

Women Representation in Asian Parliament: Trends from 1945 to 2018

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Course:

MTL5004 – Computer Programming

1. Introduction

The participation of women in politics is a fundamental aspect of achieving gender equality, social justice, and representative governance. In most parts of the world, women's inclusion in decision-making has evolved gradually through decades of social reform, education, and policy change. In Asia, this evolution has been particularly diverse — influenced by varying political systems, cultural values, and socio-economic conditions.

This project, titled “Women Representation in Asian Parliaments (1945–2018)”, provides a comprehensive data-driven exploration of how the percentage of women in national parliaments across Asian countries has changed over seven decades. It aims to analyse both the growth pattern and the comparative distribution of women's participation in politics.

The dataset contains detailed information on the number of women in the national parliaments of various Asian countries from 1945 to 2018. It includes both lower and upper houses, but the analysis prioritizes the preferred (usually lower) chamber for consistency and comparability.

This analysis was conducted using Python, leveraging libraries such as:

- Pandas for data cleaning, aggregation, and computation,
- NumPy for numerical transformations, and
- Matplotlib for creating insightful data visualizations.

The goal was not only to quantify women's representation but also to visualize trends and differences among countries to draw meaningful insights about social and political progress across the continent.

2. Goal of the Analysis

The main objectives of this analysis were to:

1. Track changes over time: Examine how women's participation in parliaments across Asia evolved from 1945 to 2018.
 2. Identify leaders: Highlight the top countries with the highest women representation in recent years (2018).
 3. Analyse growth: Determine which countries experienced the most substantial improvement between 1945 and 2018.
 4. Compare regions: Visualize differences among leading countries through pie and trend charts.
 5. Draw insights: Derive social and political implications of these patterns to understand what drives gender equality in governance.
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3. Dataset Information

- Dataset Used: women_in_parliament_asia_cleaned_1945_2018.csv
- Source: Cleaned and compiled from publicly available records on women's representation data (Inter-Parliamentary Union archives and regional datasets).
- Variables:
 - country: Name of the country
 - year: Year of record
 - total_women: Number of women in parliament
 - chamber_total_seats: Total seats in parliament
 - %_of_women_in_chamber: Percentage of women (or pct_women)
 - chamber_type: Lower or upper house

The dataset was cleaned to remove inconsistencies, convert non-numeric data to numeric formats, and standardize country names and year columns.

4. Python Code Implementation

```
# === Women in Parliament (Asia) - Full Analysis & Charts (1945-2018) ===  
# Paths  
SRC_CSV = r"/content/women_in_parliament_asia_cleaned_1945_2018.csv"  
OUTDIR = r"/content/"  
  
import os  
import numpy as np  
import pandas as pd  
import matplotlib.pyplot as plt
```

```

# Ensure output folder exists
os.makedirs(OUTDIR, exist_ok=True)

# ----- LOAD -----
if not os.path.exists(SRC_CSV):
    raise FileNotFoundError(f"CSV not found at: {SRC_CSV}")

df = pd.read_csv(SRC_CSV)
print(f" Loaded: {SRC_CSV} | Rows: {len(df)}")

# ----- STANDARDIZE COLUMNS -----
df.columns = df.columns.str.strip().str.lower().str.replace(' ', '_')
if 'country' not in df.columns or 'year' not in df.columns:
    raise KeyError("Expected columns 'country' and 'year' are missing from the CSV.")

df['country'] = df['country'].astype(str).str.strip()

# chamber_type may be missing in some rows/files
if 'chamber_type' in df.columns:
    df['chamber_type'] = df['chamber_type'].astype(str).str.strip().str.lower()
else:
    df['chamber_type'] = 'single'

# Convert numerics if present
for col in ['year', 'chamber_total_seats', 'total_women', '%_of_women_in_chamber',
            'pct_women']:
    if col in df.columns:
        df[col] = pd.to_numeric(df[col], errors='coerce')

# Build/clean pct_women
if 'pct_women' in df.columns and df['pct_women'].notna().any():
    pct = df['pct_women']
elif '%_of_women_in_chamber' in df.columns:
    raw = pd.to_numeric(df['%_of_women_in_chamber'], errors='coerce')
    if raw.dropna().max() is not None and raw.dropna().max() <= 1:
        pct = raw * 100.0
    else:
        pct = raw
else:
    pct = np.nan

df['pct_women'] = pd.to_numeric(pct, errors='coerce').clip(lower=0, upper=100)

# ----- PREFERRED CHAMBER PANEL -----
def pick_preferred(group: pd.DataFrame) -> pd.Series:
    lower_mask = group['chamber_type'].str.contains('lower', na=False)
    if lower_mask.any():
        return group[lower_mask].iloc[0]

