WOMEN AND CHILD DEVELOPMENT

1.Project Overview and Objective

This project focuses on cleaning, transforming, and analysing government health data related to pregnant and lactating women enrolled in Anganwadi centers using Microsoft Excel and Power BI.

The primary objective of this project is to demonstrate effective **data pre-processing techniques using Excel** and to develop an **interactive Power BI dashboard** that enables stakeholders to analyze enrollment patterns, identify regional variations, and support informed decision-making in maternal and child welfare programs.

2.Data Sources

Source Description and Timeline:

- Source: Telangana Government Open Data Portal (Anganwadi dataset)
- Data Period: 2025

Domain:

- Women and child development Analytics

The dataset contains district, project, sector, and Anganwadi center-level information on pregnant and lactating women enrollments.

3. Problem Statement

The objective of this analysis is:

- To analyze the enrollment of pregnant and lactating women across districts and projects.
- To identify high-performing and low-performing districts and projects.
- To study month-wise and district-wise enrollment trends.
- To support data-driven decisions for targeted interventions, awareness programs, and efficient resource allocation in Anganwadi centers.

4. Attribute (Column / Feature) Details

Attribute Name	Data Type	Description
Reporting_Year	Integer	Year of data reporting
Reporting_Month	Integer	Month of data reporting
D_Name	Text	District name
Proj_Name	Text	Project name
Sec_Name	Text	Sector name
AWC_ID	Integer	Unique Anganwadi Center ID
AWC_Name	Text	Name of the Anganwadi center
Tot_PW	Integer	Total pregnant women
Tot_LW	Integer	Total lactating women
Tot_SC_PW	Integer	SC pregnant women
Tot_ST_PW	Integer	ST pregnant women
Tot_BC_PW	Integer	BC pregnant women
Tot_OC_PW	Integer	OC pregnant women
Tot_SC_LW	Integer	SC lactating women
Tot_ST_LW	Integer	ST lactating women
Tot_BC_LW	Integer	BC lactating women
Tot_OC_LW	Integer	OC lactating women
Total_Beneficiaries	Integer	Calculated field (Tot_PW + Tot_LW)

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5. Tools & Technologies

- **Microsoft Excel**
  - Data cleaning and transformation
  - Calculated fields
  - Pivot Tables and Pivot Charts
- **Power BI**
  - Data modelling
  - DAX calculations
  - Interactive visualizations and dashboards

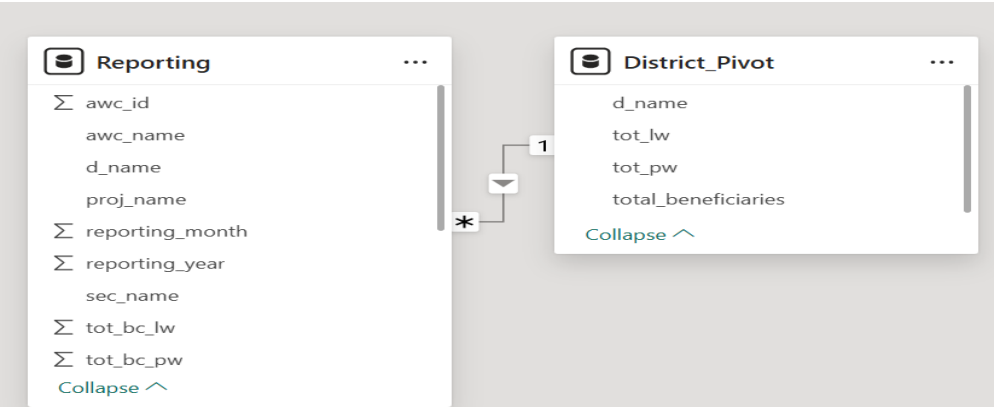
6. Data Pre-Processing (Excel / Power Query)

Tasks Performed:

- **Data Cleaning & Transformation**
  - Removed duplicate records
  - Handled missing values
  - Standardized column names and formats
  - Ensured numeric consistency
- **Calculated Fields**
  - Created **Total_Beneficiaries = Tot_PW + Tot_LW**
- **Filtering & Sorting**
  - Organized data by district, project, and reporting period
- **Pivot Tables**
  - District-wise summary
  - Project-wise performance

7. Data Modelling and DAX (Power BI)

Data Model: Reporting table used as fact table and Relationships established using District



DAX Measures Created:

- Total Pregnant Women= **sum(Reporting[tot_pw])**
- Total Lactating Women= **sum(Reporting[tot_lw])**
- Total Beneficiaries =**[total_lactating_women]+[Total_Pregnant_Women]**
- Total Districts= **DISTINCTCOUNT(Reporting[d_name])**
- Total Projects=**DISTINCTCOUNT(Reporting[proj_name])**
- Average Beneficiaries per Awc=**AVERAGEX(VALUES(Reporting[awc_id]),[Total_beneficiaries])**

- Total SC =sum(Reporting[tot_sc_pw])+sum(Reporting[tot_sc_lw])
- Total BC = SUM(Reporting[tot_bc_lw])+sum(Reporting[tot_bc_pw])
- Total OC=sum(Reporting[tot_oc_pw])+sum(Reporting[tot_oc_lw])
- Total ST= SUM(Reporting[tot_st_lw])+SUM(Reporting[tot_st_pw])

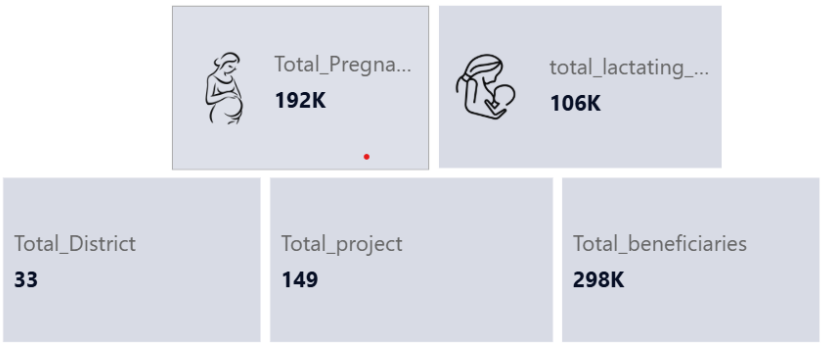
8. Analysis and Visualizations (Power BI)

