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Data Set on Forecasting Gender Trends for Primary School Teachers in Somalia from Academic Years 2015/2016 - 2025/2026

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Abstract

This analysis examines forecasting gender trends for primary school teachers in Somalia from the academic years 2015/2016 to 2025/2026. For male teachers, the data reveals an increase from 5,587 in 2015/2016 to 10,812 in 2021/2022, with predictions suggesting further growth to approximately 14,673 by 2025/2026, despite some short-term fluctuations. In contrast, female teachers rose from 498 to 1,838 during the same period, followed by a slight decline to 1,774 in 2022/2023. Forecasts indicate a temporary decrease to about 1,567 in 2023/2024 but anticipate a significant rebound to nearly 2,924 by 2025/2026. The findings highlight a trend of increasing male representation and fluctuating female participation among primary school teachers in Somalia, underscoring the need for targeted policies to address these gender dynamics.

Keywords: Data Set , Forecasting , Gender Trends, Primary School , Teachers , Somalia

Specifications Table

Subject	Education
Specific subject area	Teacher Education
Type of data	Tables and Figures
How the data were acquired	The data was sourced from the official annual statistical reports published by the Somali Ministry of Education, Culture, and Higher Education. The data spans the academic years from 2015/2016 to 2022/2023.
Data format	Raw and Analysed
Parameters for data collection	The information was gathered from the official annual statistical reports published by the Somali Ministry of Education, Culture, and Higher Education. It encompasses four member states:

Galmudug, Hirshabelle, Southwest, Jubaland, and the Banadir Region. These reports provided detailed insights into various aspects of Somalia's education system, including enrollment statistics and teacher data, such as the number of primary school teachers, their qualifications, and their geographic distribution. The relevant data points were carefully extracted, compiled into a single dataset, and organized into tables. Throughout the data processing and analysis phases, SPSS, and Excel were used.

Data source location and accessibility

<https://moe.gov.so/en/reports/>

Value of Data

- The data set compiled for this research can serve as a valuable resource for researchers, policymakers, and education planners in Somalia and other interested parties.
- The insights gained from analysing the gender trends among primary school teachers can inform workforce planning, teacher recruitment and retention strategies, and professional development programs.
- The data can also be used to monitor progress toward achieving gender parity and equity goals in the education sector, which are often closely tied to broader national development objectives.
- The forecasted values can aid in scenario planning and help stakeholders proactively address any potential imbalances or challenges in the teacher workforce.

Data Description

The longitudinal data examined in this analysis covers the academic years from 2015/2016 to 2022/2023, except 2017/2018, which is unavailable. This data was sourced from official statistics published on the Somali Ministry of Education, Culture, and Higher Education website. The analysis investigates gender parity among primary school teachers in four Somali member states: Galmudug, Hirshabelle, Southwest, Jubaland, and the Banadir Region during these academic years in Somalia. 2015/2016 [1], 2016/2017 [2], 2018/2019 [3] 2019/2020[4], 2020/2021[5], 2021/2022[6], and 2022/2023[7].

Furthermore, the research includes forecasted values for the next two academic years, 2024/2025 and 2025/2026, based on the ministry's five-year strategic plan for 2022-2026. These forecasted values aim to provide insights into the potential future trends in gender representation for primary school teachers in Somalia.

Examining the primary teaching workforce in Table 1, the results reveal a persistent and significant gender disparity. Over the analysed period, the percentage of male primary teachers has consistently been higher, ranging from 85.16% to 92%, while the proportion of female primary teachers has ranged from 8% to 14.84%. The Gender Parity Index (GPI) values, which measure the relative access to education between males and females, have remained below the parity value of 1, indicating a clear imbalance favoring male teachers. The overall trend suggests a substantial gender imbalance in the primary teaching cadre.

