized by wet and cold winter and hot and dry summer. Mountain areas are substrates for the practice and development of poultry farms. As in other mountainous regions, the Wilaya of Tizi-Ouzou posted a poultry breeding business out a very important ground (an effective of 9.5 millions head during the 2017/2018 agricultural period), which puts it on the 11th place in the national poultry production. This effective has known a growth rate of -4.55% over the last agricultural period (DSA, 2018).

### Sampling and information collection

The method of collecting the information used is the survey that was conducted between April and June 2018. It concerned 120 poultry farms randomly chosen from 2800 farms in the District of Tizi-Ouzou (DSA, 2018). Based on the data from the DSA for the 2017/2018 agricultural season, an optimal stratified random sampling method was used. The number of farms to be investigated was determined by the following formula Yadolah (2007).

This sample allowed to characterize the different poultry farms, but does not have the ambition to represent the whole population of these poultry farms. The model of our questionnaire is broad enough to provide as much information as possible about broiler chicken farming in the study area. It consists of the following components: the social

section, which gathers all the information on the breeder; the technical part, which includes the structure of the building, the management of the broiler chicken livestock, feeding (supply, suppliers, feed quality), hygiene and prophylaxis... etc, and the economic aspect (the marketing of the livestock product, etc.).

### Statistical analyses

The results were first submitted for descriptive analysis (means, proportions and standard errors) using Microsoft *Excel*<sup>®</sup> 2016 software. In addition, we carried out an analysis of comparison of variances. Next, a principal component analysis (PCA) followed by ascending hierarchical clustering (AHC) was performed with *XLSTAT* 2016 software.

The control variables used are of structural and functional type. Those are: the number of tapes per year, the actual broiler chicken, total feed consumed/subject (kg), feed distribution frequency/day and the production cost AD/kg (AD: Algerian Dinar).

The results of the analysis were used for the comparison of technical and economic performances of different groups of poultry farmers.

In order to better analyze technical performance, we used some indexes to better assess food efficiency and production performance.

**Average daily gain (ADG) by g/day:** It is the ratio between the average weight and the age of slaughter. It measures the average growth rate of the animals.

**Consumption index:** This is the ratio between the quantity of feed used during rearing and the quantities of the product going to slaughter. This ratio expresses the quantity of feed needed to produce 1 kg of the product.

**Production index:** A synthetic variable provides an overall assessment of the technical and economic performance of the workshops. It is calculated by the following formula:

$$PI = (ADG * Viability) / (CI * 10)$$

Viability = 100% - mortality rate

**Gross margin:** This is the difference between overall activity and consumption.

**Gross margin rate:** (Selling price - production cost) \* 100 / production cost.

## RESULTS

### Presentation of poultry farms

The results of the survey show that the vast majority of farmers (91.6%) did poultry farming as their main activity. The average age of the poultry farmers is 48 years. The number of permanent workers per farm rarely exceeds one worker. Regarding education, we note that over 65% of our respondents have a secondary level, while nearly 3% of poultry farmers have university level. The livestock buildings are traditional, semi-modern and modern. 53% of farmers have chicken coops semi-modern type, 37% of modern type and 10% are traditional. Some poultry farmers transform the agricultural greenhouses into the livestock buildings.

The average surface of a livestock building is 25m X 8m for an average of 2000 subjects. Furthermore, 37.3% of poultry houses are equipped with mechanical ventilation, 6 buildings with a generator. The heating in winter is rudimentary and done by butane gas. For drinking water, more than 50% of respondents pay for water from the water supply pipe network (AEP), while another access to free water is from private wells.

Furthermore, 3 strains are used: ISA 15, ISA Classic and Arbor Acre. The dominant strain is ISA 15, it is found in 78% of respondents.

### Typology of broiler chicken farms

The typology of the results of the AHC can distribute livestock into five distinct groups.

Table 2 shows significant differences ( $P < 0.05$ ) between the 5 groups concerning the variables studied, such as the Number of bands/year, Number of broilers and Total feed consumption/subject. However, there is no significant difference between the different groups that was found in terms of Production cost AD/KG ( $P > 0.05$ ).