Analysis

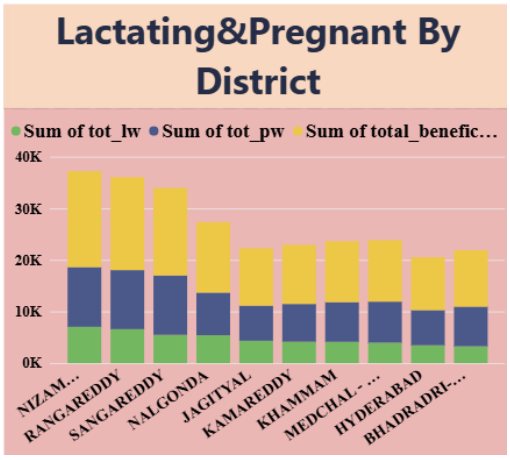
- Overall reporting
- Caste wise reporting

Visualizations Used:

- Cards: Total Beneficiaries, PW, LW, Districts, Projects



- Stacked Column Chart: District-wise beneficiaries



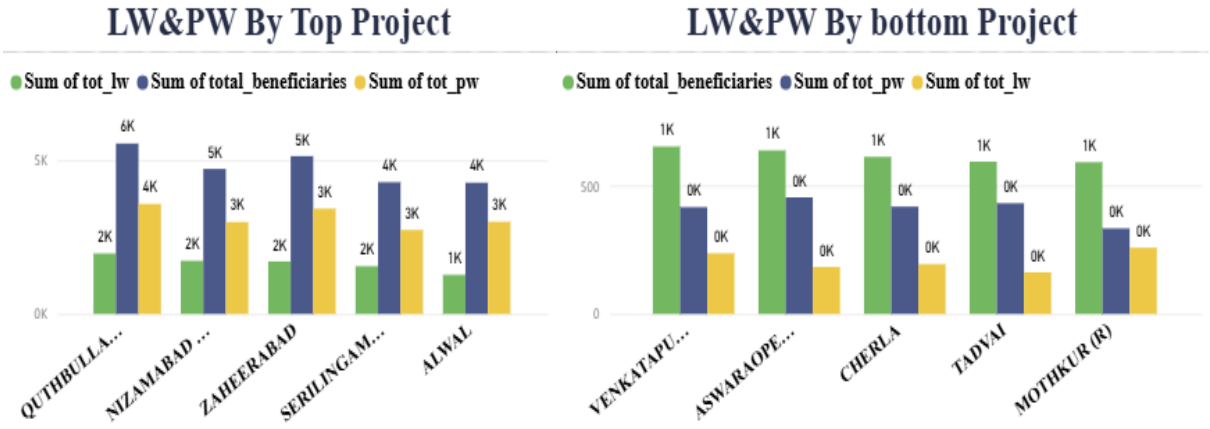
Insights:

- Nizamabad **, Rangareddy, and Sangareddy** emerge as the top-performing districts. These districts have the **highest total beneficiaries**, driven by consistently high counts of both pregnant and lactating women.

Nizamabad (19k) beneficiaries in this district total pregnant women(12k)and total lactating women(7k).

Rangareddy (18k) beneficiaries in this district pregnant women(11k)and lactating women(7k), Sangareddy(17k)beneficiaries in this district pregnant women(12k),lactating women(5k).

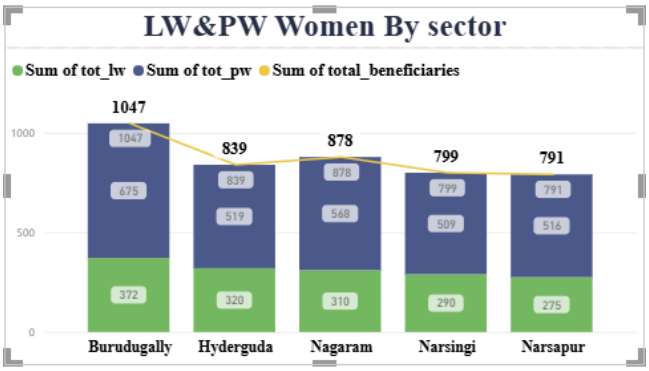
- Bar Chart: Project-wise performance



Insights LW & PW by Top and Bottom Projects

- The comparison clearly highlights a **wide performance gap** between top-performing and bottom-performing projects. While top projects record beneficiary counts in the range of **4K–6K**, bottom projects remain around **1K or less**, indicating uneven project-level implementation.

- Line and stacked column chart: sector wise performance

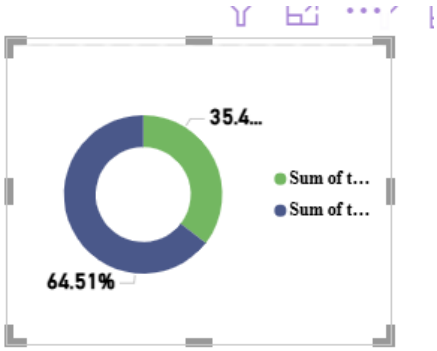


Insight Sector-wise Enrollment Variation

- The chart highlights noticeable differences in total beneficiary enrollment across sectors. **Burudugally** emerges as the highest-performing sector, while **Narsapur** shows the lowest overall enrollment among the sectors presented under Top 5 sectors.
- **Burudugally** records the highest total beneficiaries (1047), A high number of pregnant women (675), A comparatively strong enrollment of lactating women (372)

- The balanced contribution indicates effective sector-level outreach and service delivery.

Donut Chart: Pregnant vs Lactating distribution



Insights

The visualization shows that **pregnant women account for approximately 64.5%** of the total beneficiaries, while **lactating women constitute about 35.5%**. This indicates that nearly two-thirds of the enrolled beneficiaries are pregnant.

