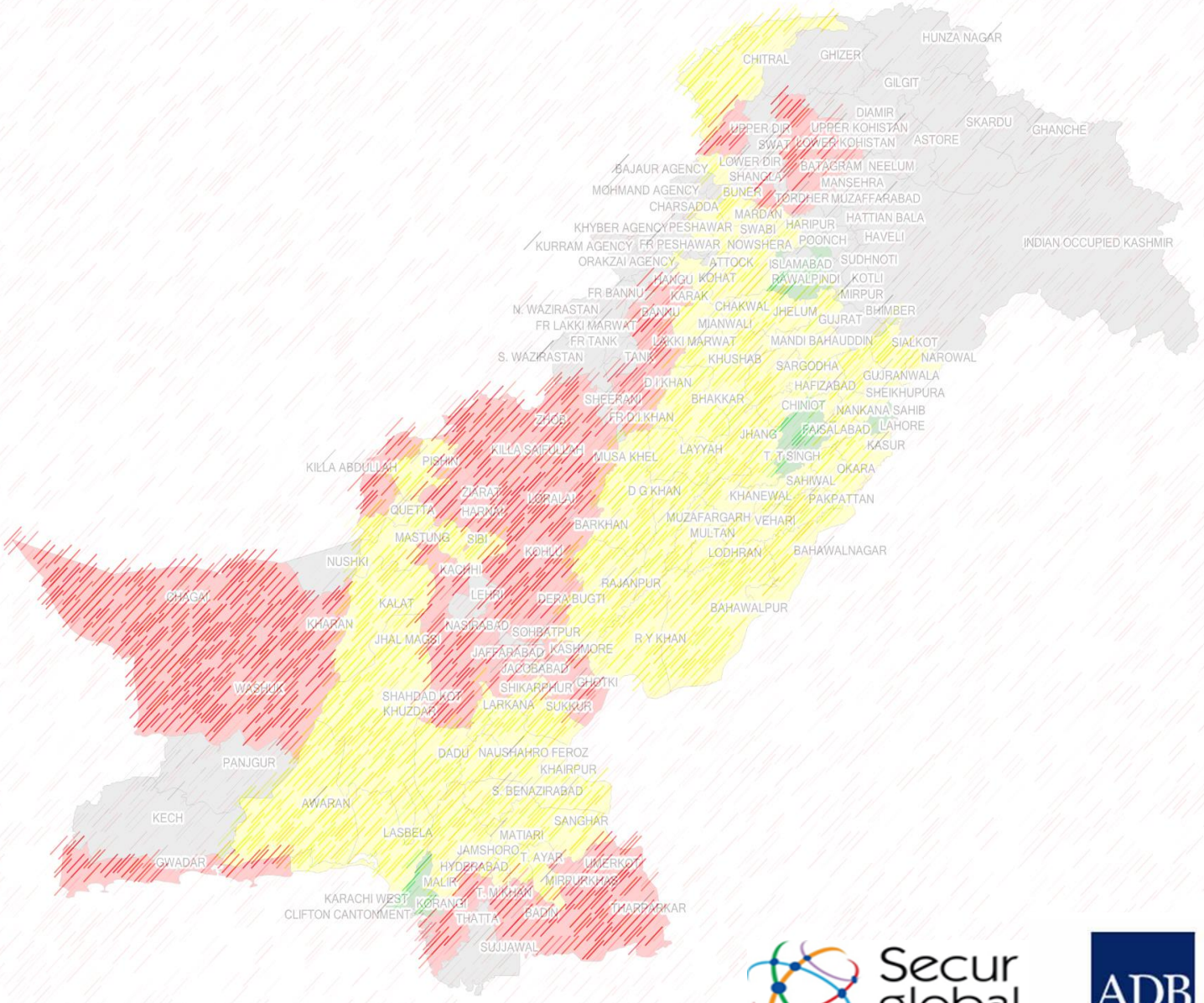
Supporting Economic Corridor Development Through Strategic Planning Frameworks

District Development Monitor (DDM)



Secur global

ADB
Asian Development Bank

DISTRICT DEVELOPMENT MONITOR

A robust tool to facilitate district support system…

- ✓ **Dynamic**
- ✓ **User friendly**
- ✓ **Simple**
- ✓ **No requirement of proprietary software on the user's end**
- ✓ **Excellent cross platform compatibility**
- ✓ **Ease of versioning**
- ✓ **Visual graphical representation**