Groups 1 and 2 represent only 13% of the breeders in our sample. These are large and well-off farmers, who have the lowest production costs, respectively 136.42 and 156.91 AD/kg. Breeders of Groups 1 and 2 realize respectively the highest number of bands year (16 and 6 bands). The total consumption of feed/subject is the lowest among the different groups, being less than 6 kg.

Group 3, the most important group of the sample (36%), is made of small breeders (less than 2,000 head/band). The number of bands/year is the lowest among the 5 groups, and its breeders do not reach 4 bands/year. The number of chickens raised in these farms is below average. These farmers recorded the highest production costs in the sample (159.93 AD/kg).

Group 4 with its 19% of farmers, is made up of medium-scale farmers in terms of the number of chickens reared. However, it records a high production cost that exceeds the sample average (159.83 AD/kg). The total consumption of feed/subject is the highest among the different groups, being more than 6 kg (Table 1).

**Table 1** Characterization of the identified groups

	<b>Group 1 (N=6)</b>	<b>Group 2 (N=10)</b>	<b>Group 3 (N=43)</b>	<b>Group 4 (N=23)</b>	<b>Group 5 (N=38)</b>	<b>F</b>	<b>P-value</b>	<b>Total Sample (N=120)</b>
Number of bands/year	16.83 ±7.1	6.7 ±3.4	3.77 ±0.5	5.11 ±1.4	4.22 ±1.0	23.1	< 0.0001	5.07 ±2.0
Number of broilers	13150 ±969.0	7800 ±1229.2	1941.8 ±192	4573.91 ±668.4	3060.53 ±476.5	3.9	0.004	3849.17 ±1959.7
Total feed consumption / subject (kg)	5.82 ±0.10	5.9 ±0.14	5.99 ±0.1	6.15 ±0.2	6.10 ±0.1	4.2	0.003	6.03 ±0.2
Production cost AD/KG	136.42 ±16.1	156.91 ±20.5	159.93 ±13.9	159.83 ±13.9	157.39 ±14.7	0.6	0.625	158.67 ±14.5

Finally, Group 5 represents 32% of the farmers. These farmers report broiler numbers below the sample average, but manage to register lower production costs than all groups (157.39 AD/kg). The total consumption of feed/subject remains among the highest. On the contrary, production costs reported by this group are close to the average of the sample.

Moreover, the average number of bands/year is nearly 5 with a crawl space for a period of 20 days. Duration of each band is on average 58 days.

### Feeding conduct

For all respondents, the feed distributed in broiler chicken is presented as crumbs made from soya, maize, CMV (mineral complex vitamin) and phosphorus. The power supply is in three phases (starting, growing and finishing). In Group 1, nearly 47% of broiler farmers produce feed themselves, while most farmers buy feed. In Group 3, farmers are recording chicken coops with significant numbers.

In addition, it indicates the lowest quantity of total feed intake by a subject during rearing period (5.8

kg/animal). On the contrary, for our sample, this feed intake is 6.03 kg/subject. Moreover, the feed distribution rate ranges from 1 to 3 times/day, but over 77% of farmers reported that distribution frequency is of 2 times/day.

### Health management

In the study area, regarding diseases, we found that omphalitis, colibacillosis and coccidiosis were the most frequent in the majority of these farms,

For prophylaxis, poultry farmers surveyed seemed to take sanitary measures that reduce losses.

Moreover, vaccination is performed by the poultry farmers themselves. Veterinarians are called in case of the spread of infectious diseases.

### Technical performance of poultry workshops

The production performance of different groups is described in Table 2. A significant difference ( $P < 0.05$ ) appears between the groups for the variables: age (days), live weight (kg) of a subject and mortality (%).

Thus, Group 3 registers the lowest production performance, below the average of the sample.

The large breeders in Group 1 have the best consumption index (1.89), which is not the case for Group 3 which has the lowest number of bands/year and the reported consumption index lower than average (2.19). Nevertheless, the differences in consumption and production indexes were not confirmed statistically ( $P>0.05$ ).

In addition, Group 2 indicates the highest live weight of the subjects among the different groups.

These animals reach 3.1 kg at the end of breeding. The same group indicates another production performance, which is the mortality rate (6.7%).

