

# Schools Information System (Pakistan)

— Nayab Irfan (report)

## 1. Description of the Data Source Purpose:

This dataset originates from Punjab's educational departments having 48193 unique rows and 55 columns, providing a comprehensive overview of the region's schools.

**Scope:** The dataset includes key columns such as

school_id	Unique identifier for each school.	
emiscode	Education Management Information System code for the school.	
school_name	Name of the school.	
district	District where the school is located.	
tehsil	Administrative sub-division (tehsil) within the district.	
markaz	Cluster or center where the school is located.	
moza	Village or locality where the school is situated.	
permanent_address	Permanent address of the school.	
street_name	Name of the street where the school is located.	
uc_name	Name of the Union Council where the school is located.	
uc_no	Union Council number of the school.	
na_no	National Assembly constituency number for the school area.	
pp_no	Provincial Assembly constituency number for the school area.	
head_name	Name of the school head/principal.	
head_type	Type or designation of the school head (e.g., principal, headmaster).	
head_grade	Grade level or rank of the school head.	

school_status	Current operational status of the school.
medium	Language medium of instruction in the school.
school_shift	Shift(s) during which the school operates (e.g., morning, evening).
school_location	Location type of the school (e.g., urban, rural).
school_gender	Gender designation of the school (e.g., boys, girls, co-ed).
gender_studying	Gender(s) of students currently studying at the school.
school_level	Level of education offered (e.g., primary, middle, high).
school_type	Type of school (e.g., public, private).
est_year	Year when the school was established.
upgrade_primary_year	Year when the school was upgraded to primary level.
upgrade_middle_year	Year when the school was upgraded to middle level.
upgrade_high_year	Year when the school was upgraded to high school level.
upgrade_high_sec_year	Year when the school was upgraded to higher secondary level.
bldg_status	Current building status of the school.
school_ownership	Ownership status of the school (e.g., government, private).
place_status	Indicates if the school has a designated place or campus.
construct_type	Type of building construction (e.g., concrete, temporary).
bldg_condition	Condition of the school building (e.g., good, needs repair).
total_area_kanal	Total area of the school in kanals.
total_area_marla	Total area of the school in marlas.
covered_area	Area of the school covered by buildings.
uncovered_area_kanal	Uncovered area in kanals.
uncovered_area_marla	Uncovered area in marlas.
functional_classrooms	Number of classrooms that are currently functional.

classes	Number of classes offered at the school.
drink_water	Availability of drinking water at the school.
drink_water_type	Type of drinking water source (e.g., tap, well).
drink_water_type_other	Additional description for drinking water source, if applicable.
electricity	Indicates if the school has electricity.
electricity_source	Source of electricity (e.g., grid, solar).
toilets	Indicates if the school has toilet facilities.
total_toilets	Total number of toilets available.
teachers_toilets	Number of toilets designated for teachers.
boundary_wall	Indicates if the school has a boundary wall.
boundary_wall_state	Condition of the boundary wall.
security	Indicates if there are security measures in place.
care_giver	Indicates if there is a caregiver (support staff) present.
enrollment	Total number of students enrolled at the school.
teachers	Number of teachers employed at the school.
non_teachers	Number of non-teaching staff at the school.

along with other relevant fields that reflect school demographics, facilities, and infrastructure.

**Data Range:** The data encompasses details on 48,191 schools across Punjab, collected over a specified period.

## 2. Documentation of Data Cleaning and Manipulation Data Preparation:

The data preparation involved steps like removing null values, normalizing data entries, and filtering out irrelevant records. Due to the ***limitations of dataset provided***, the analysis was hard and derived limited insights, here are some of them.

**Added Columns:** New columns were added to indicate vacant and non-vacant teaching and non-teaching positions.

Teachers_Vacant	NonTeachers_Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Not Vacant
Not Vacant	Vacant
Not Vacant	Not Vacant

**Validation:** Data validation was conducted to ensure the accuracy of critical fields such as enrollment figures and the conditions of school infrastructure.

## 3. Dataset Analysis:

### Key Trends and Insights Enrollment Trends:

The analysis reveals student distribution by gender and school level (primary, middle, high), highlighting disparities, particularly in rural areas.

**Teacher Distribution:** Trends indicate the availability of teachers and non-teaching staff across various districts, with particular attention to areas facing significant vacancies.

**Facility Availability:** The dataset presents the availability and conditions of essential facilities, including drinking water, electricity, toilets, and boundary walls, with a focus on districts in high need.

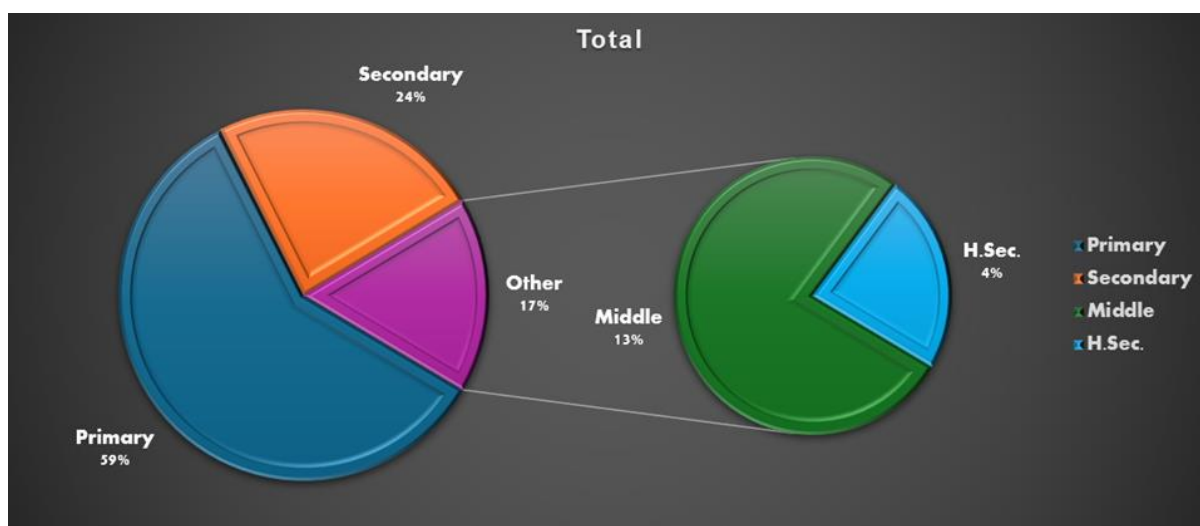
**Security and Building Conditions:** An examination of schools shows which districts have satisfactory building conditions and security measures, identifying those that are most lacking.

### Total Schools:

The dataset contains a total of **48,191** schools.