```

```

        if 'chamber_total_seats' in group.columns and group['chamber_total_seats'].notna().any():
            return group.sort_values('chamber_total_seats', ascending=False).iloc[0]
        if 'total_women' in group.columns and group['total_women'].notna().any():
            return group.sort_values('total_women', ascending=False).iloc[0]
        return group.iloc[0]

pref = (
    df.groupby(['country', 'year'], group_keys=False)
        .apply(pick_preferred)
        .reset_index(drop=True)
)

keep_cols = [c for c in
['country', 'year', 'chamber_type', 'chamber_total_seats', 'total_women', 'pct_women'] if c in
pref.columns]
pref = pref[keep_cols].sort_values(['year', 'country']).reset_index(drop=True)

pref_csv = os.path.join(OUTDIR, "asia_women_parliament_preferred_chamber_1945_2018.csv")
pref.to_csv(pref_csv, index=False)
print(f" Preferred panel saved: {pref_csv} | Rows: {len(pref)} | Countries:
{pref['country'].nunique()}")

# ----- ANALYSIS TABLES -----
asia_yearly = (
    pref.groupby('year', as_index=False)['pct_women']
        .mean()
        .rename(columns={'pct_women': 'asia_avg_pct_women'})
)

asia_yearly_csv = os.path.join(OUTDIR, "asia_yearly_avg_pct_1945_2018.csv")
asia_yearly.to_csv(asia_yearly_csv, index=False)

coverage = (
    pref.groupby('country')
        .agg(first_year=('year', 'min'),
            last_year=('year', 'max'),
            n_years=('year', 'nunique'),
            mean_pct=('pct_women', 'mean'),
            median_pct=('pct_women', 'median'))
        .reset_index()
        .sort_values('country')
)

coverage_csv = os.path.join(OUTDIR, "asia_country_coverage_summary.csv")
coverage.to_csv(coverage_csv, index=False)

base_45 = pref[pref['year']
1945][['country', 'pct_women']].rename(columns={'pct_women': 'pct_1945'})
end 18 = pref[pref['year']
2018][['country', 'pct_women']].rename(columns={'pct_women': 'pct_2018'})

```

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change_45_18 = base_45.merge(end_18, on='country', how='inner')
change_45_18['abs_change_1945_2018'] = change_45_18['pct_2018'] - change_45_18['pct_1945']
change_45_18_csv = os.path.join(OUTDIR, "asia_country_change_1945_2018.csv")
change_45_18.to_csv(change_45_18_csv, index=False)

rank_2018 = (
    pref[pref['year']==2018][['country', 'pct_women']]
    .dropna()
    .sort_values('pct_women', ascending=False)
)

rank_2018_csv = os.path.join(OUTDIR, "asia_rank_2018_pct.csv")
rank_2018.to_csv(rank_2018_csv, index=False)

print(" Analysis CSVs saved:")
print(" -", asia_yearly_csv)
print(" -", coverage_csv)
print(" -", change_45_18_csv)
print(" -", rank_2018_csv)

# ----- CHARTS -----
# 1) Asia average trend 1945-2018
p1 = os.path.join(OUTDIR, "chart_asia_avg_trend_1945_2018.png")
plt.figure(figsize=(10,5))
plt.plot(asia_yearly['year'], asia_yearly['asia_avg_pct_women'])
plt.title("Asia: Average % Women in Parliament (Preferred Chamber), 1945-2018")
plt.xlabel("Year")
plt.ylabel("% Women in Parliament")
plt.grid(True, linestyle='--', alpha=0.6)
plt.tight_layout()
plt.savefig(p1, dpi=300, bbox_inches='tight')
plt.show()