Table1. A Longitudinal Analysis of Gender Representation among Primary School Teachers

Academic Year	Male	%	Female	%	Total	GPI*
2015/2016	5,587	92	498	8	6085	0.089
2016/2017	5713	89.78	650	10.22	6,363	0.114
2017/2018	NA	NA	NA	NA	NA	NA
2018/2019	6296	85.16	1098	14.84	7394	0.174
2019/2020	8596	85.82	1421	14.18	10017	0.165
2020/2021	9793	89.67	1129	10.33	10922	0.115
2021/2022	10812	85.48	1838	14.52	12650	0.170
2022/2023	10746	86	1774	14	12520	0.165

*GPI: Gender Parity Index.

Experimental Design, Materials, and Methods

Time series analysis techniques in SPSS and Excel were applied for forecasting. Different forecasting models, including Holt's method shown in Table 2, and model fit evaluations presented in Table 3, were performed.

The results of the table 3 show that the model fit statistics for the forecasting model used in the analysis. The mean stationary R-squared is 0.849, indicating a strong fit of the models to the stationary component of the data, with a range from 0.823 to 0.876. The mean R-squared is 0.585, suggesting the models explain about 58.5% of the variance in the data, with a range from 0.502 to 0.669. The mean RMSE (Root Mean Squared Error) is 1579.149, indicating the average magnitude of the forecasting errors, ranging from 397.225 to 2761.073. The mean MAPE (Mean Absolute Percentage Error) is 22.738%, suggesting the forecasts have an average absolute percentage error of around 22.7%, with a range from 18.571% to 26.905%. The mean MaxAPE (Maximum Absolute Percentage Error) is 59.599%, indicating the maximum absolute percentage error in the forecasts, with a range from 51.750% to 67.448%. The mean MAE (Mean Absolute Error) is 1053.725, with a range from 297.338 to 1810.113. The mean MaxAE (Maximum Absolute Error) is 3014.856,

with a range from 662.215 to 5367.497. The mean normalized BIC (Bayesian Information Criterion) is 14.428, which is a measure of model fit that penalizes model complexity, with a range from 12.489 to 16.367. Overall, the model fit statistics suggest the forecasting models have a strong performance, with high stationary R-squared and R-squared values, and relatively low MAPE and MaxAPE, indicating reliable and accurate forecasts.

Table 2. Model Description for Forecasting Primary Teachers' Trends

Model ID	Model Type	
	Male	Female
	Model_1	Model_2
	Holt	Holt

Table 3. Model Fit of Data for Forecasting Primary Teachers' Trends

Fit Statistic	Mean	SE	Minimum	Maximum
Stationary R-squared	.849	.037	.823	.876
R-squared	.585	.118	.502	.669
RMSE	1579.149	1671.493	397.225	2761.073
MAPE	22.738	5.893	18.571	26.905
MaxAPE	59.599	11.100	51.750	67.448
MAE	1053.725	1069.693	297.338	1810.113
MaxAE	3014.856	3327.137	662.215	5367.497
Normalized BIC	14.428	2.742	12.489	16.367

The analysis conducted on the dataset related to forecasting gender trends for primary school teachers in Somalia from the academic years 2015/2016 to 2025/2026 is summarized as follows:

Forecasting Male Teachers in Primary Schools (2015/2016-2025/2026)

Table 7 and Figure 1 provide forecasts for the number of male primary school teachers from the 2015/2016 to the 2025/2026 academic year. The data shows an increase in the number of male teachers from 5,587 in 2015/2016 to 10,812 in 2021/2022, followed by a slight decrease to 10,746 in 2022/2023. The forecasts suggest a steady rise, with the number expected to reach 12,467.24 in 2023/2024, 13,569.98 in 2024/2025, and 14,672.71 in 2025/2026. The lower and upper confidence intervals indicate a range of potential outcomes, highlighting a significant level of uncertainty, especially in the later years. Overall, the data suggests a continued increase in the number of male primary school teachers over the upcoming academic years.