The age at slaughter is on average 58.4 days, but reached 59 days in Group 3 and 58.6 days in Group 4. Group 1 and 2 report durations of less than average. In these groups, the death rates are above average (6.35%), while in Group 3, 4 and 5 those rates are below the average.

**Table 2** The production performance of poultry workshops

	Group1	Group2	Group3	Group4	Group 5	F	P-value	Sample
Age (days)	51.17 ±0.41	56.6 ±1.43	59.05 ±2.10	58.65 ±1.81	58.29 ±2.78	4.235	0.003	58.43 ±2.18
Live weight (kg) of a subject	2.87 ±0.08	3.1 ±0.16	2.74 ±0.17	2.92 ±0.17	2.85 ±0.24	3.314	0.013	2.84 ±0.20
Mortality (%)	7.20 ±3.29	6.7 ±1.24	10.60 ±3.43	9.96 ±3.60	10.50 ±4.24	3.793	0.006	9.96 ±3.65
Estimated average daily gain (g / day)	50.14 ±1.02	53.92 ±2.75	46.50 ±3.54	49.97 ±4.11	49 ±4.11	2.149	0.079	48.76 ±3.94
Consumption Index	1.89 ±0.08	2.11 ±0.17	2.19 ±0.18	2.11 ±0.17	2.15 ±0.19	1.178	0.324	2.14 ±0.18
Production index	247.22 ±15.65	240.68 ±25.04	192.01 ±23.83	216.19 ±30.06	206.03 ±27.58	0.905	0.464	207.9 ±29.17

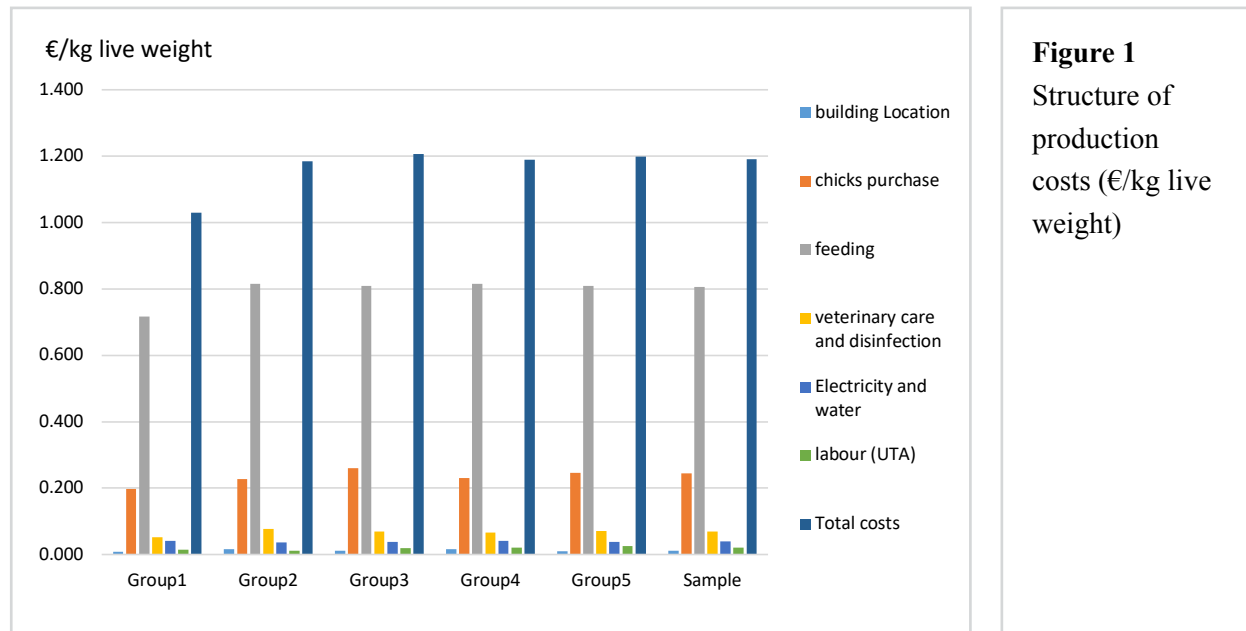
In addition, almost half of the farms in the sample (Group 4 and 5) indicate an ADG close to the sample average. However, the lowest average daily gain ADG recorded by the farmers is that of Group 3 with 46.50 g/day, with the longest rearing period in the sample, which is 59 days. It is below the sample average. On the other hand, the large farmers in Group 1 report one of the highest ADG (50.14 g/day) for a rearing period of 51 days.