OBJECTIVES

TOOL DEVELOPMENT

DISTRICT ASSESSMENT

OBJECTIVES

OBJECTIVES

A- District Ranking and Classification

District ranking based on social, economic and infrastructure indicators using Traffic Light Classification (TLC) system

Show the relative level of development across the districts

OBJECTIVES

B- District Assessment

Assessing the industrial structure of districts

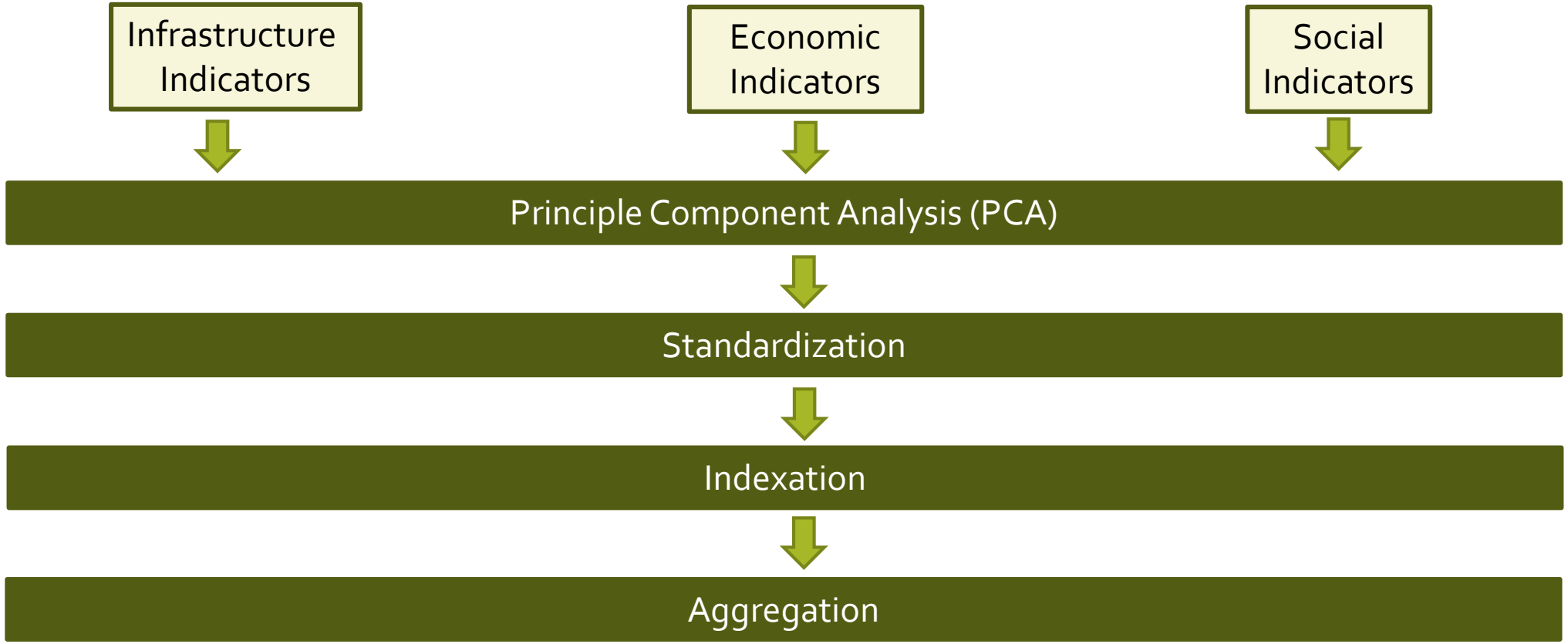
Identifying opportunities for diversification and economic development

Identifying the backward and forward linkages between development

Identifying the economic distance (time and financial resources) to reach a particular level of development

TOOL DEVELOPMENT

METHODOLOGY



District development mapping – Traffic Light Classification (TLC) system

PRINCIPAL COMPONENT ANALYSIS (PCA)

- ✓ A multivariate analysis
- ✓ More robust for dimension-reduction
- ✓ High dimension covariates
- ✓ Overcomes multi-collinearity
- ✓ High dimensional covariates