Forecasting Female Teachers in Primary Schools (2015/2016-2025/2026)

Table 8 and Figure 2 present forecasts for the number of female primary school teachers from the 2015/2016 to the 2025/2026 academic year. The data shows that the number of female teachers increased from 498 in 2015/2016 to 1,838 in

2021/2022, with a slight decline to 1,774 in 2022/2023. The forecasts predict a decrease to 1,566.60 in 2023/2024, followed by a sharp increase to 2,691.54 in 2024/2025 and 2,923.61 in 2025/2026. The confidence intervals suggest moderate uncertainty, particularly in the later years. Overall, the data indicates that the number of female primary school teachers is expected to fluctuate, with a short-term decrease followed by a significant increase in the long term.

Table 4. Forecasting Male Teachers for Primary School from Academic Year 2015/2016-2025/2026

Timeline	Male	Forecast (Male)	Lower Confidence Bound (Male)	Upper Confidence Bound (Male)
2015/2016	5587			
2016/2017	5713			
2017/2018	0			
2018/2019	6296			
2019/2020	8596			
2020/2021	9793			
2021/2022	10812			
2022/2023	10746	10746	10746.00	10746.00
2023/2024		12467.23	7077.78	17856.69
2024/2025		13569.97	8013.34	19126.61
2025/2026		14672.71	8952.51	20392.92

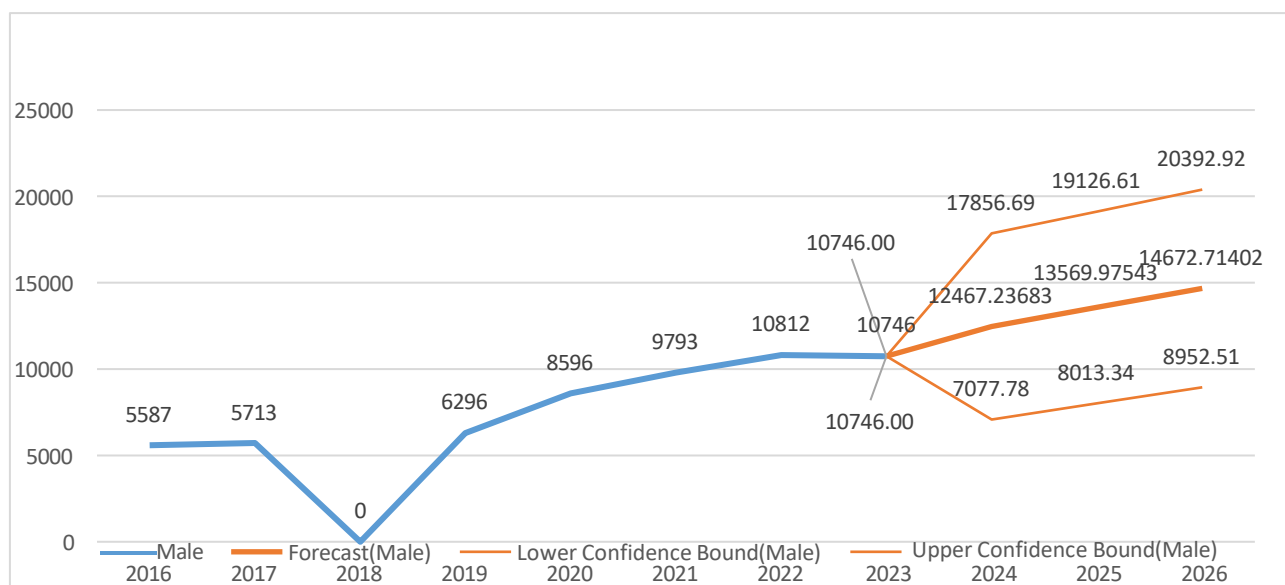


Figure 1 Forecasting Male Teachers for Primary School from Academic Year 2015/2016-2025/2026

