

Research Article

Study on current status and future trends of commercial poultry production in Pakistan

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Abstract

The study was designed to analyze the present status and predict the future trends of poultry production in Pakistan. This project focused on poultry price fluctuation during last ten years. On the basis of that data, we predicted the future trends for poultry price in Pakistan. The layer population, in commercial farms has shown a marked increase from 9.55 million birds during the year 1995 to 27.50 million birds in year 2010. The broiler production from 72.80 million birds in the year 1991 to 795 million birds in the year 2010 was recorded which led to increased broiler meat production. During the year 1995, almost 111772 metric tons of broiler meat was produced which increased to 587000 metric tons during the year 2010. Although the broiler production was increased significantly but price of broiler meat also kept increasing which demonstrate the shortfall in demand and supply. In case of layer flocks same trend was observed. In spite of significant increase in layer flocks which led to enhanced egg production, still the egg price kept rising during all the previous years. The regression models were used for prediction of layer, broiler, egg and poultry meat production on the basis of past 15-20year's production.

Keywords: Commercial poultry; Broiler; Layer; Future trends; Pakistan

Introduction

In poultry sector, population index growth is about 10-12% and it contributes a lion share (40%) of meat produced in Pakistan. Moreover, poultry sector consumes agriculture products and bi-products in the form of poultry feed ingredients which provide almost Rs.50 billion rupees/year revenue to agriculture sector. In Pakistan, there are 400 hatcheries, 150 feed mills, 8.5 million broiler

breeders farms, 0.428 million-layer breeders and total feed consumption by poultry is 5.51 million metric tons [1]. Although in Pakistan, the concept of commercial poultry rearing, hatching and feed mills were not known before 1960s. Poultry feed is considered as the major expenses in poultry production as its share is around 60-70% of total costs. Obviously, the major fraction of feed costs is its ingredients used and feed processing/

preparing costs [2]. Modernization in poultry rearing techniques and controlled housing system has already changed the trends of poultry production in recent years. To maximize the profit not only efficient poultry rearing, management on scientific basis is required but it's also critical to keep constant eye on costs and production index. Aside from prevalent market prices of various poultry goods, variability in cost components is mainly dependent on feed efficiency and managerial conditions [2-4]. Better planning and management and minimizing the effects of environment also help to reduce the production cost [5, 6].

Keeping this in view, the present study was conducted with the objective of making analytical evaluation of relationship between poultry population and production of the poultry products in Pakistan. Defined production systems which are based on animal/human friendly relation, to the animals housed. Adaptation of modern scientific advances in poultry rearing contributes to the enhanced and high quality products [7, 8].

This study deciphered the past, present and future trends of poultry production in Pakistan.

Materials and methods

Study was designed to forecast and evaluate the future trends in commercial poultry, its price/population index and regression model & regression analysis of broiler production versus 'X' egg produced.

Detailed information regarding broiler, layer and breeder stock population, their production capabilities and price characteristics were collected. Moreover data regarding feeding, breeding, management, egg production, costs against vaccination/medicine and constrains of poultry production were collected and analyzed statically. The data was obtained from record books of concerned district poultry officers, public and private sector farms. Variables measured during study

include sex of day old chick, its live bodyweight and biometric measurements, which were recorded randomly in breeder farms [8]. The information about egg production was recorded regularly on farm record register. For comparative study the data for the years 1991 to 2010 was collected from PRI Rawalpindi after an official permission and poultry population data was composed in this study.

Results

Layer population during 1991-2011

Data regarding layer production in Pakistan since 1991 to 2011 was collected and analyzed statistically (Table 1). Data showed a constant increase in layer production in each consecutive year. During the year 1991, total 9.55 Million birds were raised and almost increased to 300% during the year 2011. This depicts a significant increase in layer farming and showed a constant increase in demand.