Interactivity:

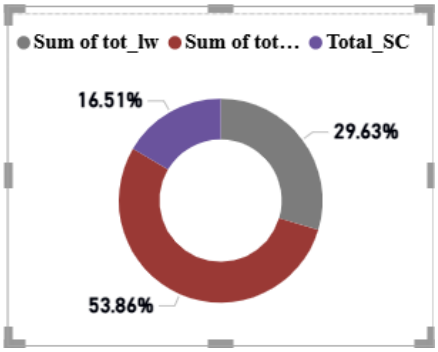
- Slicers: District, Project
- Cross-filtering across visuals
- Clear titles, legends, and labels
- Bookmarks for navigation

Analysis-Lw&Pw by SC

- DONUT CHART

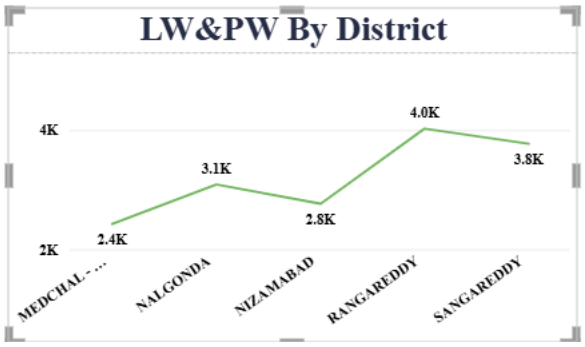
Insights

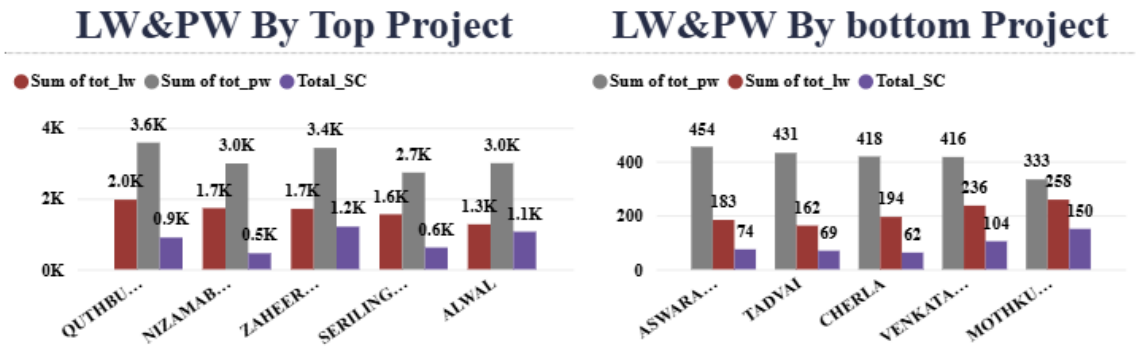
Total_SC (≈16.51%) **contributes the smallest share, suggesting it has a relatively limited impact compared to the other two components.**



Insight from "LW & PW(SC) by District"

- **Rangareddy (≈4.0K)** records the highest LW & PW value, indicating the greatest workload or activity concentration among the districts.
- **Sangareddy (≈3.8K)** follows closely, showing consistently high levels and suggesting strong operational demand in this district.
- **Nalgonda (≈3.1K)** demonstrates moderate activity, positioned above the lower-performing districts but well below the top two.





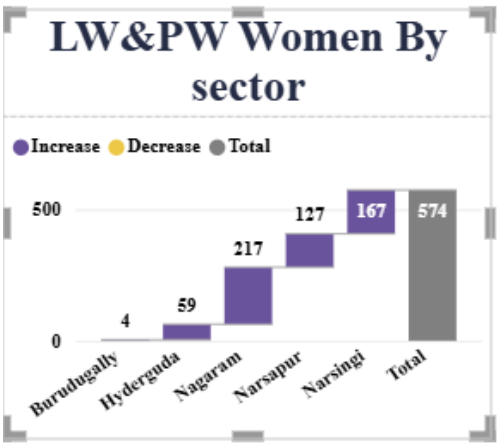
Top Projects

- **QUTHBULLAPUR** shows the highest overall activity, driven primarily by **PW (~3.6K)**, with a strong **LW (~2.0K)** contribution, indicating intensive workforce utilization.
- **Nizamabad** and **Zaheerabad** display balanced performance, where PW remains the dominant factor, supported by moderate LW and SC values.
- **Serilingampally** and **Alwal** have comparatively lower totals among the top projects, but still maintain a consistent mix of PW, LW, and SC, suggesting stable operations.

Bottom Projects

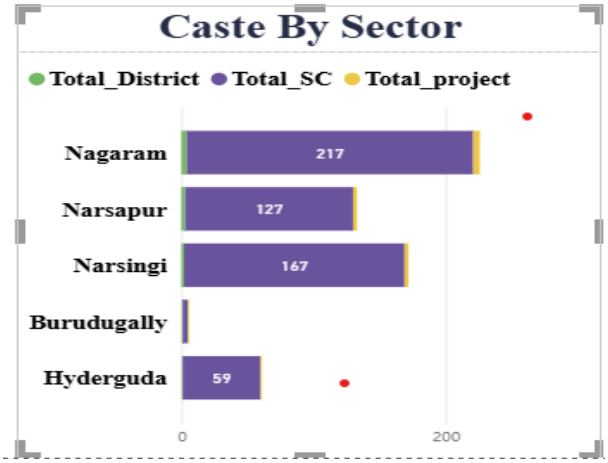
- **Aswaraopet** records the highest PW (~454) within the bottom group, yet LW and SC remain relatively low, reflecting limited scale rather than inefficiency.
- **Tadvai** and **Cherla** show declining trends across all three measures, indicating reduced operational activity.

Insight from "LW & PW (SC)Women by Sector"



The **overall total (≈574)** indicates a positive net increase in women's involvement across sectors.

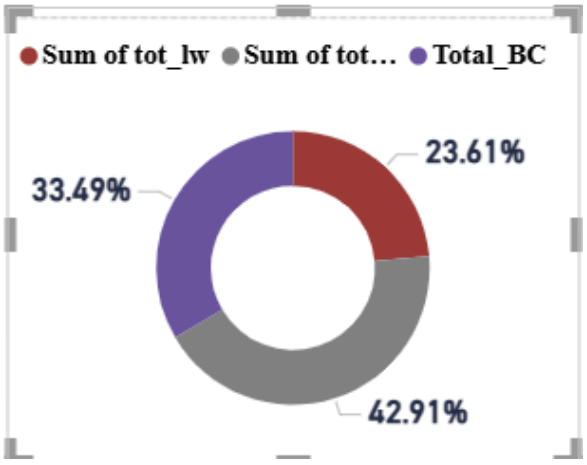
Insight from “Caste by Sector”



- **Nagaram (≈217)** records the highest representation, making it the leading sector in terms of caste-wise participation across district, SC, and project levels.
- **Narsingi (≈167)** and **Narsapur (≈127)** follow, indicating substantial participation but at a noticeably lower level than Nagaram.
- **Hyderguda (≈59)** shows limited representation, suggesting comparatively lower outreach or engagement.