DATA SOURCES

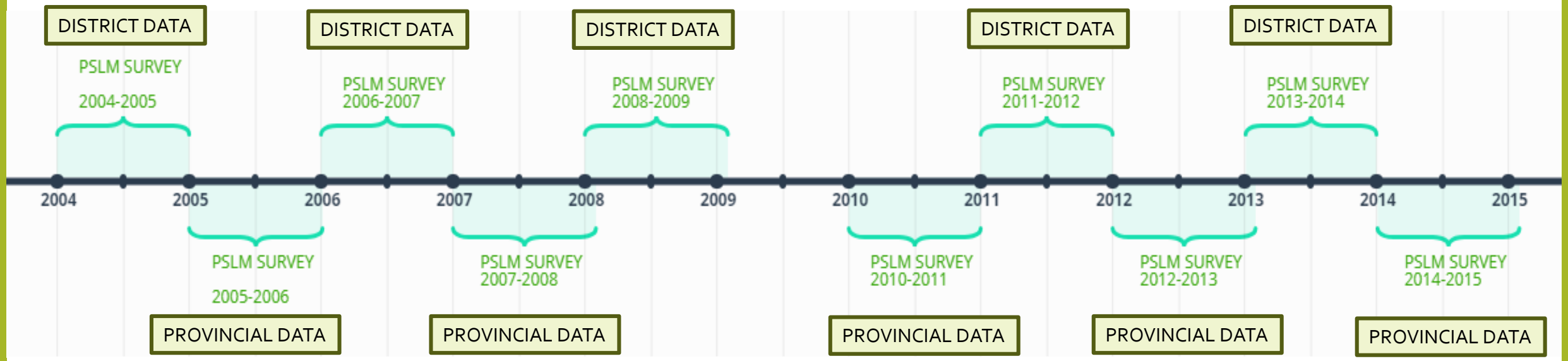
PAKISTAN SOCIAL & LIVING MEASUREMENT SURVEY (PSLM)

MULTIPLE INDICATOR CLUSTER SURVEY (MICS)

PROVINCIAL DEVELOPMENT STATISTICS (PDS)

CENSUS OF MANUFACTURING INDUSTRIES (CMI)