As regards the production index (PI) [PI<50: mediocre performance; 50 < PI<100: average technical performance; 100<PI<150: relatively satisfactory performance; PI ≥ 150: good technical performance], the sample mean is 207.9. Group 1 notes the lowest PI relative to the average (192). Group 1, 2 and 4 indicate a higher IP than average, while Group 5 registers an IP that almost equals the average.

**Economic performance**

Production costs are firstly calculated in Algerian Dinars and later converted to Euro (€)/kg live weight. On average in the sample, the production cost of a kg live weight is 1.2 € (Fig. 1). Globally,

the largest item in the expenses is that of feed, representing 68% of the production costs, whereas the purchase of the chicks follows with 20.5% of the total costs.



**Figure 1**  
Structure of production costs (€/kg live weight)

However, this expenditure item is experiencing a significant change during the year, as the price of the chick may range from 0.05 to 0.33 €. Except veterinary care (5.81% of the total costs), the other expenditure is relatively weak.

Furthermore, Group 3 registers the highest costs of all groups with 1.283 €/kg live weight.

Conversely, Group 1 has the lowest production costs of 1.03 €/kg. For the other groups (2, 4 and 5), costs vary from 1.20 to 1.24 €/ kg live weight.

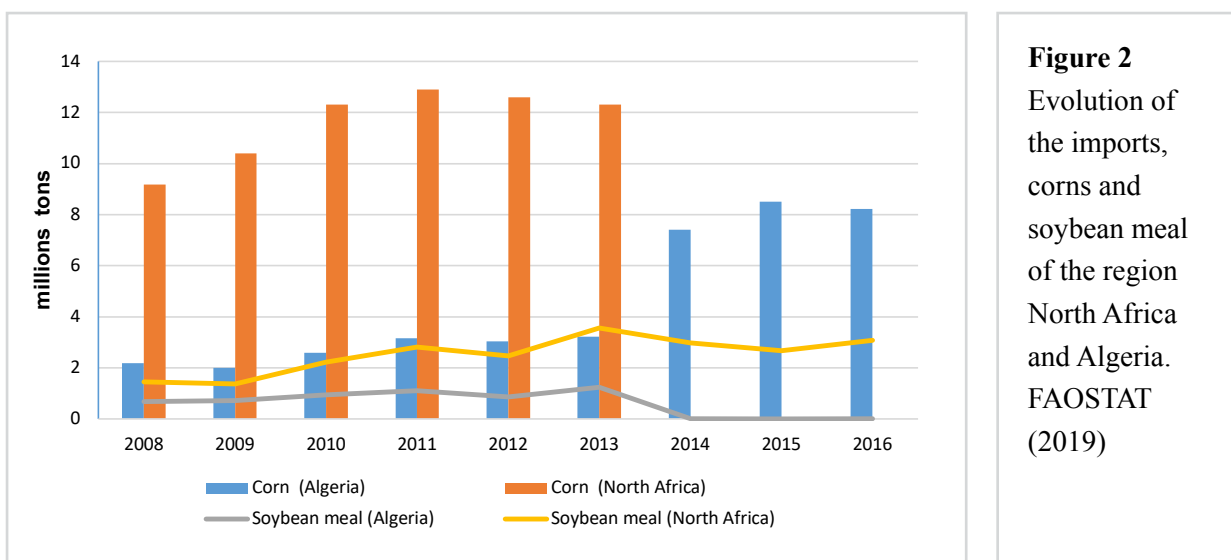
Regarding the evolution of the markets for broiler chicken feed between 2010 and 2015, the trend of the feed indices is generally on the rise (Table 3). This increase is attributable to higher prices of raw materials used in feed manufacturing. However, since 2013, the trend has been decreasing. This is due to the drop in prices of feed raw materials, particularly corn, which at the end of 2015 reached a price of 150 €/ ton. For soybean meal, the price has reached 350 €/ton (Magdelaine, 2014).