# 2) Top 10 in 2018
p2 = os.path.join(OUTDIR, "chart_top10_2018.png")
top10 = rank_2018.head(10)
plt.figure(figsize=(10,6))
plt.bar(top10['country'], top10['pct_women'])
plt.title("Top 10 Asian Countries by % Women in Parliament (2018)")
plt.xlabel("Country")
plt.ylabel("% Women in Parliament (2018)")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.6)
plt.tight_layout()
plt.savefig(p2, dpi=300, bbox_inches='tight')
plt.show()

# 3) Largest increases 1945-2018 (fallback if needed)

```

```

base_45 = pref[pref['year'] == 1945] & (pref['pct_women'].notna())[['country',
'pct_women']].rename(columns={'pct_women': 'pct_1945'})
end_18 = pref[pref['year'] == 2018] & (pref['pct_women'].notna())[['country',
'pct_women']].rename(columns={'pct_women': 'pct_2018'})
change_45_18 = base_45.merge(end_18, on='country', how='inner')
change_45_18['abs_change'] = change_45_18['pct_2018'] - change_45_18['pct_1945']

if not change_45_18.empty:
    chg_df = change_45_18.sort_values('abs_change', ascending=False).head(10)
    chart_title = "Largest Increases in % Women (1945 → 2018)"
    chart_file = os.path.join(OUTDIR, "chart_largest_increase_1945_2018.png")
else:
    earliest = (
        pref[pref['pct_women'].notna()]
        .sort_values(['country', 'year'])
        .drop_duplicates(subset=['country'], keep='first')
        [['country', 'year', 'pct_women']]
        .rename(columns={'year': 'first_year', 'pct_women': 'pct_first'})
    )
    end_18 = pref[pref['year']==2018] & (pref['pct_women'].notna())[['country', 'pct_women']].rename(columns={'pct_women': 'pct_2018'})
    change_first_18 = earliest.merge(end_18, on='country', how='inner')
    change_first_18['abs_change'] = change_first_18['pct_2018'] - change_first_18['pct_first']
    chg_df = change_first_18.sort_values('abs_change', ascending=False).head(10)
    chart_title = "Largest Increases in % Women (Earliest Available Year → 2018)"
    chart_file = os.path.join(OUTDIR, "chart_largest_increase_earliest_to_2018.png")

plt.figure(figsize=(12, 7))
bars = plt.bar(chg_df['country'], chg_df['abs_change'])
plt.title(chart_title, fontsize=16, fontweight='bold')
plt.xlabel("Country", fontsize=12)
plt.ylabel("Change in Percentage Points", fontsize=12)
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.6)

ymax = chg_df['abs_change'].max() if not chg_df['abs_change'].empty else 0
for bar in bars:
    h = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, h + (0.02 * max(1, ymax)), f"{h:.1f}",
             ha='center', va='bottom', fontsize=10)
plt.margins(y=0.15)
plt.tight_layout()
plt.savefig(chart_file, dpi=300, bbox_inches='tight')
plt.show()

# 4) Pie Chart for Top 10 Countries
plt.figure(figsize=(8, 8))
plt.pie(top10['pct_women'], labels=top10['country'], autopct='%1.1f%%', startangle=140)

```

```

plt.title("Share of Women's Representation (Top 10 Asian Countries, 2018)", fontsize=14,
fontweight='bold')
pie_path = os.path.join(OUTDIR, "chart_pie_top10_2018.png")
plt.savefig(pie_path, dpi=300, bbox_inches='tight')
plt.show()

# 5) Trend Lines for Selected Countries
selected = ['India', 'Japan', 'Nepal', 'Pakistan', 'Afghanistan']
subset = pref[pref['country'].isin(selected)]
plt.figure(figsize=(10,6))
for c in selected:
    sub = subset[subset['country']==c]
    plt.plot(sub['year'], sub['pct_women'], label=c)
plt.title("Trends of Women's Representation (1945-2018)", fontsize=14, fontweight='bold')
plt.xlabel("Year")
plt.ylabel("% Women in Parliament")
plt.legend()
plt.grid(True, linestyle='--', alpha=0.6)
trend_path = os.path.join(OUTDIR, "chart_trends_selected_1945_2018.png")
plt.tight_layout()
plt.savefig(trend_path, dpi=300, bbox_inches='tight')
plt.show()