PAKISTAN SOCIAL AND LIVING STANDARD MEASUREMENT (PSLM) - TIMELINE

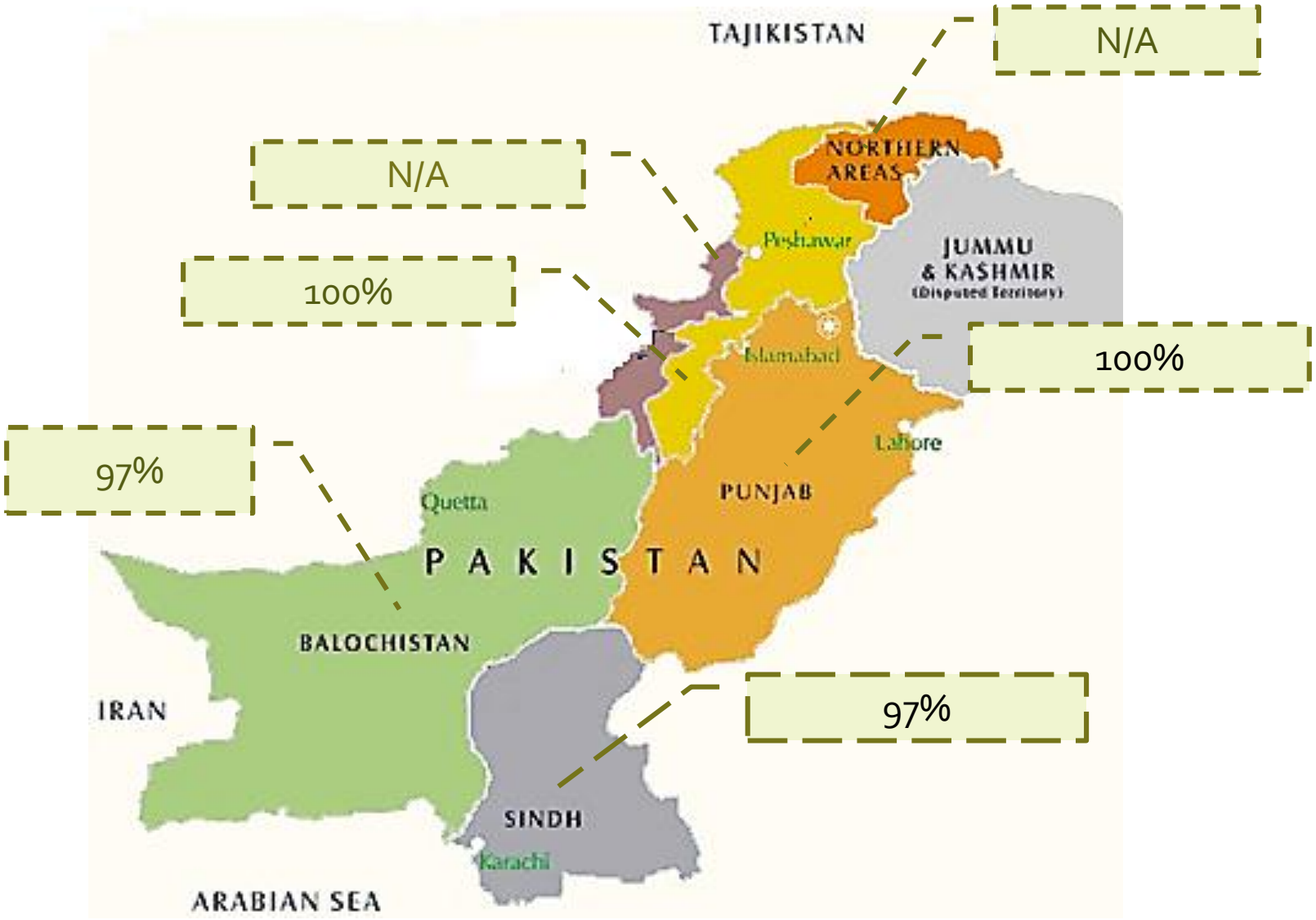


SOCIAL INDICATORS
Education
Health

ECONOMIC INDICATORS
Industrial Output

INFRASTRUCTURE INDICATORS
Living Standards
Transportation

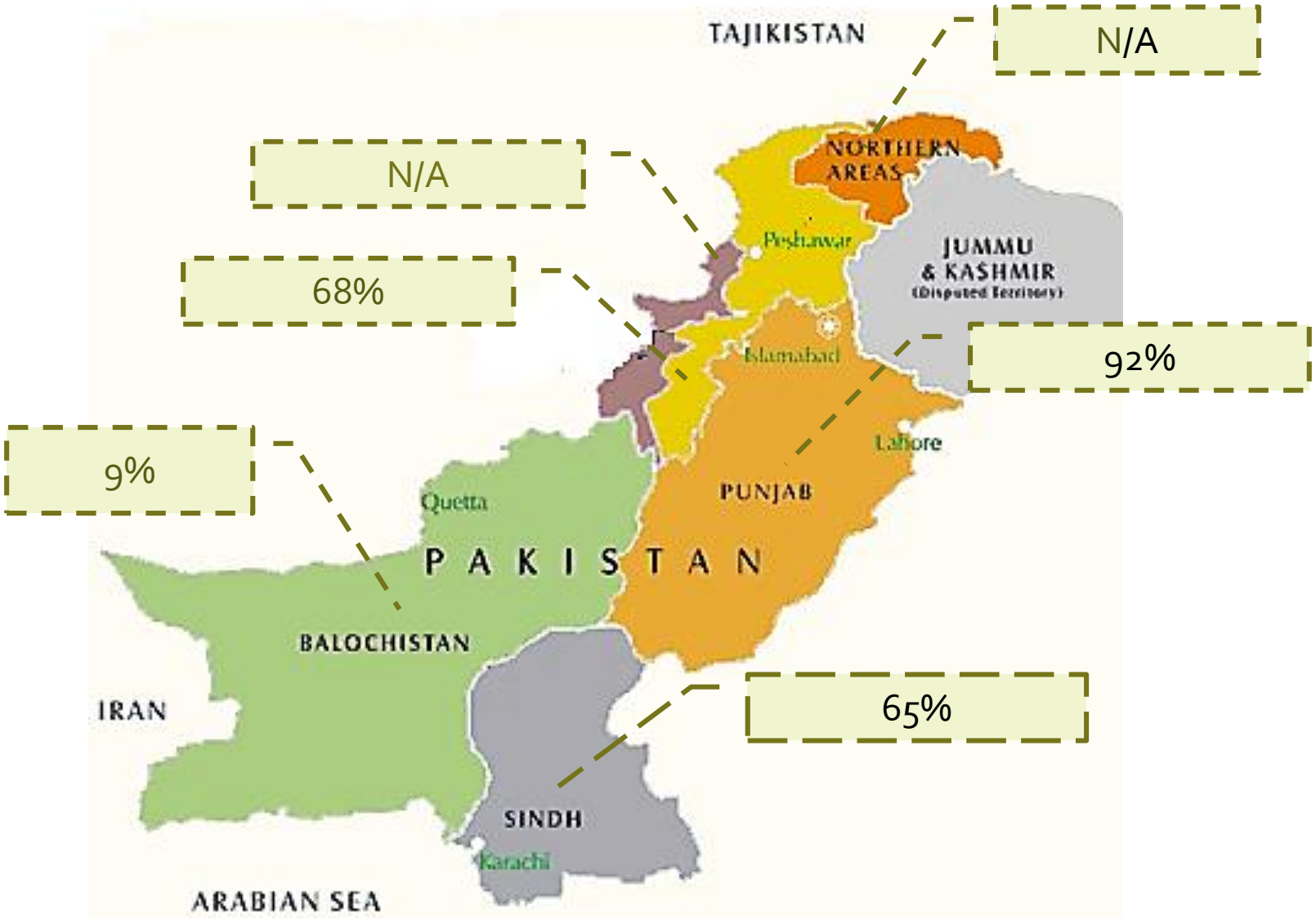
PAKISTAN SOCIAL AND LIVING STANDARD MEASUREMENT (PSLM 2014) COVERAGE