**Table 3** Evolution of annual average feed indices for standard chicken according to ITAVI (2015)

2010	2011	2012	2013	2014	2015
142.34	172.74	189.37	184.75	161.88	153.05

As for imports of feed raw materials used in the manufacture of poultry feeds, Algeria ranks first among the North African group. Algeria alone accounts for more than 50% of imports of corn and nearly 65% of soybean meal, whereas during

the period 2008-2013 (Fig. 2), Algerian imports of corn reported the growth rate about 46.5%. Imports of soybean meal have the highest growth rates. Algeria reported an 82% increase in imports of soybean meal during the same period.



**Figure 2**

Evolution of the imports, corns and soybean meal of the region North Africa and Algeria. FAOSTAT (2019)

Table 4 shows that there are no significant differences between the groups regarding economic performance indicators ( $P > 0.05$ ).

In the study area, poultry farms give off an average gross margin of 0.17 € / kg live weight (average gross margin of 15.13%) (Table 4). Group 1 registers the rate of the higher gross margin by

almost 28.76%. In fact, the poultry farmers of this group have the lowest production costs among all groups. It is followed by Group 2 with a margin rate of 25.67%. On the other hand, Group 3 and 5 record the gross margin below the sample average. The lowest rate is reported by farmers in Group 3, 10.83%.

**Table 4** Economic performance of poultry workshops

	Group1	Group2	Group3	Group4	Group5	F	P-Value	Sample
Production cost (€ / kg)	1.03 ±0.12	1.18 ±0.11	1.21 ±0.11	1.19 ±0.11	1.20 ±0.12	0.655	0.625	1.19 ±0.12
Gross margin (€ / kg live weight)	0.27 ±0.19	0.28 ±0.17	0.13 ±0.10	0.19 ±0.14	0.15 ±0.15	1.579	0.185	0.17 ±0.14
Gross margin (%)	28.76 ±24.95	25.67 ±20.70	10.89 ±9.17	17.05 ±13.84	13.83 ±14.87	2.389	0.055	15.13 ±14.79



## DISCUSSION AND CONCLUSION

The typological analysis shows that breeders adopt strategies according to the means of production. There are three distinct groups: large, medium and smallholders.

The analysis showed that Group 1 and 2 include few breeders. These farmers are considered the richest with the most important effective of broiler chickens. Broiler farming is considered the only activity and the only source of income. These farmers invest throughout the year, they are not speculators. They are efficient in terms of breeding practices (feed distribution) and management of production costs. They recorded the lowest production cost of the entire sample.

Group 3 includes nearly 36% of the small farmers in the study region. These farmers operate in small size bands. Their performance is below the sample average. They are often speculators who realize a few bands per year depending on specific dates when the demand is very important. Broiler farming is a secondary activity. The main source of income often comes from other farms, trade or public service. Their strategy is to diversify sources of income with a minimum of investment in broiler farming

Group 4 and 5 bring together nearly 51% of the farmers surveyed, and are considered average according to importance of the means of production. The bands operated have relatively average numbers of broilers, and are, therefore, masterable. For Group 5, these farmers are efficient and have the lowest production costs in our sample. Broiler farming is the main activity, but these farmers often practice other secondary activities such as cattle breeding or trade, and they are in a risk reduction strategy by diversifying sources of income.

### Feeding conduct

Food production is based on the use of a compound feed with almost all the ingredients imported, such as soya, maize and CMV (mineral complex vitamin). The import is a factor which increases the cost of production. More than half of the large farms in Group 1 make their own feed. Often, small feed factories are integrated into these farms. It provides these farmers with the opportunity to reduce the risk of feed shortages and also to reduce production costs. The surplus feed production is put on the market. During its rearing period, the broiler chicken consumes an average of 6.03 kg of feed. Some breeders succeed in reaching 5.8 kg per bird. This quantity consumed is close to the quantity cited by Banaszak et al. (2020), which indicated a feed intake of 5.36 kg. However, our total feed intake is higher than reported by Kryeziu et al. (2018), who observed the intake of 3.73 kg per broiler. In addition, Barbosa Filho et al. (2017) indicate a lower feed intake of 2.1 kg for a rearing period of 28 days.