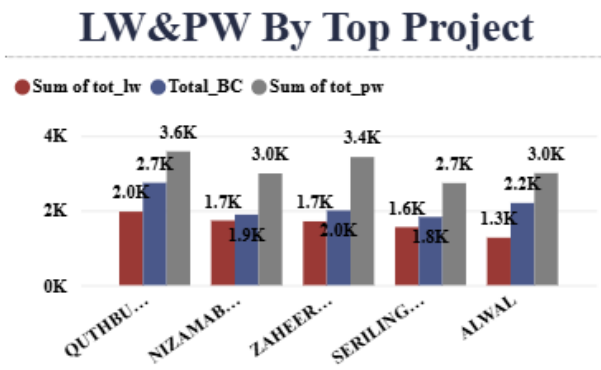
Analysis-Lw&Pw by BC

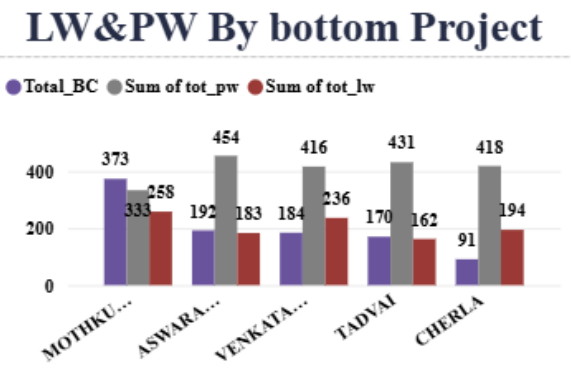
INSIGHT:**DONUT CHART**



Total_BC (≈33.49%) forms a substantial portion, reflecting strong participation or coverage within the BC category.

Insights from "LW & PW by Top Project" and "LW & PW by Bottom Project"





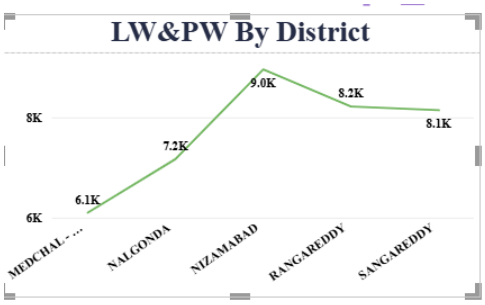
Top Projects

- **Quthbullapur** leads overall performance, driven by the highest **PW (~3.6K)** and strong **BC (~2.7K)**, along with substantial **LW (~2.0K)**. This indicates a well-balanced and high-scale project.
- **Nizamabad** and **Zaheerabad** show solid performance with PW as the dominant component, supported by moderate BC and LW contributions.
- **Serilingampally** and **Alwal** record comparatively lower totals among the top group, but still demonstrate consistent participation across PW, LW, and BC.

Bottom Projects

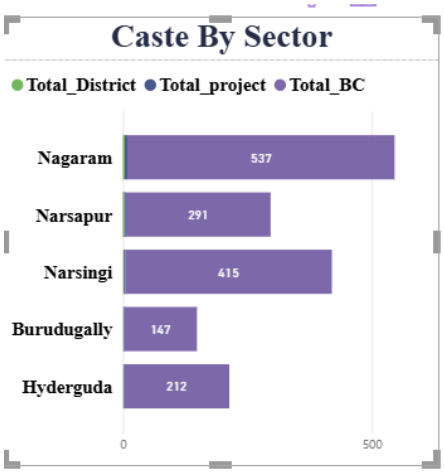
- **Aswaraopet** has the highest PW (~454) among bottom projects, yet relatively lower BC and LW, indicating limited scale rather than inefficiency.
- **Venkatanagaram** and **Tadvai** show moderate PW levels but weak BC and LW contributions, suggesting underutilized workforce or limited outreach.
- **Mothkur** and **Cherla** are the lowest performers, particularly in BC and LW, highlighting minimal engagement and output.

Insight from "LW & PW(BC) by District"



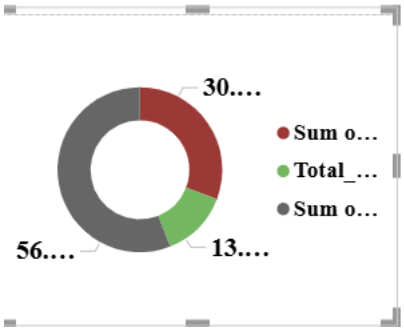
- **Nizamabad (≈9.0K)** records the highest LW & PW by (BC) value, indicating the strongest concentration of labor and project work among all districts.
- **Rangareddy (≈8.2K)** and **Sangareddy (≈8.1K)** follow closely, reflecting consistently high activity levels, though slightly below Nizamabad.

Insight: Caste by Sector Analysis



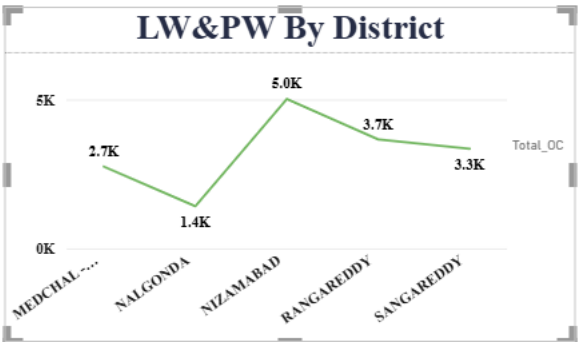
- **Nagaram** records the highest count of BC beneficiaries/projects (**537**), indicating a strong concentration of activity and outreach in this sector.
- **Narsingi** follows with a substantial count (**415**), suggesting it is another key focus area for BC-related initiatives.
- **Narsapur** (**291**) and **Hyderguda** (**212**) show moderate levels of representation, indicating comparatively balanced but lower engagement.