Once the data regarding poultry production in Pakistan since 1991 to 2011 was collected and analyzed, it became easier to predict the future trend of poultry farming and its production as shown in Table 2. The predicted value in million heads is shown in Table 9. Future trend forecast showed a value of 19.96 million layers in the year 2011 and 26.99 million layers in the year 2020. The law of demand and supply governs everywhere and has significant effect on price. Other factors such as disease outbreaks, management etc also play a critical role in poultry production. The season also played an important role in the consumption of meat and farmers have to plan accordingly to market their poultry in winter and rainy seasons. This factor predicts the farmers to start fresh batch of poultry to fetch good market price during these particular seasons [9]. Keeping all other factors as constant, this estimation will play a key role in analysis of poultry production growth index and its future trends specially the projected population.

Table 1. Layer production for last 20 years (million birds) at the commercial poultry farms

Years	Number of layers at farms (million birds)	Years	Number of layers at farms (million birds)
1991	9.55	2002	17.50
1992	10.85	2003	19.56
1993	9.22	2004	19.60
1994	9.56	2005	19.60
1995	9.60	2006	20.06
1996	9.60	2007	21.70
1997	10.06	2008	24.00
1998	11.70	2009	26.00
1999	14.00	2010	25.00
2000	16.00	2011	27.50
2001	15.00		

Table 2. Regression model to predict the layer production in Pakistan

Predictor	Co-efficient	S.E	T	P-value
Constant	8.01	0.8533	9.40	0.0001
X	0.703	0.1314	5.35	0.0003

Egg production

The egg production data from 1991 to 2011 was collected and analyzed statistically. The results showed a marked increase as the egg production more than doubled in 2011 as compared to 1991 as shown in Table 3. For future prediction of egg production at the commercial layer farms, the regression models were employed on the basis of last 20 years egg production trend (Table 4). The

value 83.41 shows the average increase the egg produced during each calendar year. As regression value indicates that 83.41% of the variation of the egg production was associated with the independent variable (years). The estimated coefficients suggested significant impact of independent variable (years) on the egg production. The estimated number of egg produced is also shown in Table 9.

Table 3. Egg production for last 20 years (million birds) at the commercial poultry farms

Years	Number of eggs produced (million eggs)	Years	No. of eggs produced (million eggs)
1991	2,101.00	2002	3,160.00
1992	2,390.00	2003	4,101.00
1993	2,031.00	2004	4,390.00
1994	2,106.00	2005	4231.00
1995	2,200.00	2006	4,106.00
1996	2,200.00	2007	4,200.00
1997	2,305.00	2008	4,200.00
1998	2,680.77	2009	4,305.00
1999	3,150.00	2010	4,680.77
2000	2,317.00	2011	5,150.00
2001	2,772.00		

Table 4. Prediction of egg production

Predictor	Co-efficient	S.E	T	P-value
Constant	1992.3	147.6	13.50	0.00001
X	83.41	22.73	3.67	0.0004

Broiler production

To meet the need of poultry meat, the broiler produced from 1991 to 2011 are shown in Table 5. Similar trend in broiler production was observed as was documented in layer and egg production during the last several years. This constant development and increased production in all poultry sectors demonstrates a surge in demand. To predict the broiler production at the commercial poultry farms, the regression models were used on the basis of last 20 years population. The Table 6 shows the co-efficient of regression model of Boiler Production on different time periods. This also shows the co-efficient of Production of Boiler is

significant because its p-value is 0.0001 which is less than 0.05. The value 33.146 shows the average increase in the Production of Boiler during each year. As R value indicates that 33.146% of the variation of the broiler production was due to the effect of the independent variable (years). The estimated coefficients demonstrate the significant impact of independent variable (years) on the broiler production. From the model one can predict the type and magnitude of the change in broiler production in the study area. The predicted number of broilers produced till 2020 are also shown in Table 9.