### Health management

In the study area, the most frequent diseases such as coccidiosis are recorded. The same result is reported by Debbou-Iouknane et al. (2018). Indeed, all farmers reported that they cleaned the building and equipment with detergents, change litter and then disinfect with sanitary products. Cleaning and disinfection are carried out after the end of each band.

### Technical performance of poultry workshops

Age at slaughter in some countries is much lower than ours, for example England (2013), the Netherlands (2013), Spain (2013), Germany (2013) and France (2016). It is, respectively (38, 40, 49, 37 and 35.79) (FAO/OCDE, 2013; FAOSTAT, 2017). These results are the consequences of a

good mastery of husbandry practices, feeding and the use of efficient animals.

For the consumption index (CI), we find that Group 1 recorded a better performance than the average (1.89 vs 2.14). In addition, others groups have a CI close to the average. However, in Group 3, the CI is high compared to the average (2.19 vs 2.14). The CI used in our sample is lower than that reported by Kaci (2015) at the national level (2.14 vs 3.4). However, it is higher than that of developed countries such as England (2013), the Netherlands (2013), Spain (2013), Germany (2013) and France (2016), which is, respectively (1.75, 1.67, 1.9, 1.68 and 1.69) (FAO/OCDE, 2013; FAOSTAT, 2017).

It should be noted that the larger farmers (Group 1 and 2) have high ADG compared to the average of the sample. They are the most affluent and the most efficient. But, these performances remain below what is indicated by certain authors such as Kopmels et al. (2020) who recorded an ADG of 66.7 g/day during a rearing period of 41 days, and Cho et al. (2019) who recorded an ADG of 59.87 g/day for the same period of time.

With regard to the production indices (PI), we note that these observed PIs are higher than (PI = 143) registered by Amghrou (2005) who worked on a part of our study area. This index is much higher than 149 obtained at national level by Kaci and Cheriet (2013). It should be noted that the sample average PI (207.9) is lower than PI recorded by certain producer countries such as Brazil and the USA, their PIs are 245 and 232 (ITAVI, 2003; OFIVAL, 2003). So, this medium PI is located at equidistant from two completely different breeding models, the French and Moroccan conditions (257 and 178), according to Kaci and Cheriet (2013). In 2016, in France, the PI is higher than our PI, (207.9 vs 298.7) (FAOSTAT, 2017). Finally, all groups have high PI (150), which means that they reported good technical performance.

### **Economic performance**

Production cost for Group 2, 3, 4 and 5 seems to be almost the same. The age at slaughter and the consumption index are the highest of all groups (59 days and 2.19, respectively). This increases feed costs.

The slaughter age of our broilers is very high. On average, it is 58.43 days. Group 1 indicates the lowest age at slaughter, which is 51.17 days. However, these rearing periods remain high compared to those reported by Jacobs et al. (2020), which is 35 days, and by Kopmels et al. (2020), which is 41 days. Livestock farmers are extending the rearing period in order to obtain carcass weights according to market demand. However, in return, the cost of feed increases.

In addition, for Group 3, the low number of bands/year does not incite breeders to seek performance, and thus reduce production costs. This situation is mainly due to the high costs of feeding and purchasing the chicks. This situation is reported in Turkey by Tandoğan and Çiçek (2016). On the other hand, Group 1 (the most efficient) has the lowest production cost. For this group, savings are made in the reduction of feed and chick purchase costs.

By comparison with some American countries in 2016 (including the USA and Brazil) (FAOSTAT, 2017), the results of our study show a higher cost of production (1.2 times) than the average production costs in these countries (0.96 and 1 €/kg).

In addition, a diachronic comparison of production costs with some major producers such as the USA, Brazil, or even with a neighbouring country (Tunisia), our study area and even Algeria, indicates the higher production costs than in these countries (Table 5).