Analysis- Lw& Pw by OC



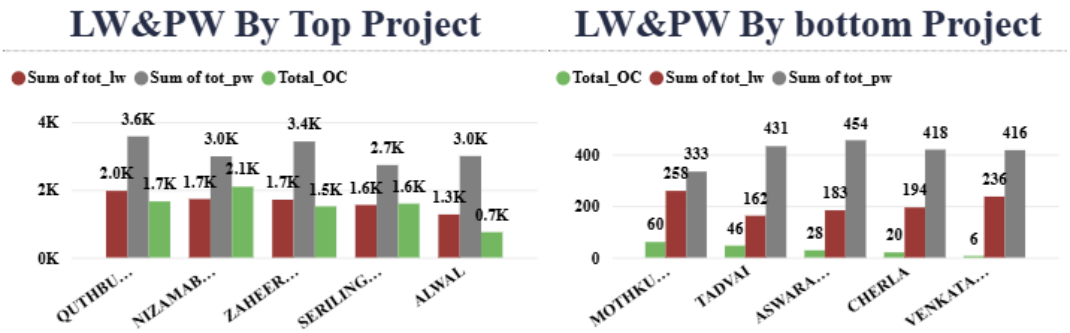
Total_OC(≈13.17%) forms the smallest share about reflecting comparatively limited contribution or coverage.

Insight: OC (LW & PW) by District



- **Nizamabad** records the highest OC count at approximately **5.0K**, indicating the strongest concentration of LW & PW cases/projects among all districts.
- **Rangareddy** follows with around **3.7K**, showing consistently high OC representation.
- **Sangareddy** (**3.3K**) and **Medchal** (**2.7K**) fall in the mid-range, reflecting moderate OC distribution.

Insight: LW & PW by Top and Bottom Projects



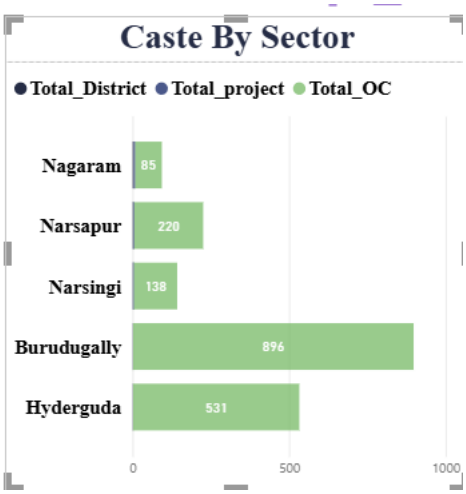
Top Projects

- **Quthbullapur** shows the highest **PW** count (≈ **3.6K**) with strong **LW** (**~2.0K**) and moderate **OC** (**~1.7K**), indicating overall high activity across categories.
- **Nizamabad** and **Zaheerabad** demonstrate balanced but slightly lower totals, with **PW** remaining the dominant component in both.

Bottom Projects

- Projects such as **Mothkur**, **Tadvai**, **Aswaraopet**, **Cherla**, and **Venkatapur** show **very low OC values** (mostly below **60**), while **PW** remains the highest component in each.
- **Aswaraopet** and **Cherla** have relatively higher **PW** (above **400**) but weak **LW** and minimal **OC**, indicating limited overall project penetration.

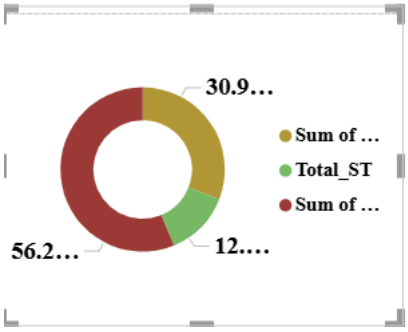
Insight: Caste by Sector – OC Distribution



- **Burudugally** records the highest OC count (**896**), indicating a strong concentration of OC beneficiaries/projects in this sector.
- **Hyderguda** follows with a substantial OC count (**531**), making it the second most significant sector for OC representation.
- **Narsapur** shows a moderate OC presence (**220**), suggesting balanced but lower engagement.

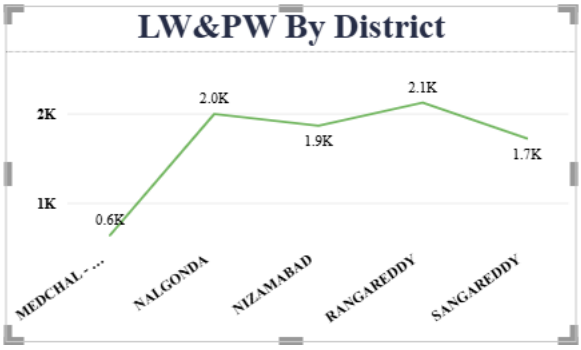
Analysis-Lw&Pw by ST

Insights



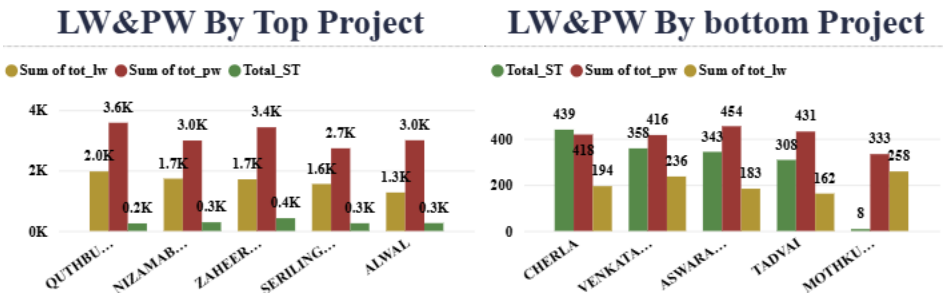
The **smallest segment (~12%)**, labeled **Total_ST**, highlights comparatively **low ST representation** in the overall distribution.

Insight: LW & PW by District (ST Category)



- **Rangareddy** records the highest ST count at approximately **2.1K**, indicating the strongest LW & PW representation for the ST category among the districts.
- **Nalgonda** (**2.0K**) and **Nizamabad** (**1.9K**) follow closely, showing consistently high and stable ST participation.
- **Sangareddy** registers a slightly lower but still significant count (**1.7K**).