### Lowest Student Count by School Gender and Level (2000s):

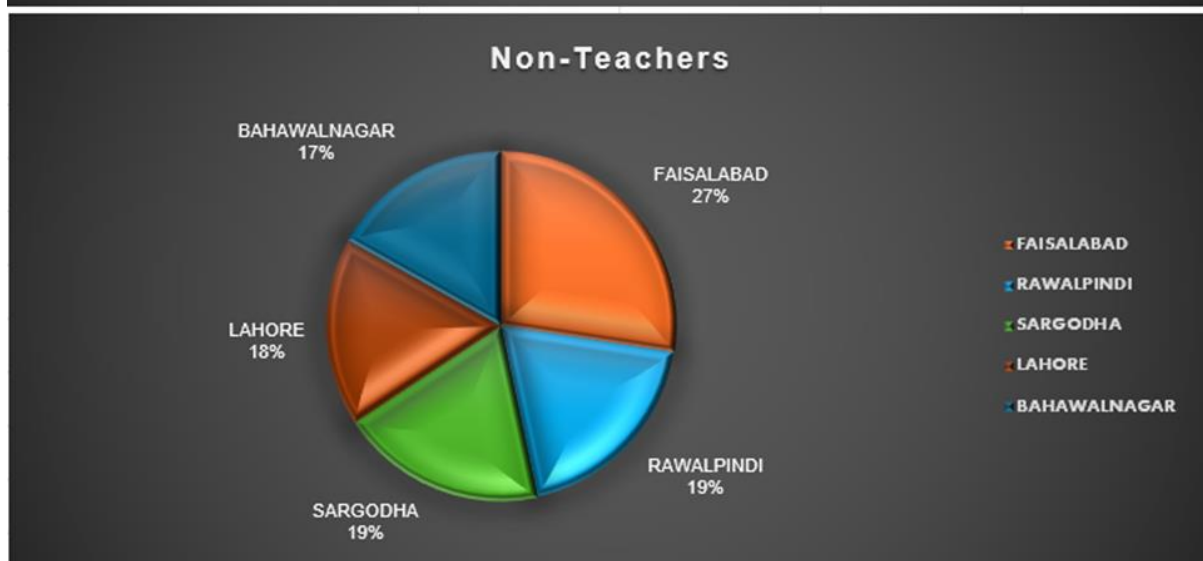
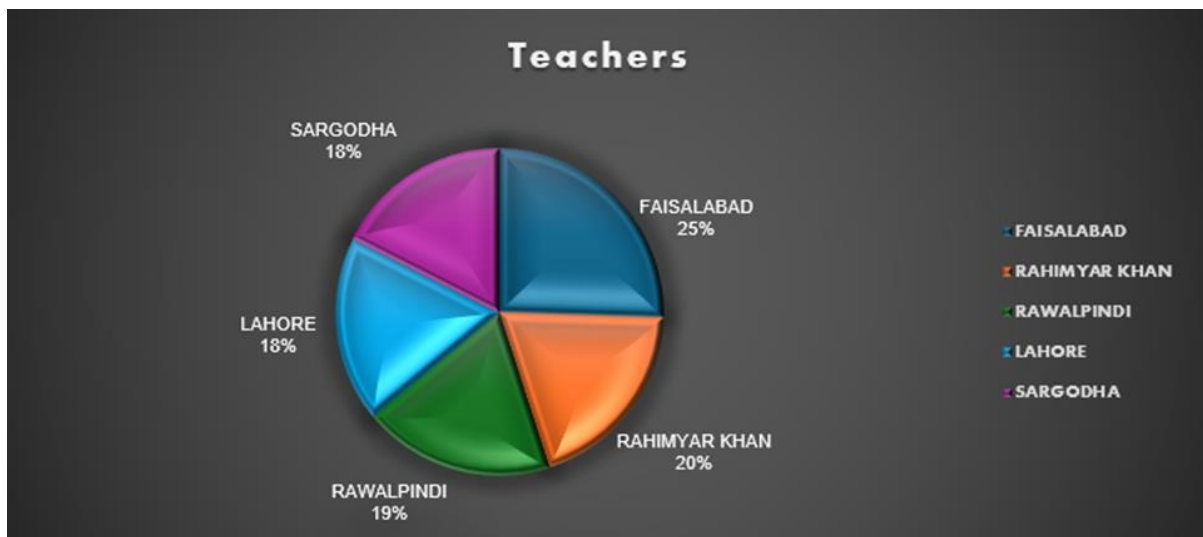
Schools established in the 2000s show the lowest male student count in **Secondary schools (19)** and **Mosque schools (16)**, and the lowest female student count in **Secondary schools (51)** and **Mosque schools (0)**.



### Top 5 Districts by Teachers and Non-Teachers:

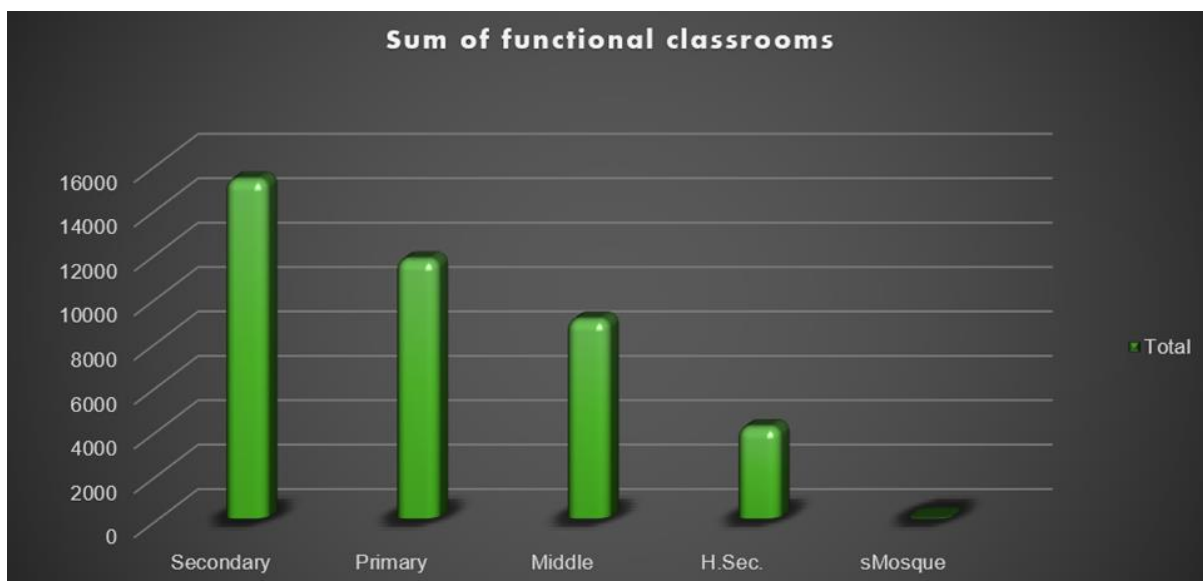
The top districts by teacher and non-teacher count are:

- Faisalabad:** 22,996 teachers, 4,918 non-teachers
- Rahimyar Khan:** 17,641 teachers, 3,013 non-teachers
- Rawalpindi:** 17,120 teachers, 3,438 non-teachers
- Lahore:** 16,676 teachers, 3,130 non-teachers
- Sargodha:** 15,798 teachers, 3,418 non-teachers



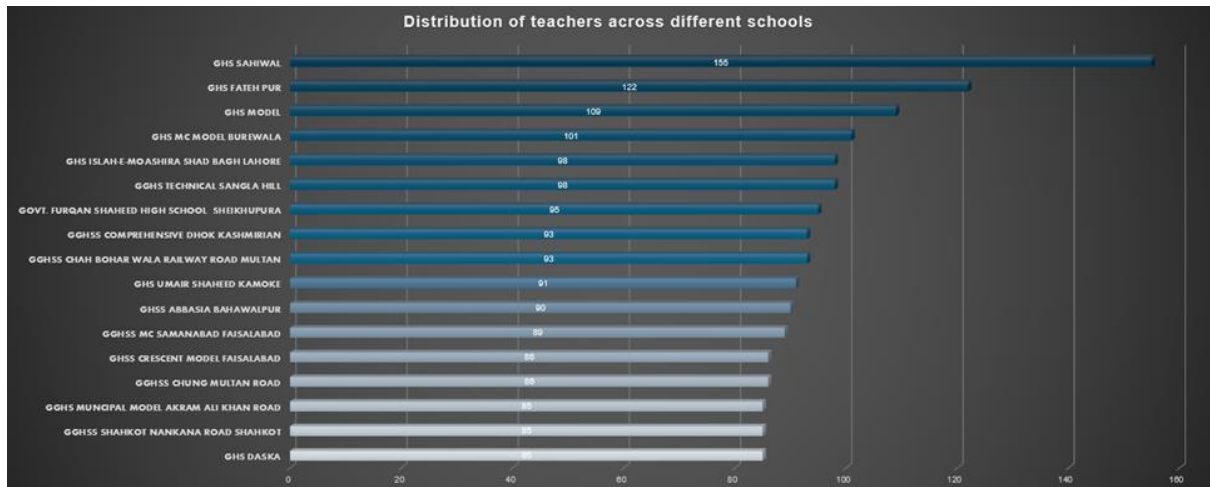
### School Level and Medium with Lowest Functional Classrooms:

**sMosque** schools in English medium have the lowest functional classrooms, totaling **29**.



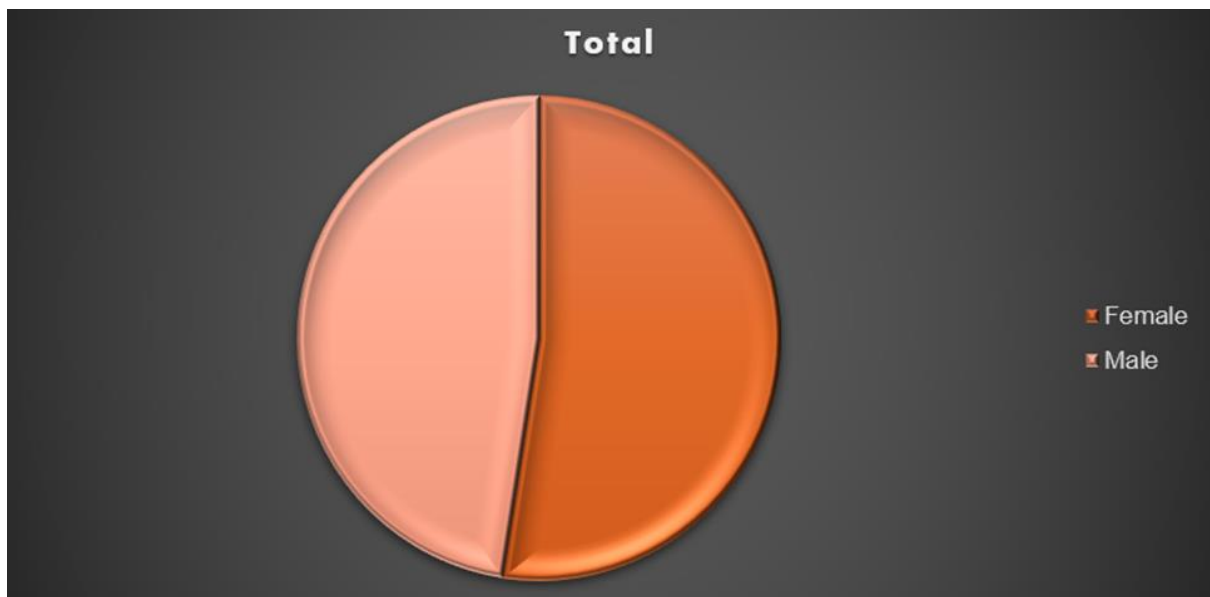
## Teacher Distribution Across Schools:

Teacher distribution varies significantly across schools, with noticeable peaks in high-population districts.



## Student Gender Count:

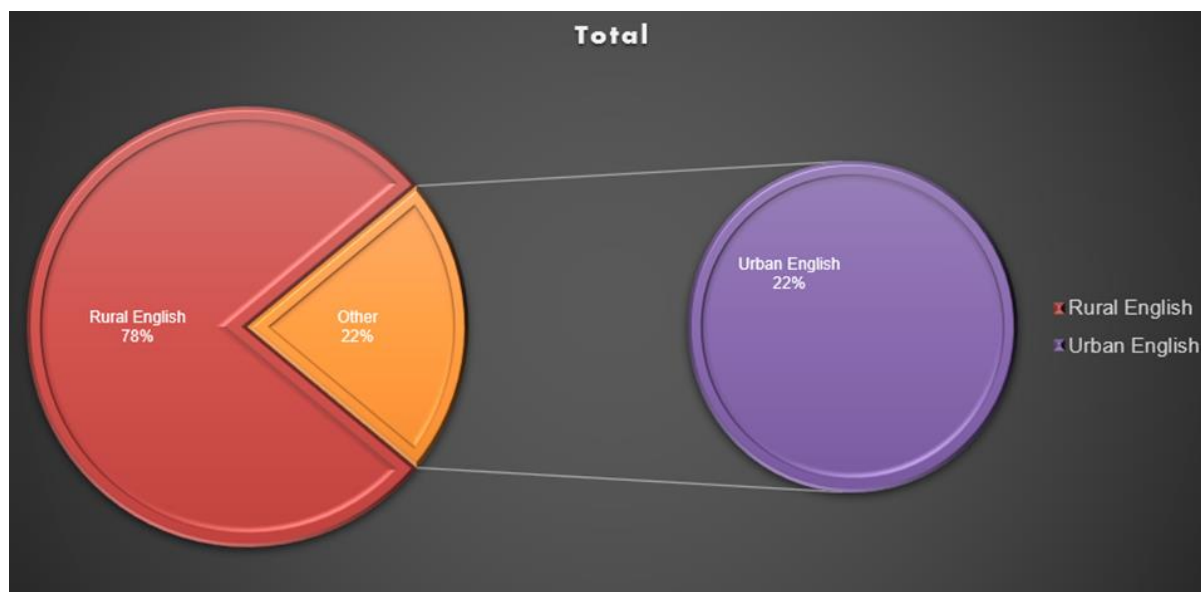
There are **22,921 male students** and **25,270 female students** in the dataset.