MULTIPLE INDICATOR CLUSTER SURVEY (MICS) COVERAGE

Multiple Indicator Cluster Survey (MICS)

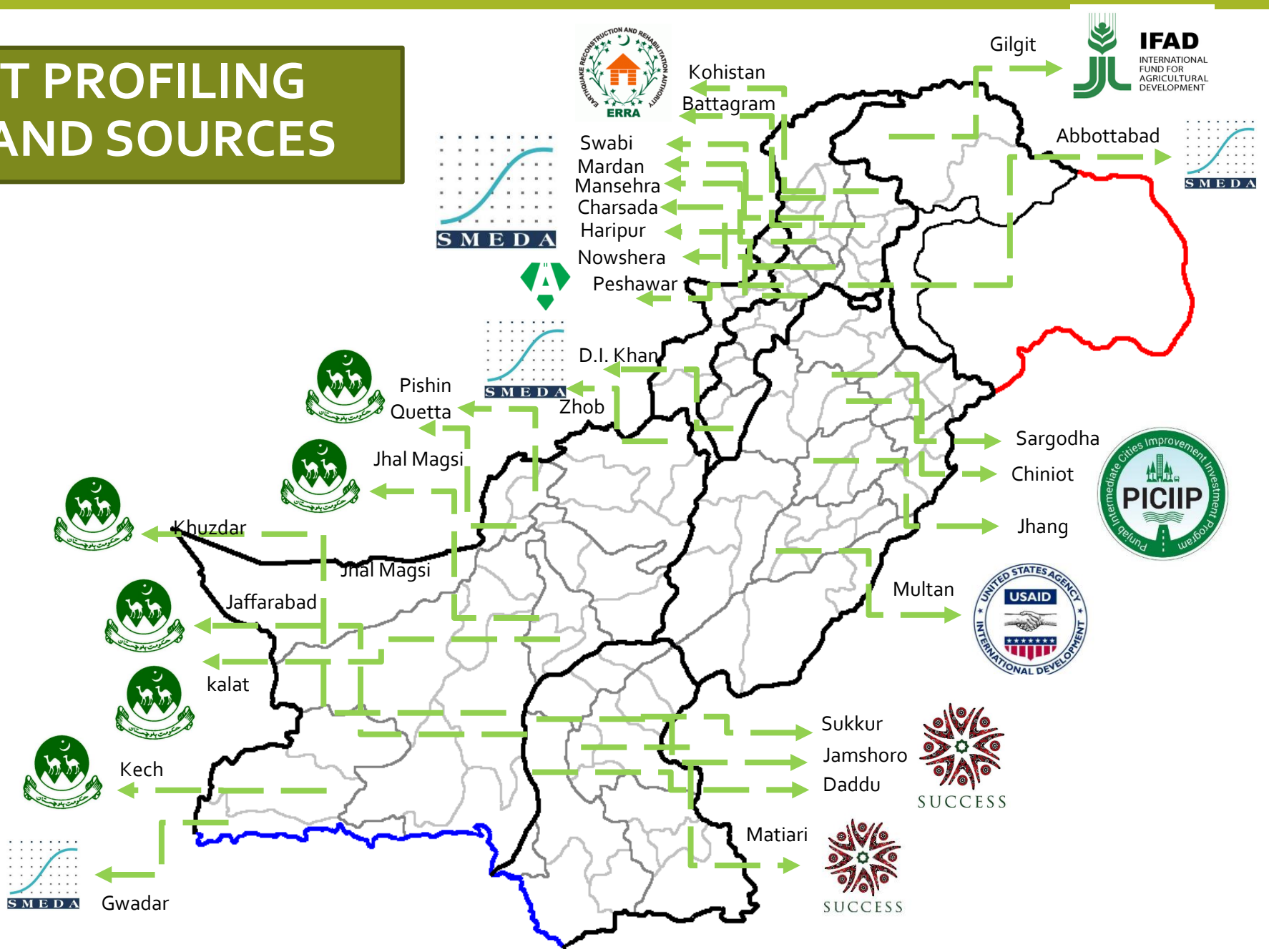
CENSUS OF MANUFACTURING INDUSTRIES (CMI) COVERAGE 2005