Insight: LW & PW by Top and Bottom Projects (ST Category)



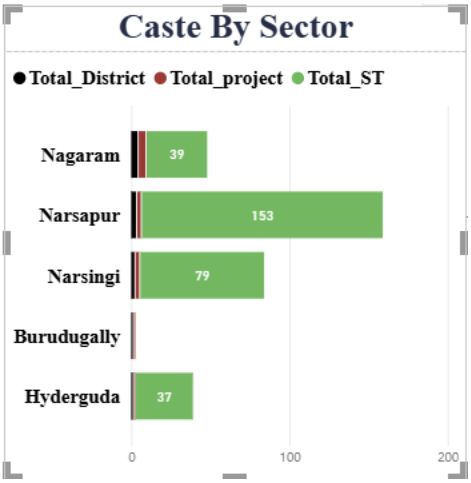
Top Projects

- **Quthbullapur** leads with the highest **PW** (**~3.6K**) and strong **LW** (**~2.0K**), but **ST representation is minimal** (**~0.2K**), indicating high overall activity with limited ST inclusion.
- **Nizamabad** and **Zaheerabad** show balanced LW and PW volumes; however, **ST counts remain below 0.5K**, reflecting underrepresentation.
- **Serilingampally** and **Alwal** maintain moderate LW and PW activity, yet **ST participation remains consistently low** across these high-performing projects.

Bottom Projects

- **Aswaraopet** and **Cherla** exhibit **relatively higher ST counts** (around **0.34K–0.44K**) compared to other bottom projects, despite lower LW and PW volumes.**Venkatapur** and **Tadvai** show moderate LW and PW but only **limited ST participation**.

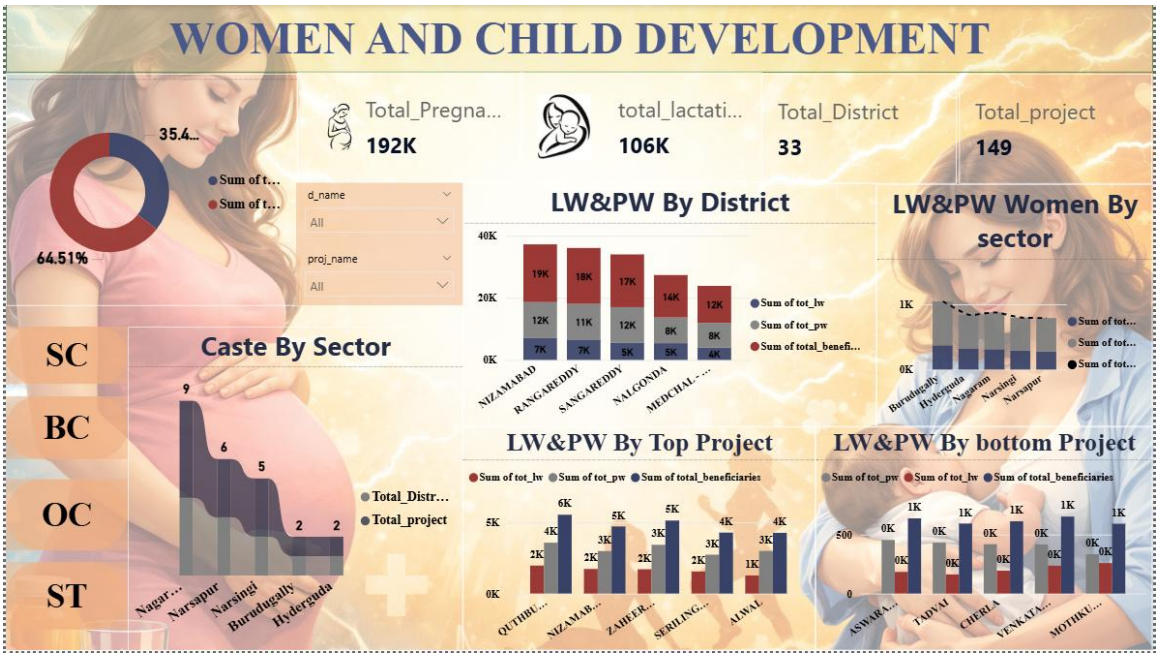
Distribution by Sector



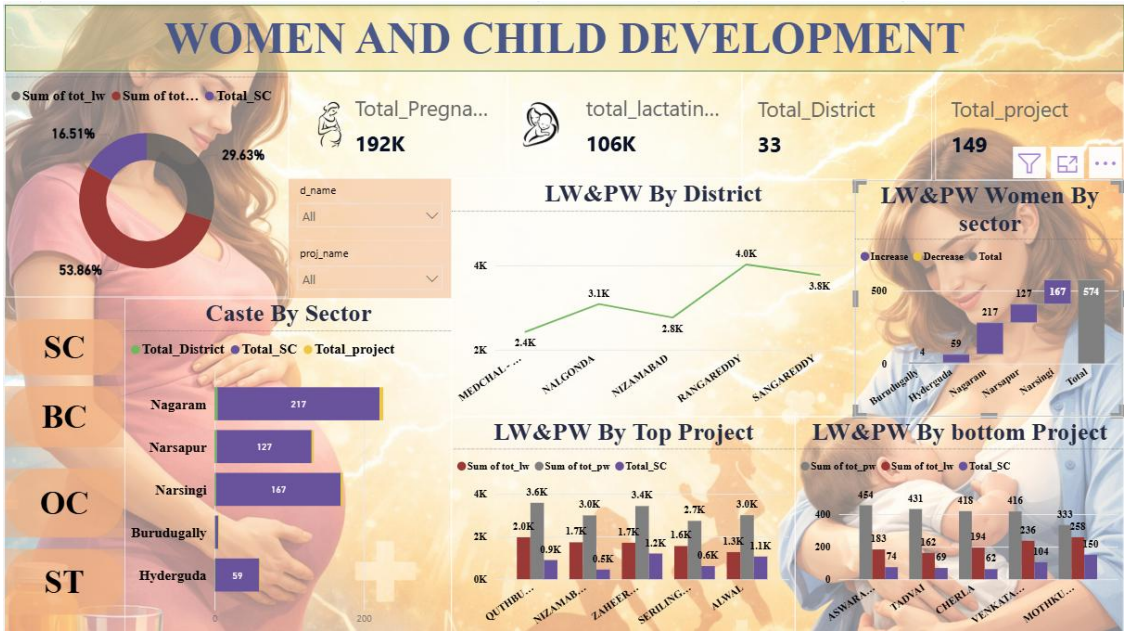
Narsapur has a very high Total _ST count (153) compared with all other sectors.Narsapur has a very high Total _ST count (153) compared with all other sectors.