**Table 5** Comparative approach to the production costs for chicken farms flesh (€/kg live weight) according to FAOSTAT (2017) and our survey

	Production cost in € / kg live weight	Local cost / foreign cost
China (2016)	1.81	0.66
United States (2016)	0.96	1.25
Brazil (2016)	1	1.2
France (2016)	1.11	1.08
Tunisia (2016)	1.55	0.77
Algérie (2016)	1.55	1.55
Algeria (Tizi-Ouzou. 2011)	0.90	1.33
Algeria (Bejaia. 2012)	1.05	1.14
Algeria (M'sila. 2017)	1.09	1.1
Our study (2018)	1.19	1

The feed cost drastically influences the production cost. Countries like the USA or Brazil, where feed raw materials are produced locally, such as soybeans, show lower production costs. Given their performance, it is clear that Algerian broiler farms cannot be competitive with European or American farms.

Countries where it is very difficult to produce feed raw materials are forced to import considerable quantities of these materials and parent stock chicks to operate the fabric of poultry farms. For this effect, the poultry industry becomes fragile and dependent on world markets. According to Kaci (2015), the dependence of the poultry industry to imported inputs at high prices and the considerable depreciation of the Algerian Dinar against foreign currencies, the technical weakness of competitiveness of breeding and lack of organization of industry players explain this situation.

It should be noted that except from the risks of

mortality and changes in market prices, poultry farming generates significant benefit. In order to reduce the costs of feeding, substitutions of imported feed raw materials by local materials deserve to be studied. In addition, in importing countries in order to reduce the feed bill, some products such as wheat bran, prove interesting for partial replacement for imported corn and soybean meal in broilers feed in Algerian farms (Boudouma, 2007; ITAVI, 2015).

In conclusion, the breeding of broiler chickens in mountain areas recorded different performances according to the financial allocations of the groups. In fact, the poultry farmers of Group 1 marked the best performance with the largest effective. The majority of farmers do not follow successful farming practices. In addition, they do not invest in buildings and equipment meeting the breeding standards. Despite imports of all inputs, these farms still manage to generate profits. They also reach rather significant production indices.

However, the performance of Algerian broiler chicken farms remains far behind those of some European and American countries despite the opening of the Algerian market and tariff dismantling that would benefit many more foreign companies than local. These companies were able to maintain their share of the national market.

The improved performance of poultry farms necessarily involves reducing the import of inputs, including the substitution of imported feed

raw materials used in the manufacture of feed, or by the ones available locally in Algeria. The reduction of production costs can also be achieved by improving animal farming practices, such as obtaining a better consumption index through efficient feeding practices such as those of Group 1 farmers. Improving the production index can be achieved by reducing mortality rates by practicing good hygiene and, in addition, strengthening the human factor training for optimal husbandry practices and the management of poultry farms.

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## PERFORMANSE I KOMPETITIVNOST FARMI BROJELRA U PODRUČJU SLOBODNE TRGOVINE: SLUČAJ TIZI-OUZOU (ALŽIR)

### SAŽETAK

Cilj ovog istraživanja jeste identificirati tehničke performanse i procijeniti ekonomsku kompetitivnost farmi brojlera uvjetima postojanja sporazuma o slobodnoj trgovini u regiji Tizi-Ouzou u Alžiru. Metodologija: Istraživanje je obavljeno na randomiziranom uzorku od 120 farmi smještenih na teritoriji cijele wilave (distrikta). Rezultati: Rezultati analize glavnih komponenti su pokazali postojanje pet grupa farmi prema veličini i broju brojlerskih traka. Prosječna veličina jata je iznosila 3,850 brojlera sa pet jata godišnje. Objekti za uzgoj brojlera ne zadovoljavaju sve kriterije. Cjelokupna količina hrane koju brojlerski pilići konzumiraju iznosi 6.03 kg. Prosječna težina brojlera je 2.84 kg dostignuta za 58 dana. Indeks proizvodnje je iznosio 207. Prosječni trošak proizvodnje je iznosio 158.67 AD/kg (1.20 €/kg), od čega su 67% bili troškovi hrane. Ove ekonomske performanse omogućavaju uzgajivačima stvaranje bruto marže od 21.72 AD/kg (0.17 €/kg). Zaključak: Ovo istraživanje pokazuje da uprkos priključivanja Alžira tržištu slobodne trgovine i slabim performansama brojlerskih farmi, ove peradarske farme još uvijek drže značajan dio nacionalnog tržišta.

**Ključne riječi:** Brojlerski pilići, uzgoj, performanse, planinsko područje