## Schools Offering Urdu, English, or Both Mediums:

Urban and rural schools offer Urdu, English, or both, with a distinct preference for Urdu-medium in rural areas.

- **Rural schools:** 7,608
- **Urban schools:** 1,808



### Primary School Enrollment by District:

**Rahimyar Khan** has the highest enrollment in primary schools since establishment.

school_level	Primary
Row Labels	Sum of enrollment
RAHIMYAR KHAN	257799
FAISALABAD	234888
BAHAWALNAGAR	188760
MUZAFFARGARH	184840
D.G. KHAN	176390
SARGODHA	160621
JHANG	153896

### Secondary School Enrollment by District:

**Faisalabad** leads in secondary school enrollment since establishment.

school_level	Secondary
Row Labels	Sum of enrollment
FAISALABAD	362868
LAHORE	353382
GUJRANWALA	186595
RAWALPINDI	180642
SARGODHA	173756
SIALKOT	165435
GUJRAT	157207



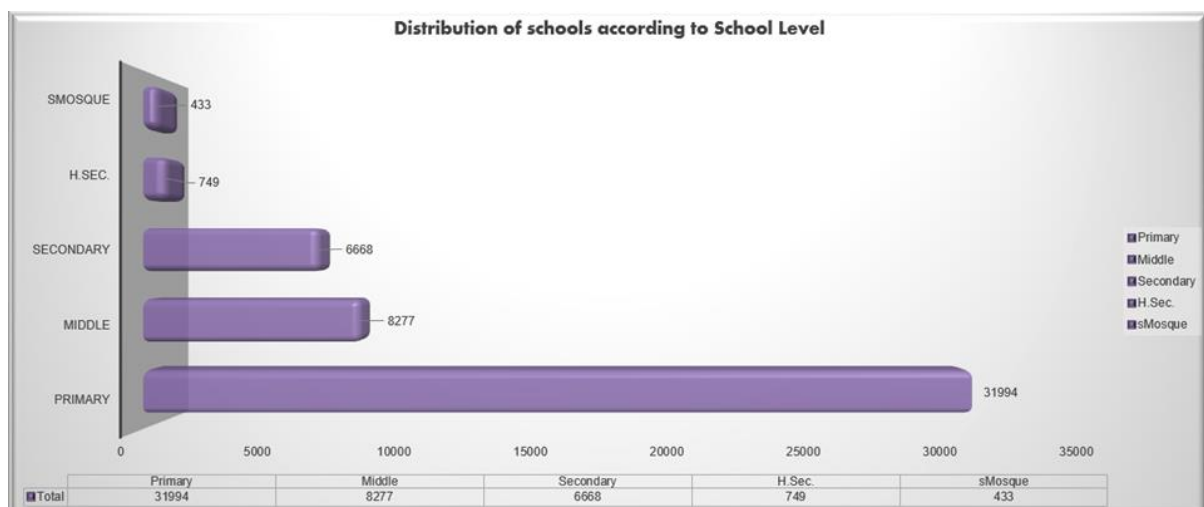
## Higher Secondary School Enrollment by District:

**Faisalabad** also has the highest enrollment in higher secondary schools since establishment.

school_level	H.Sec.
Row Labels	Sum of enrollment
FAISALABAD	99227
LAHORE	50918
SIALKOT	40423
MULTAN	38429
SARGODHA	36088
SAHIWAL	35339
RAWALPINDI	33499

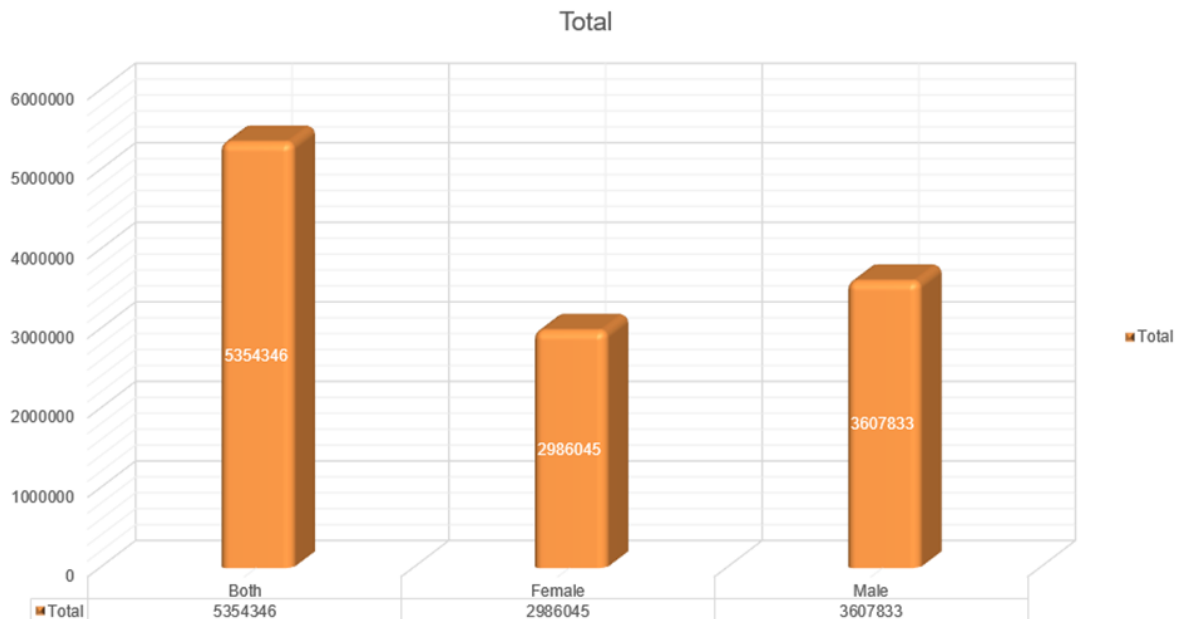
## School Level Distribution:

The distribution of schools across different levels is diverse, with high counts at primary and secondary levels.