9.INSIGHTS & CONCLUSION

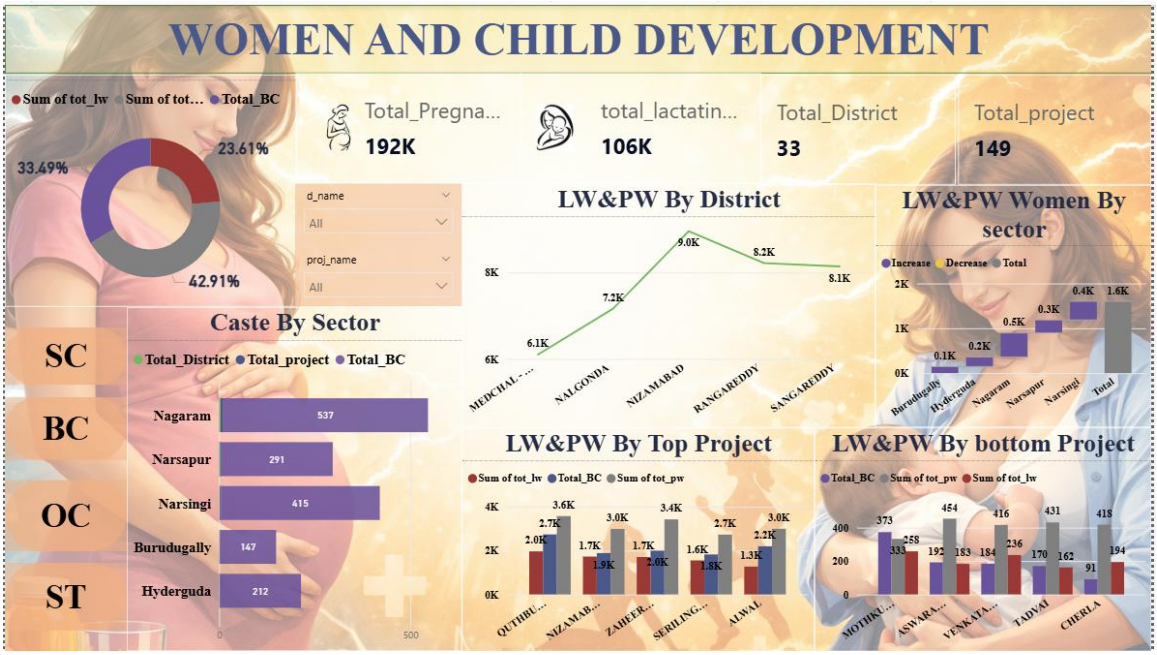
REPORTING



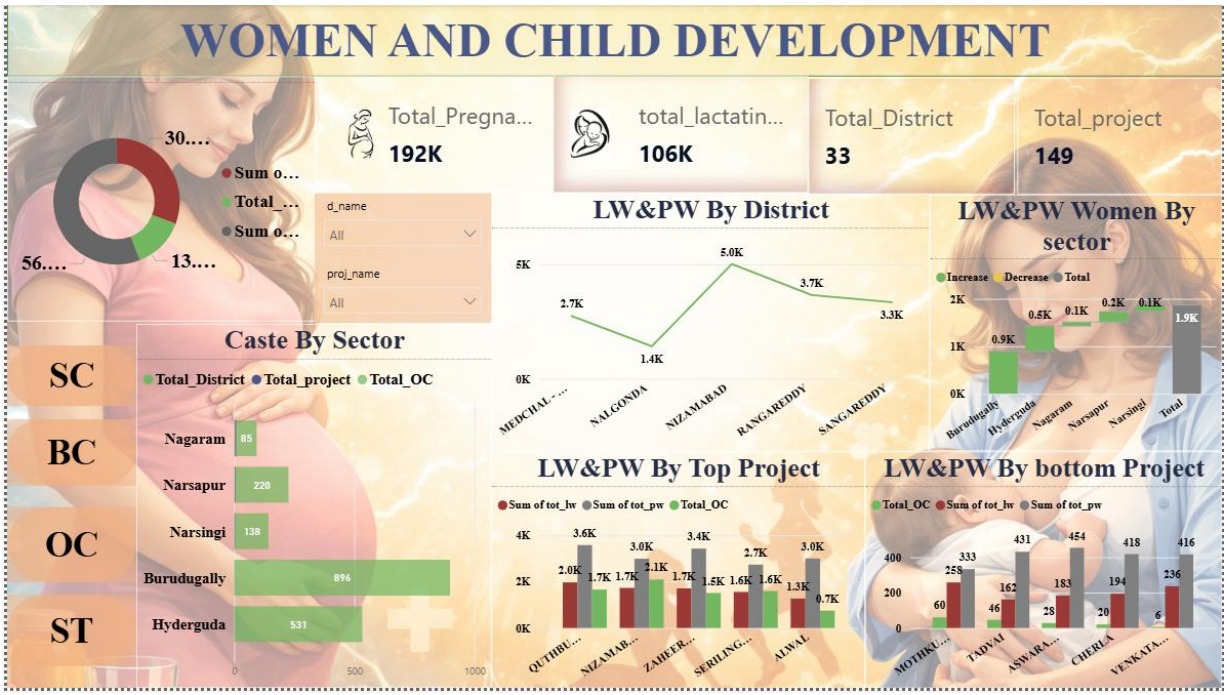
TOTAL LW&PW BY SC



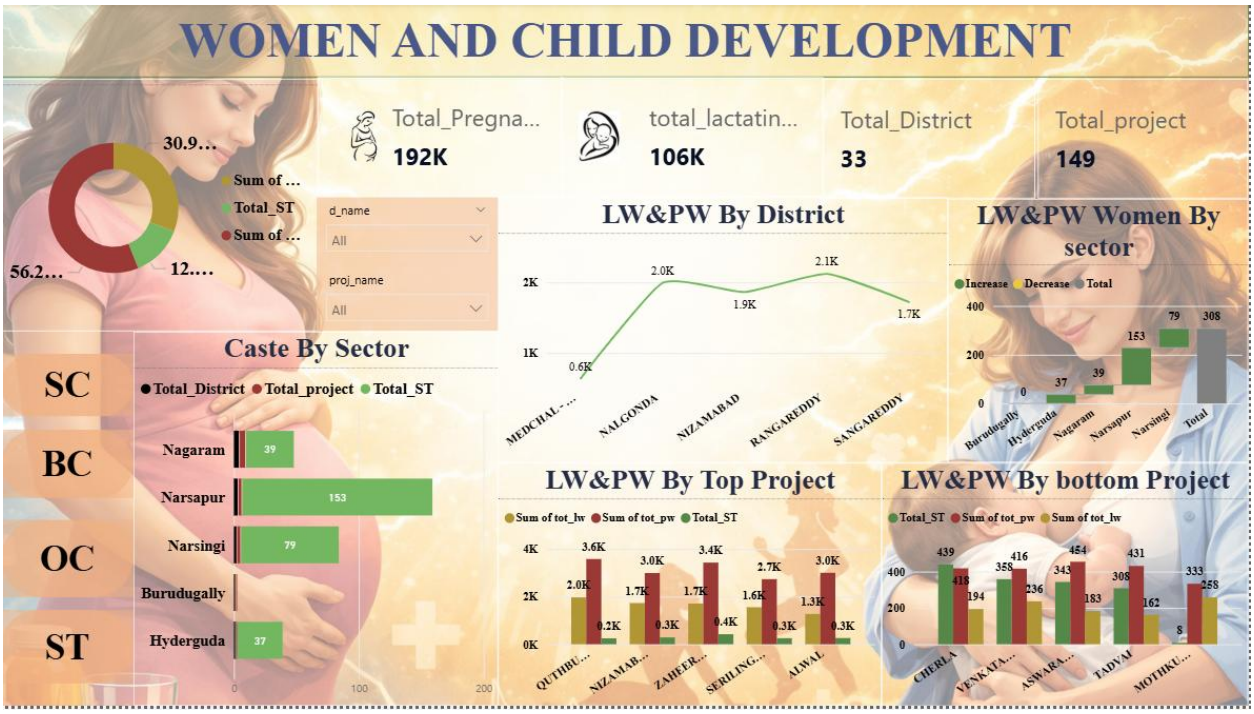
TOTAL LW&PW BY BC



TOTAL LW&PW BY OC



TOTAL LW&PW BY ST



Analysis Insight

1.Descriptive Insights (What happened?)

1. The dashboard indicates a **total of approximately 298k beneficiaries**, comprising **192k pregnant women** and **106k lactating women** across the reporting period.
2. The program coverage spans **33 districts** and **149 projects**, reflecting wide geographical implementation.
3. **Pregnant women constitute about 64.5%** of total beneficiaries, while **lactating women account for 35.5%**.
4. District-wise analysis shows **Nizamabad, Rangareddy, and Sangareddy** as the top-performing districts in terms of total beneficiaries.
5. Sector-wise analysis highlights **Burudugally** as the highest-performing sector, while **Narsapur** and **Narsingi** show relatively lower enrollment.
6. Project-wise comparison reveals significant differences between top projects (Quthbullapur, Nizamabad, Zaheerabad) and bottom projects (Venkatapur, Aswaraopeta, Cherla).
7. Caste-based analysis indicates higher beneficiary presence in **SC and BC categories**, followed by OC and ST categories.

2. Diagnostic Insights (Why did it happen?)

1. Higher enrollment in top districts is likely driven by **better outreach mechanisms, higher population density, and efficient reporting systems**.
2. The consistent dominance of pregnant women enrollment suggests **strong antenatal registration processes**, while comparatively lower lactating women numbers point to **gaps in post-natal follow-up**.
3. Sector-level variation indicates differences in **operational efficiency and Anganwadi center performance**.
4. Low-performing projects may be affected by **limited awareness, accessibility challenges, or data under-reporting**.
5. Caste-wise disparities suggest that **socio-economic and geographic factors** influence beneficiary participation across sectors.

3. Predictive Insights (What is likely to happen?)

1. If current trends continue, **high-performing districts and projects will continue to contribute the majority of beneficiaries**, widening the gap with low-performing areas.
2. Pregnant women enrollment is expected to **remain higher than lactating women enrollment** unless targeted post-natal interventions are introduced.