Table 5. Forecasting Female Teachers for Primary School from Academic Year 2015/2016-2025/2026

Timeline	Female	Forecast (Female)	Lower Confidence Bound (Female)	Upper Confidence Bound (Female)
2015/2016	498			
2016/2017	650			
2017/2018	0			
2018/2019	1098			
2019/2020	1421			
2020/2021	1129			
2021/2022	1838			
2022/2023	1774	1774	1774.00	1774.00
2023/2024		1566.595891	1157.32	1975.88
2024/2025		2691.536169	2278.97	3104.10
2025/2026		2923.609164	2507.73	3339.49

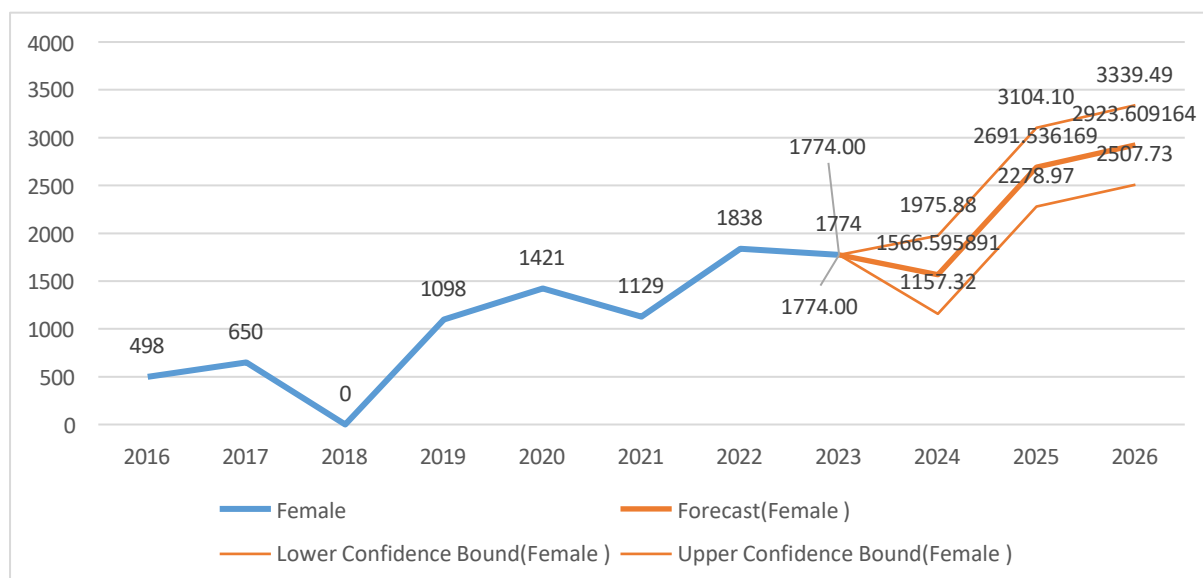


Figure 2 Forecasting Female Teachers for Primary School from Academic Year 2015/2016-2025/2026

Ethics Statements

This study adheres to ethical standards in research involving educational data. All data utilized were obtained from publicly available sources provided by the Somali Ministry of Education, Culture, and Higher Education. As the data is publicly available, the analysis respects ethical standards by ensuring that no sensitive information about individuals or specific institutions is disclosed. The research aims to contribute positively to the understanding of gender trends in primary education in Somalia, promoting equity and informed policy-making.

Declaration of Competing Interest

The authors declare that there are no competing interests related to this study. No financial or personal relationships have influenced the research, and all findings are presented impartially to further the academic discourse on gender trends among primary school teachers in Somalia.

CRedit Author Contribution Statement

Said Abubakar Writing – original draft, review & editing, formal analysis, Visualization, Project administration, Methodology, Investigation, Data curation, Conceptualization.

Abdulkadir Jeilani Writing – review & editing, Validation, Supervision, Investigation, Data curation, Conceptualization.

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