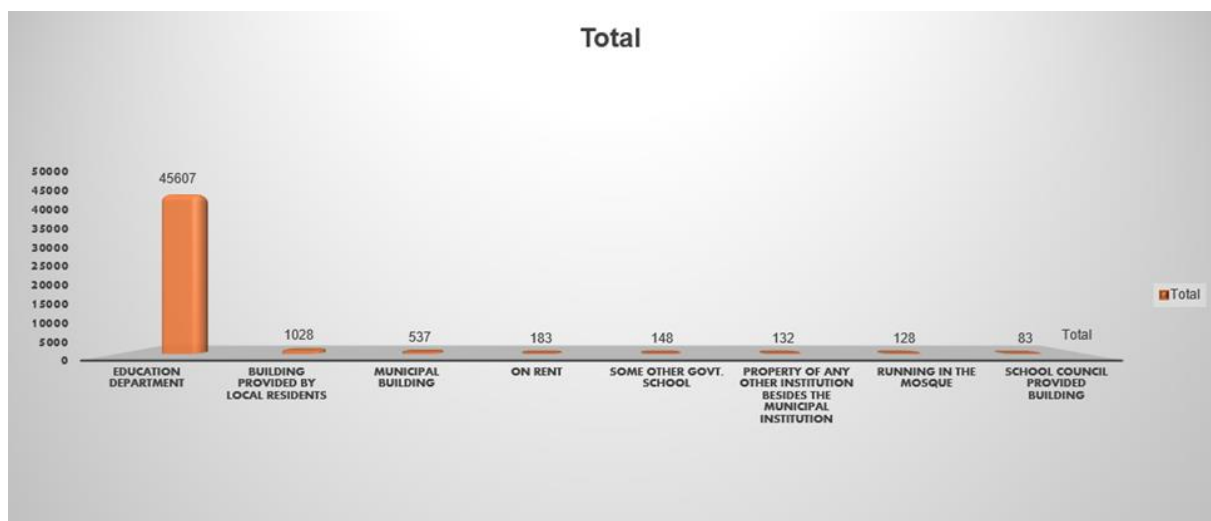
## Student Gender Distribution:

Student numbers are fairly balanced across genders, with a slight lead in female enrollment.



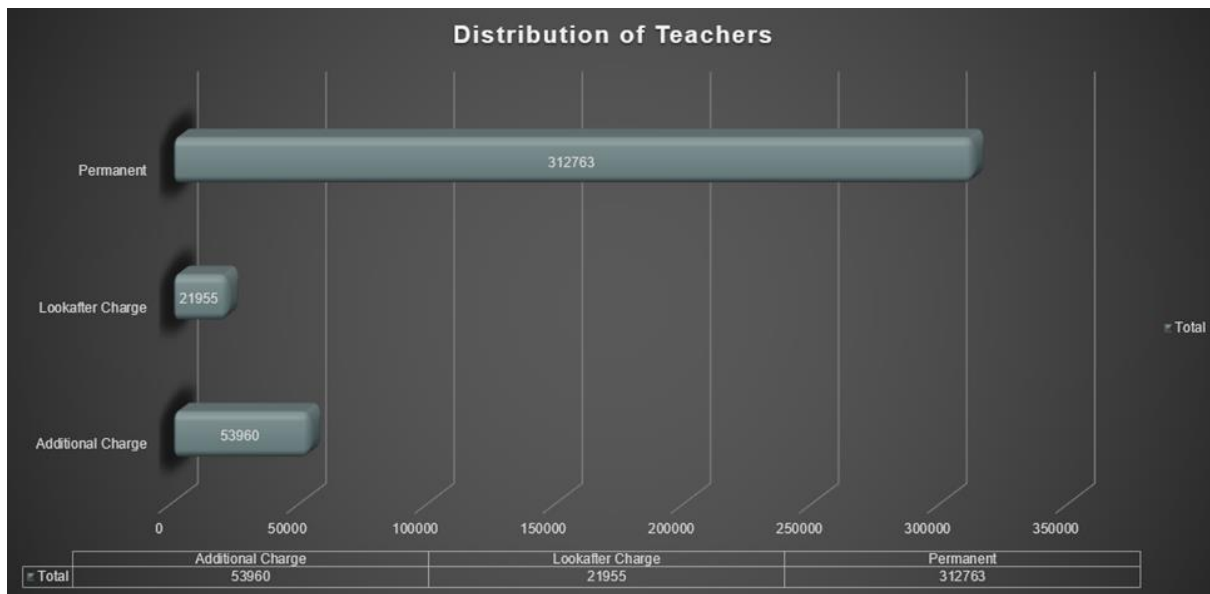
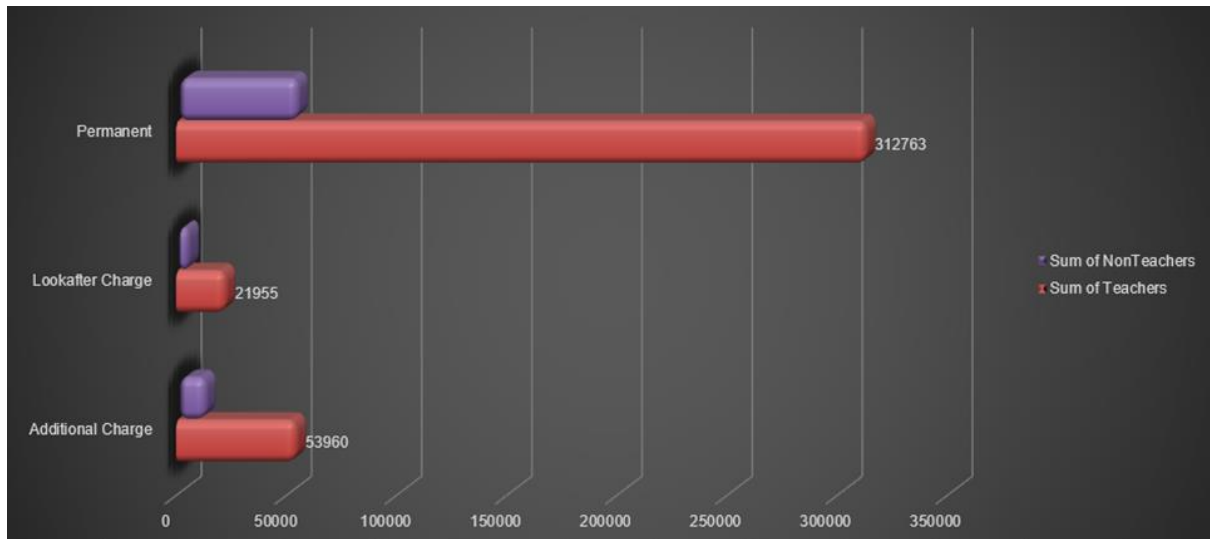
## School Ownership:

Schools have varied ownership types, with the majority being government-owned in **education department**.