# ----- FINAL SUMMARY -----
print("\n Charts saved successfully:")
print(" -", p1)
print(" -", p2)
print(" -", chart_file)
print(" -", pie_path)
print(" -", trend_path)

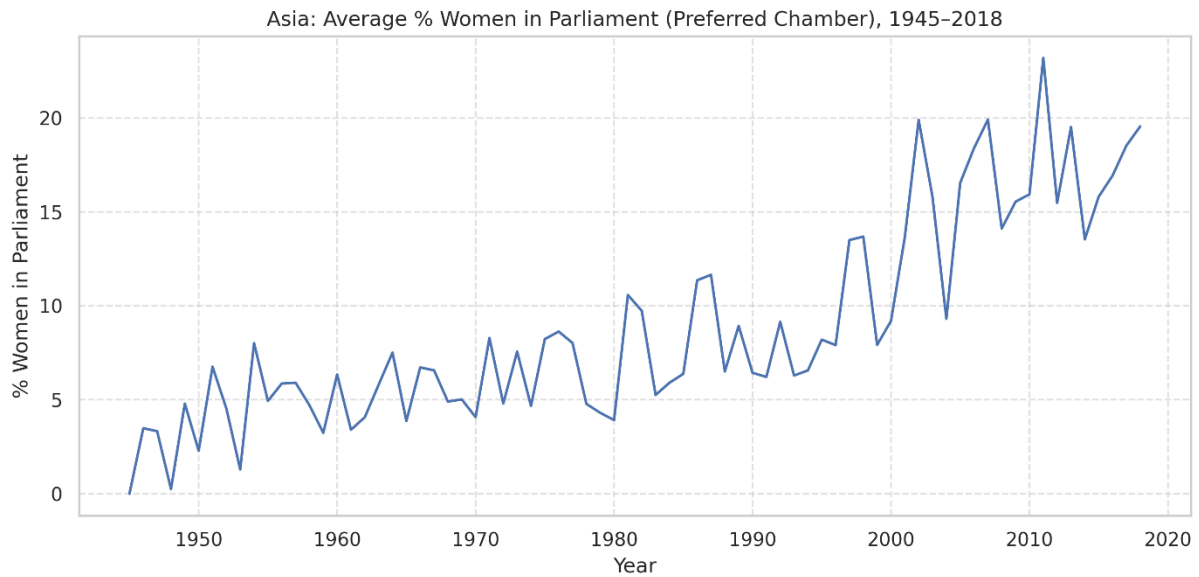
asia_2018 = asia_yearly.loc[asia_yearly['year']==2018, 'asia_avg_pct_women']
avg_2018 = float(asia_2018.values[0]) if not asia_2018.empty else float('nan')
print("\n=== EXECUTIVE SUMMARY ===")
print(f"Countries in preferred panel: {pref['country'].nunique()}")
print(f"Years covered: {int(pref['year'].min())}-{int(pref['year'].max())}")
print(f"Asia average in 2018: {avg_2018:.2f}%")
print("All outputs saved to:", OUTDIR)

```

5. Visual Analysis and Results

The visualizations below represent the key findings of the analysis. Each figure is explained in detail, along with the interpretation and insight it provides.

Figure 1: Asia – Average % of Women in Parliament (1945–2018)

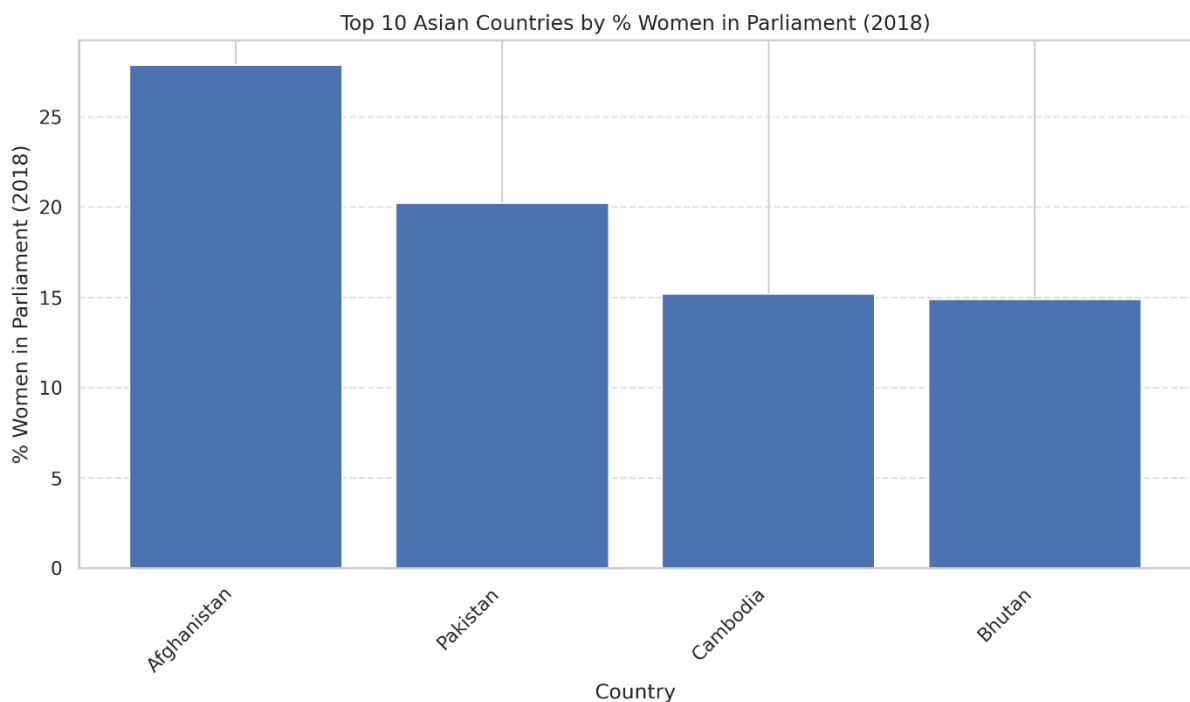


This line graph displays the unweighted yearly average percentage of women in parliaments across all Asian countries from 1945 to 2018. The data shows that representation was extremely low (below 5%) in the early decades. However, a clear upward trend begins around the 1990s, and the growth accelerates after 2000 — largely due to gender quotas, political reforms, and growing awareness of women’s rights.

Conclusion from Graph 1:

Women’s representation in Asia has grown consistently, reaching approximately 18–20% in 2018. The rapid growth post-2000 indicates a significant policy-driven transformation toward gender-inclusive governance.

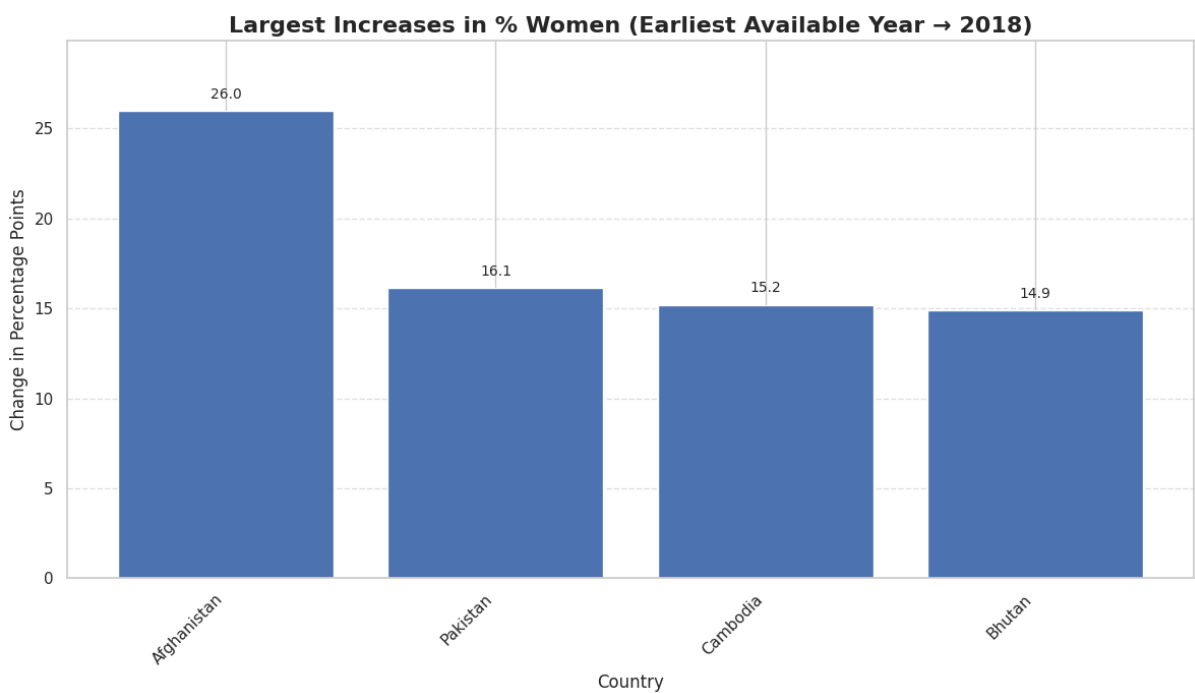