Table 5. Broiler production for last 20 years (million birds) at the commercial poultry farms

Years	Number of broilers at farms (million birds)	Years	Number of broilers at farms (million birds)
1991	72.80	2002	495.00
1992	160.00	2003	508.00
1993	144.00	2004	549.00
1994	208.00	2005	583.50
1995	249.00	2006	662.00
1996	283.50	2007	620.00
1997	162.00	2008	680.00
1998	220.00	2009	740.00
1999	280.00	2010	728.00
2000	340.00	2011	795.00
2001	528.00		

Table 6. Prediction of broiler production

Predictor	Co-efficient	S.E	T	P-value
Constant	79.56	38.31	2.08	0.065
X	33.146	5.90	5.62	0.0001

Chicken meat production

Chicken meat production at the commercially developed poultry farms in

the study area indicated a considerable increase from 111772 metric tons in the year 1991 to 587000 metric tons in the year 2011

(Table 7). The forecast of chicken meat production for next 10 years at the commercial poultry farms developed through regression models on the basis of chicken meat production trend for last 20 years. The predicted number of broilers meat production till 2020 are shown in Table 9.

The Table 8 shows the co-efficient of regression model of chicken meat production on different time periods. This also shows the co-efficient of chicken meat production is significant because its p-value is 0.0001 which is less than 0.05. The value 23353 shows the average increase in chicken meat production at every one year. The regression value suggested a variation of 23353 tons in chicken meat production with

change of each year (independent variable). The estimated coefficients suggested significant impact of years on the increase in chick meat production at commercial poultry farms.

If the production declines or remains static, ultimately price hike is expected in accordance with the application of demand /supply rule [10-12]. Previously, it has been demonstrated that management decisions at hatcheries as well as breeder farms affect wholesale rates of eggs and broiler rate per kg [13, 14]. Moreover, flock age, egg weight on hatching, egg characteristics, fertility, hatchability and sale-able chick production had significant effect on poultry products market rate [15-17].

Table 7. Chicken meat production for last 20 years (million birds) at the commercial poultry farms

Years	Chicken meat obtained (metric tons)	Years	Chicken meat obtained (metric tons)
1991	111,772.00	2002	460,000.00
1992	160,000.00	2003	411,772.00
1993	144,000.00	2004	460,000.00
1994	208,000.00	2005	447,000.00
1995	249,000.00	2006	509,000.00
1996	283,500.00	2007	549,000.00
1997	162,000.00	2008	583,500.00
1998	220,000.00	2009	562,000.00
1999	280,000.00	2010	520,000.00
2000	340,000.00	2011	587,000.00
2001	405,000.00		

Table 8. Prediction of broiler meat production

Predictor	Co-efficient	S.E	T	P-value
Constant	116830	25262	4.62	0.001
X	23353	3890	6.00	0.0001

Table 9. Future trend of number of broiler layer, eggs and poultry meat in Pakistan

	Layers population in million number future trend forecast $y = 8.01 + 0.703x$	Broiler population in million number future trend forecast $y = 79.56 + 33.146x$	Egg production in million numbers future trends forecast $y = 992.3 + 83.41x$	Production of meat 000 tons future trend $y = 11680 + 23353x$
Year	Forecast	Forecast	Forecast	Forecast
2011	19.961	642.94	3410.27	408681
2012	20.664	676.08	3493.68	432034
2013	21.367	709.22	3577.09	455387
2014	22.07	742.36	3660.50	478740
2015	22.773	775.5	3743.91	502093
2016	23.476	808.64	3827.32	525446
2017	24.882	874.92	3994.14	572152
2018	25.585	908.06	4077.55	595505
2019	26.288	941.2	4160.96	618858
2020	26.991	974.34	4244.37	642211

Conclusion

This study will assist to evaluate the future requirements and to determine the growth levels of poultry sector in Pakistan. It will also help to enhance quantitative productions to meet the future demands of poultry products in Pakistan.

Authors' contributions

Conceived and designed the experiments: T Hameed, MA Bajwa & FA Bukhari, Performed the experiments: T Hameed & M Rafeeq. Analyzed the data: B Hilal, MA Attique & MM Tariq, Wrote the paper: T Hameed, TM Asmat & FA Bokhari.

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