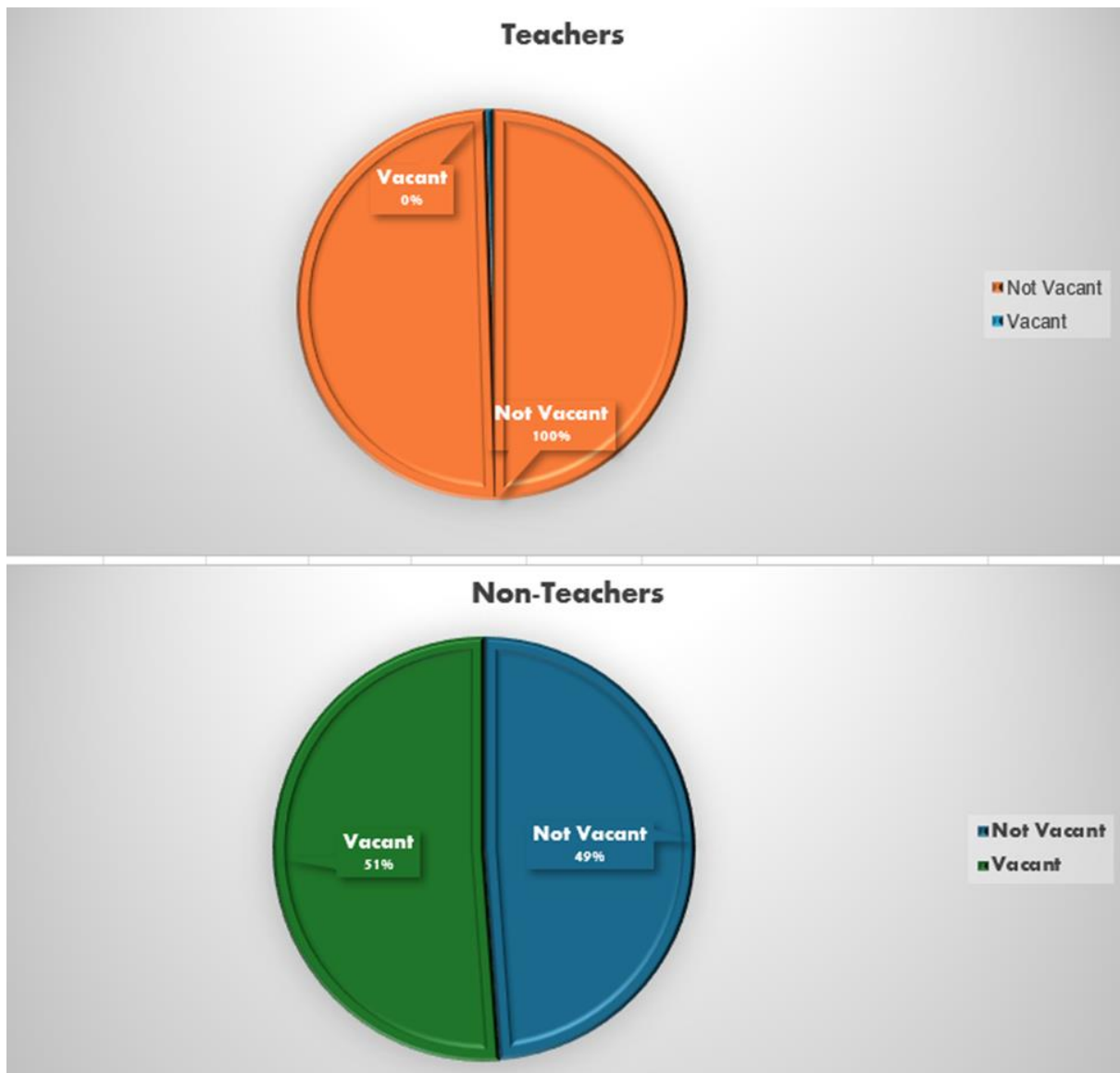
## Teacher Distribution by Job Post:

Teachers occupy various posts, with most categorized as primary or secondary-level instructors.



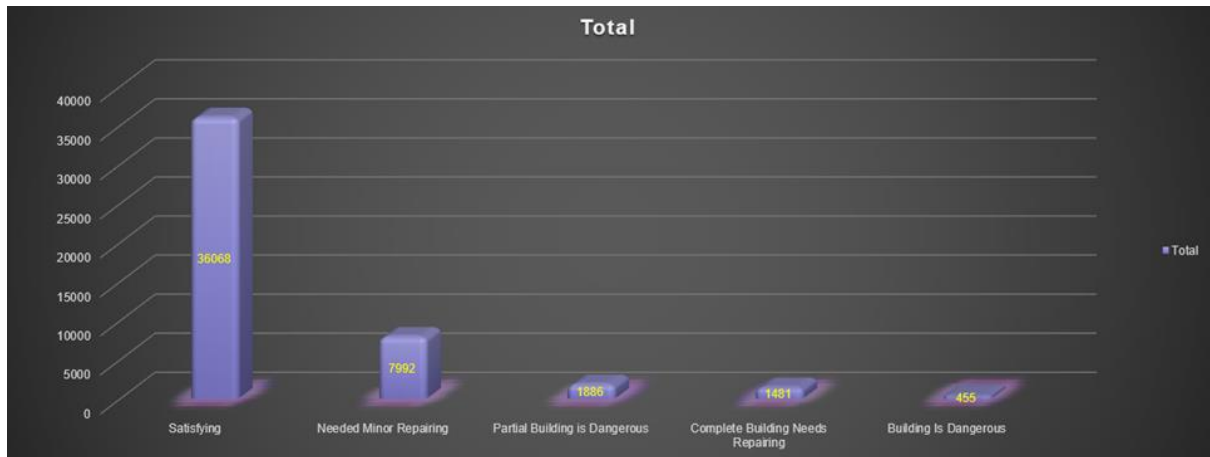
## Vacant vs. Filled Teaching and Non-Teaching Posts:

The dataset shows a mix of filled and vacant teaching and non-teaching posts, highlighting staffing needs.