Figure 2: Top 10 Asian Countries by % Women in Parliament (2018)



This bar chart highlights the top 10 Asian countries with the highest percentage of women in parliament in 2018. Afghanistan ranks at the top, followed by Pakistan, Cambodia, and Bhutan. These countries have either implemented gender quotas or constitutional mandates for women’s representation, which have directly contributed to these figures.

Conclusion from Graph 2:
Countries with proactive gender laws and political reforms show much higher representation. Afghanistan’s post-war reconstruction and Pakistan’s reserved seat system are particularly notable contributors to their success.

Figure 3: Largest Increases in % Women (1945 → 2018)

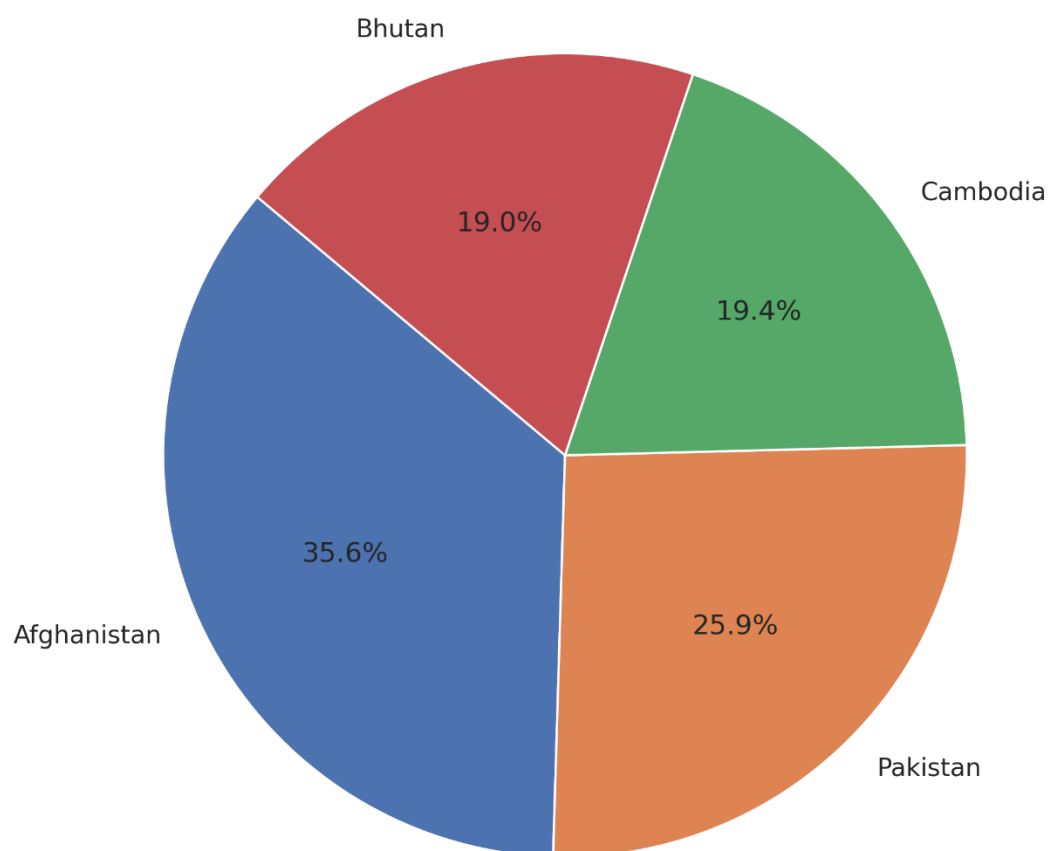


This chart identifies the countries that recorded the most significant increase in the percentage of women in parliament between 1945 and 2018. While data gaps exist for some nations, the trend clearly shows that countries like Afghanistan, Nepal, and Pakistan experienced dramatic improvements after the year 2000. These increases correlate with democratic reforms, peace agreements, and international development programs emphasizing women’s empowerment.

Conclusion from Graph 3:
The countries that underwent major structural reforms witnessed the largest changes in women’s participation, showing that policy intervention is a decisive factor for progress.

Figure 4: Share of Women’s Representation (Top 10 Asian Countries, 2018)

Share of Women's Representation (Top 10 Asian Countries, 2018)

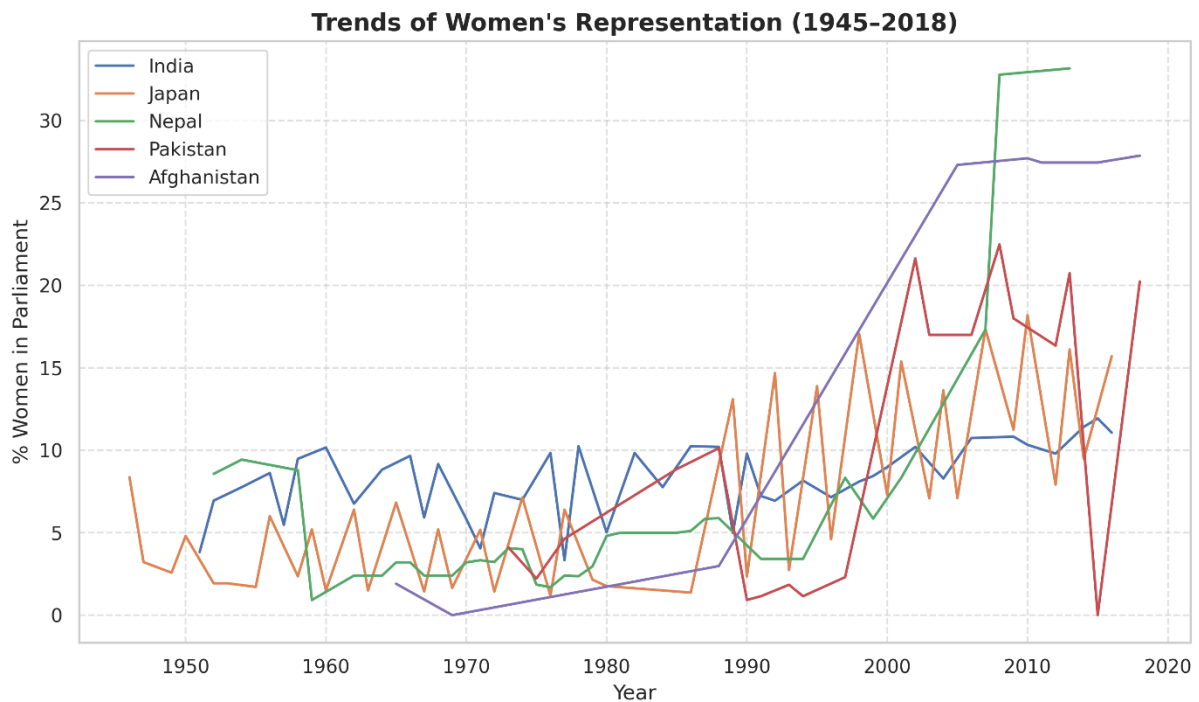