3. Without focused interventions, **low-performing sectors and projects may continue to show stagnant or minimal growth**.
4. Overall beneficiary counts are likely to **increase gradually**, driven primarily by antenatal registrations.

4. Prescriptive Insights (What should be done?)

1. **Low-performing districts, sectors, and projects** should be prioritized for targeted awareness campaigns and operational support.
2. Strengthening **post-natal tracking and follow-up mechanisms** can help improve lactating women enrollment.
3. Best practices from **high-performing districts and projects** should be documented and replicated across weaker regions.
4. Resource allocation, including staffing and monitoring efforts, should be aligned with **beneficiary load and performance gap.**

Conclusion

This project successfully demonstrates an end-to-end data analytics workflow by integrating **Excel for data preprocessing** and **Power BI for interactive visualization and analysis**. Raw government data related to pregnant and lactating women enrolled in Anganwadi centers was cleaned, transformed, and structured to ensure accuracy, consistency, and reliability.

Through descriptive analysis, the dashboard highlighted overall program coverage, district-wise and project-wise performance, and sector- and caste-level distributions. Diagnostic analysis revealed significant regional and operational disparities, particularly between high- and low-performing districts, sectors, and projects, as well as a consistent gap between pregnant and lactating women enrollment. Predictive insights indicated that without targeted interventions, existing performance patterns are likely to persist, with growth driven mainly by antenatal registrations. Prescriptive insights emphasized the need for focused awareness programs, improved post-natal follow-up, and resource reallocation to underperforming areas.

Overall, the project confirms that **Excel is effective for data cleaning and initial analysis**, while **Power BI enhances insight generation through interactive dashboards, drill-downs, and dynamic filtering**. The combined use of these tools enables data-driven decision-making and provides a scalable framework for continuous monitoring and improvement of women and child development programs.