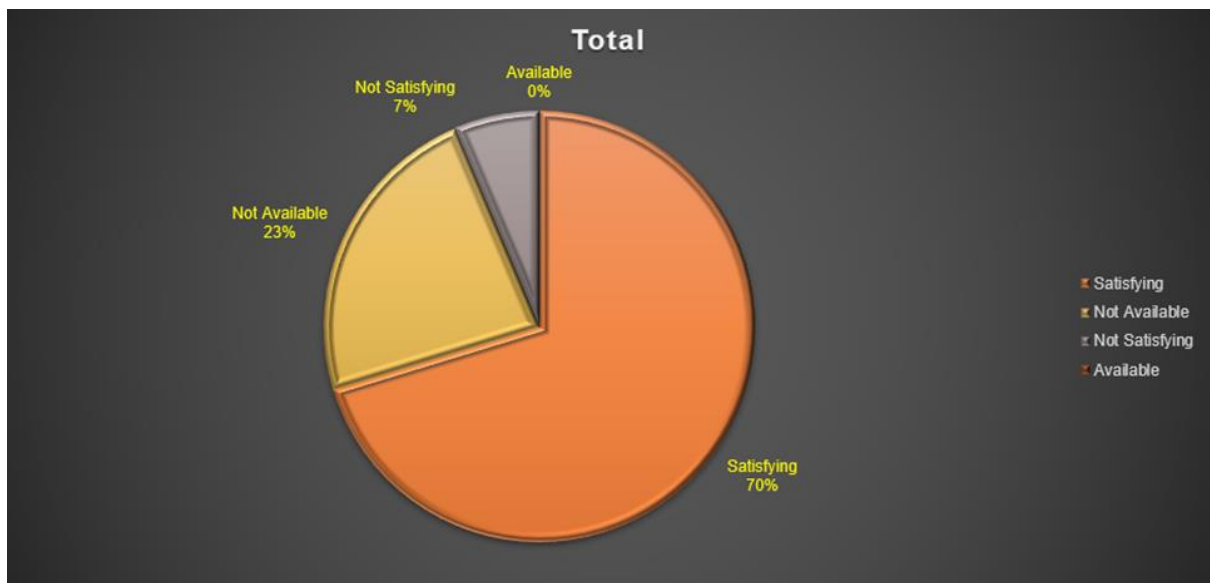
## Schools with Satisfactory Building Conditions:

**70.28%** of schools are rated as having satisfactory building conditions.



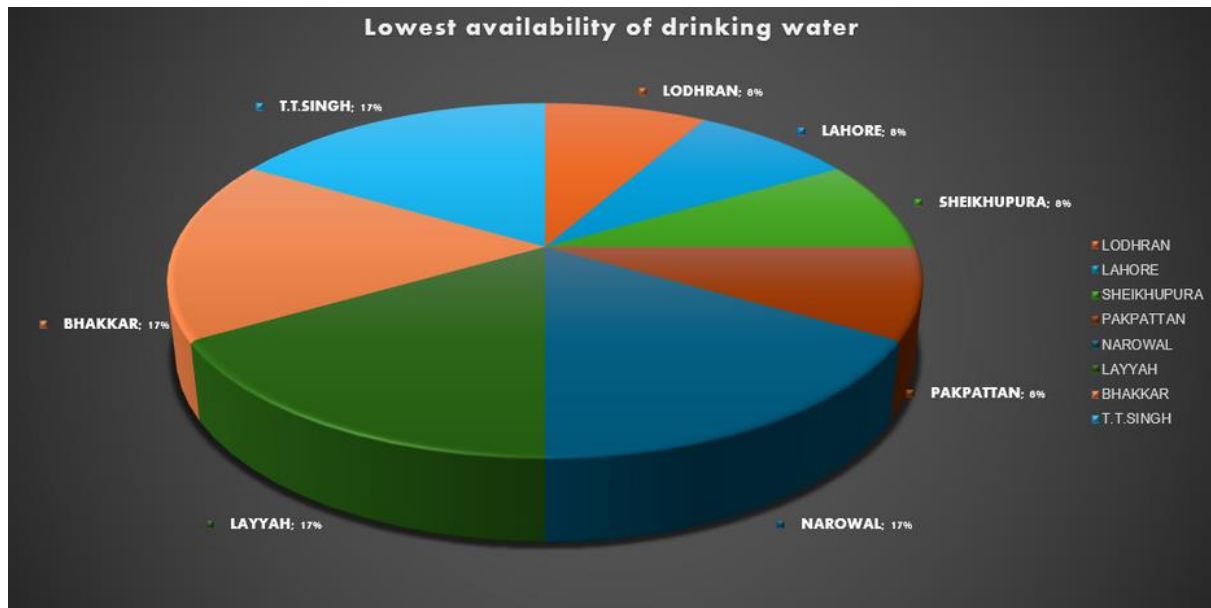
## Schools with Satisfactory Security Measures:

A total of **33,871** schools are reported to have satisfactory security measures.



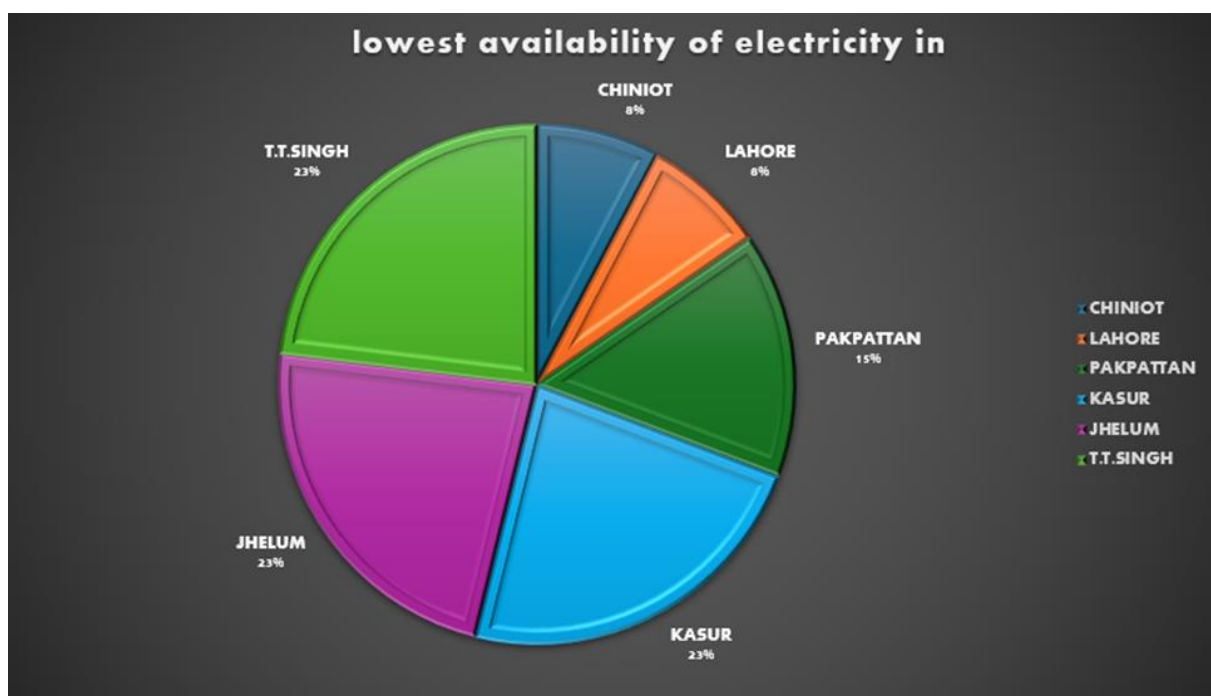
## Districts with Lowest Drinking Water Availability:

Chiniot, Hafizabad, Nankana Sahib, Lodhran, and Mandi Bahauddin have the lowest availability of drinking water facilities.