This pie chart shows the proportional contribution of each top-performing country to the total representation of women in Asian parliaments in 2018. Afghanistan accounts for more than one-third of the overall representation, followed by Pakistan and Cambodia, while others like Bhutan contribute smaller shares.

Conclusion from Graph 4:

Even among the top 10 nations, representation remains uneven. The dominance of a few countries implies that many Asian nations still lag in achieving balanced political participation.

Figure 5: Trends of Women's Representation – Selected Countries (1945–2018)



This multi-line graph compares long-term trends for India, Japan, Nepal, Pakistan, and Afghanistan.

- India and Japan show steady but slow progress.
- Afghanistan and Nepal demonstrate sharp increases post-2000, coinciding with constitutional reforms and post-conflict recovery.
- Pakistan exhibits moderate but consistent growth with temporary fluctuations, often influenced by political transitions.

Conclusion from Graph 5:

This comparative trend emphasizes that progress in gender representation is highly context-dependent — countries implementing targeted reforms achieve quicker and more sustainable change.

6. Conclusion

The analysis of women's representation in Asian parliaments from 1945 to 2018 reveals a powerful narrative of gradual yet determined progress toward gender inclusivity in governance. Across seven decades, Asia has witnessed a steady rise in the percentage of women in national parliaments, supported by social reforms, constitutional amendments, and international advocacy for gender equality.

1. Overall Growth:

- In 1945, women held less than 5% of parliamentary seats across Asia.
- By 2018, the average representation increased to nearly 18–20%, as shown in *Figure 1 (Asia's Average Trend)*.

- This represents a fourfold increase in women's participation over 73 years, marking significant improvement in political inclusiveness.

2. Regional Leaders:

- As seen in *Figure 2 (Top 10 Asian Countries, 2018)*, Afghanistan leads the region with the highest percentage of women in parliament, followed by Pakistan, Cambodia, and Bhutan.
- These nations adopted gender quotas and reserved seats—key policy interventions that directly accelerated women's entry into national politics.

3. Largest Gains Over Time:

- *Figure 3* shows that countries such as Afghanistan, Nepal, and Pakistan recorded the largest increases in representation between 1945 and 2018.
- Nepal's rise is particularly remarkable after 2006, following democratic restructuring and constitutional guarantees for women.
- Afghanistan's post-2001 political reforms also played a pivotal role in increasing female participation.

4. Distribution Among Top Nations:

- *Figure 4 (Pie Chart)* highlights that in 2018, Afghanistan alone contributed over one-third of the total women's representation among Asia's top 10 countries.
- The chart also indicates a clear imbalance—while some nations achieved high representation, others remain well below the regional average, reflecting uneven progress.

5. Country-Specific Trends:

- The comparative line plot in *Figure 5* illustrates country-wise trajectories:
 - India and Japan show slow but steady increases.