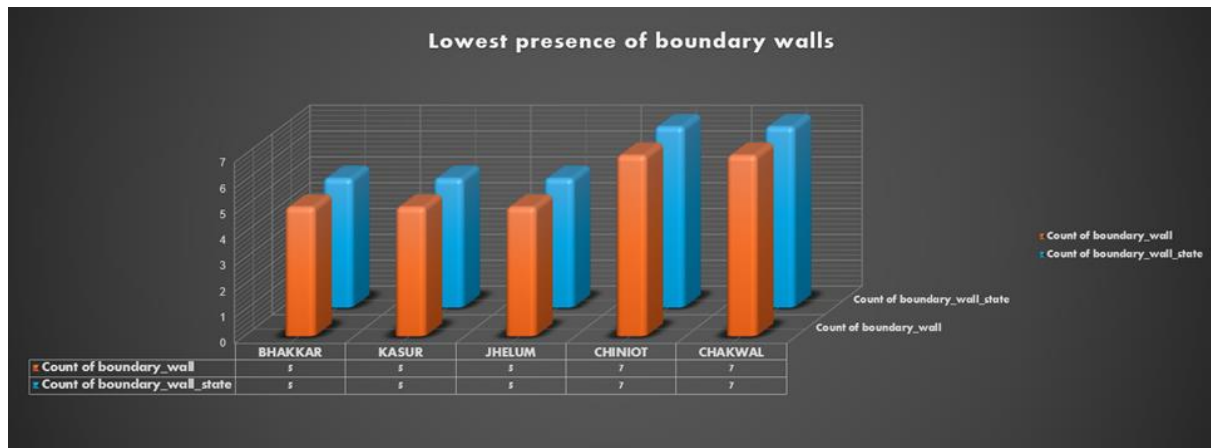
## Districts with Lowest Electricity Availability:

The same districts also have limited access to electricity.



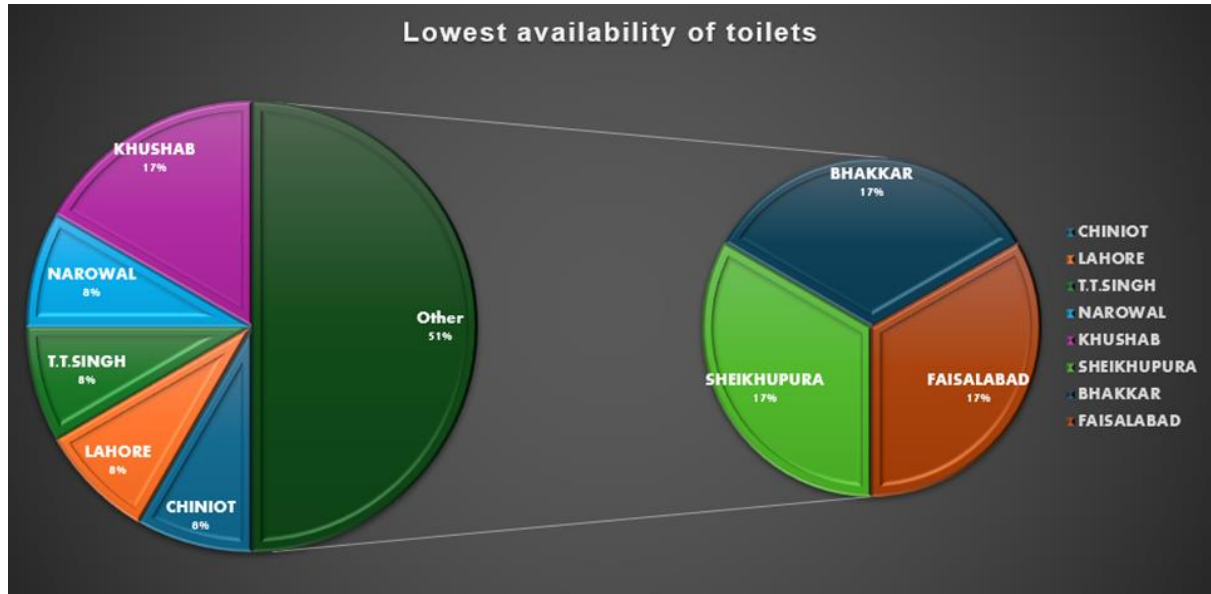
## Districts with Lowest Boundary Wall Presence:

Bhakkar, Kasur, Jehlum, Chiniot and Chakwal have the fewest boundary walls in schools.



## Districts with Lowest Toilet Availability:

Following are the cities that have the least access to toilet facilities.



#### 4. Fund Allocation School Level Upgradation:

A total of 10 million Rs. is allocated for upgrading schools, driven by trends in school enrollment and the identification of key districts that require enhancements.

**Infrastructure:** The allocation of 5 million Rs. for essential facilities is justified by highlighting the deficiencies in boundary walls, classroom functionality, and overall building conditions in the targeted districts.

**Basic Facilities (2 million Rs.):** There is a pressing need for water, electricity, and playgrounds in underfunded rural schools, particularly those with a higher number of students.

**Rural Gender-Specific Schools (20 million Rs.):** The necessity for middle and high schools in rural areas is underscored, with a specific focus on the demand for female-only institutions.

**New Primary Schools (10 million Rs.):** Areas with limited access to primary education were identified, supported by data on enrollment and the locations of rural schools.

#### 5. Data-Driven Marketing Strategies Targeted Outreach Campaigns:

Regional campaigns should be suggested to raise awareness about the newly upgraded or newly constructed facilities.

**Engagement Programs:** Initiatives that involve local leaders or community members in rural districts can be proposed to highlight the positive impact on girls' education and teacher recruitment.

**Social Media & Traditional Marketing:** Emphasizing social media campaigns that showcase infrastructure improvements can target local stakeholders and parents to boost enrollment.



## 6. Budget Plan for Optimal Resource Allocation:

A table or chart should be created to summarize the proposed allocation of the 3 million USD budget.

**Resource Distribution:** It is important to illustrate how funds will be distributed across districts based on the identified needs.

**Cost Efficiency:** A demonstration that all funds will be fully utilized is necessary, with a strategic focus on districts that have the greatest needs.

### Summary of Analysis Impact Overview

This section will highlight how the proposed investments aim to bridge the gaps in educational access, safety, and quality.

#### **Expected Outcomes:**

We outlined the expected results, including increased enrollment rates, improved student retention, enhanced academic performance, and higher teacher retention rates in rural districts.

**Visual Support Incorporate charts** and tables derived from pivot tables is inserted in excel sheets and dashboard as well as above to visually emphasize key findings, such as:

- Distribution of Schools categorized by gender, location, and school level.
- Availability of Facilities by district.
- Comparison of Vacant vs. Non-Vacant Positions in teaching and non-teaching roles.
- Ratings of Building Conditions and Security Measures.