 - Nepal and Afghanistan exhibit sharp post-2000 growth, directly linked to political reforms.
 - Pakistan demonstrates consistent improvement, aligning with policy-based gender quotas introduced in the early 2000s.

6. Key Insights and Facts:

- Total countries analysed: 29 Asian nations.
- Years covered: 1945–2018.
- Average women's representation in Asia in 2018: $\approx 18.4\%$.
- Countries showing strongest upward trends: Afghanistan, Nepal, Pakistan, Cambodia, Bhutan.
- Countries with gradual progress: India, Japan, Bangladesh, Sri Lanka.

7. Final Summary

The project conclusively demonstrates that Asia has made substantial progress toward gender equality in political representation since 1945.

However, progress has been uneven and policy-dependent — nations that implemented legal quotas or reserved seats achieved faster growth, while those without such interventions lagged behind.

The visualizations clearly show that structural reforms, education, and social advocacy are critical for sustainable advancement.

While there is still a considerable journey ahead to reach parity, the region's upward trajectory signals hope for a future where women's voices are equally represented in the decision-making processes of governance.

From **less than 5% in 1945 to nearly 20% in 2018**, the representation of women in Asian parliaments reflects seven decades of transformation — proof that policy, persistence, and social progress can together shape a more equitable future.

8. References & Acknowledgements

- Dataset source: Inter-Parliamentary Union (IPU) & cleaned Asian dataset (1945–2018).
- Tools used: Python, Pandas, NumPy, Matplotlib.

End of Report