OTHER DATA SOURCES

- Provincial development statistics (PDS)
- Bureau of statistics (BOS)
- Pakistan institute of development economics (PIDE)
- Rural development policy institute (RDPI)
- Urban unit (UU)
- Small and medium enterprises development authority (SMEDA)

DISTRICT PROFILING SPREAD AND SOURCES



PSLM INDICATORS

LIST OF ALL INDICATORS USED IN PCA TO DETERMINE INDICATORS WITH HIGHEST EXPLANATION FOR DISTRICT VARIATIONS

EDUCATION INDICATORS

- Population that has ever attended school
- Population that has completed primary level or higher
- Gross and Net Enrolment rate at Primary, Middle and Matric Levels
- Gross and Net Enrolment rate for Government primary Schools
- Drop-out rates for the cohort aged 15-19 years
- Primary level enrolment in Private schools
- Adult Literacy level – Population 15 years and older
- Literacy level –Population 10 years and older

HEALTH INDICATORS

- Percentage of children aged 12-23 months that have been immunized
- Children under 5 suffering from diarrhea in past 30 days
- Type of practitioner consulted for diarrhea treatment
- Prenatal consultations
- Postnatal consultations
- Child delivery – Location and Type of Assistance

MICS INDICATORS

LIST OF ALL INDICATORS USED IN PCA TO DETERMINE INDICATORS WITH HIGHEST EXPLANATION FOR DISTRICT VARIATIONS

WASH INDICATORS

- Percent distribution of households by housing tenure.
- Percent Distribution Of Households By Fuel Used For Lighting
- Percent Distribution Of Households By Fuel Used For Cooking
- Percentage distribution of household by source of drinking water
- Percent distribution of households by type of toilet.

CMI INDICATORS

LIST OF ALL INDICATORS USED IN PCA TO DETERMINE INDICATORS WITH HIGHEST EXPLANATION FOR DISTRICT VARIATIONS

Census of Manufacturing Industries(CMI) Indicators

Value Added at Producer Prices

No. of Units in a District

Value of Production

Average Daily Persons Engaged

Value of Fixed Assets at the End Of The Year

Employment Cost

Wages & salaries

DATA LIMITATIONS

AJK, FATA and Gilgit Baltistan could not be included in the district ranking because for these areas, only MICS indicators were available and PSLM/PDS/CMI are unavailable for these areas.

Many industries were merged in CMI without any rational or common pattern. Due to this, specialization formula is only applied to ungrouped industries for each district.

DATA PROCESSING

PRINCIPAL COMPONENT ANALYSIS

Following indicators were able to explain maximum variance across districts and therefore were selected for ranking…

Registered Voter %
(VOTER)

MICS

Female Literacy %
(FEMLIT)

PSLM

Gender Parity Index For Primary And Secondary School
(GPIP, GPIS)

MICS

Immunization %
(IMMUN)

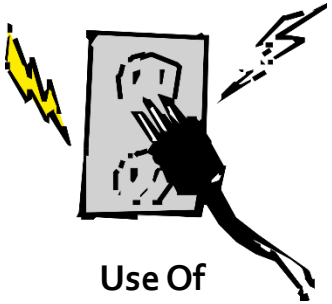
PSLM

Use Of Non-solid Fuel For Cooking %
(NONSOL)

PSLM

Use Of Iodized Salt %
(IODIZ)

MICS



Use Of Electricity For Lighting %
(ELEC)

PSLM

Use Of Gas For Cooking %
(GAS)

PSLM

Improved Drinking
(MPDW)

MICS

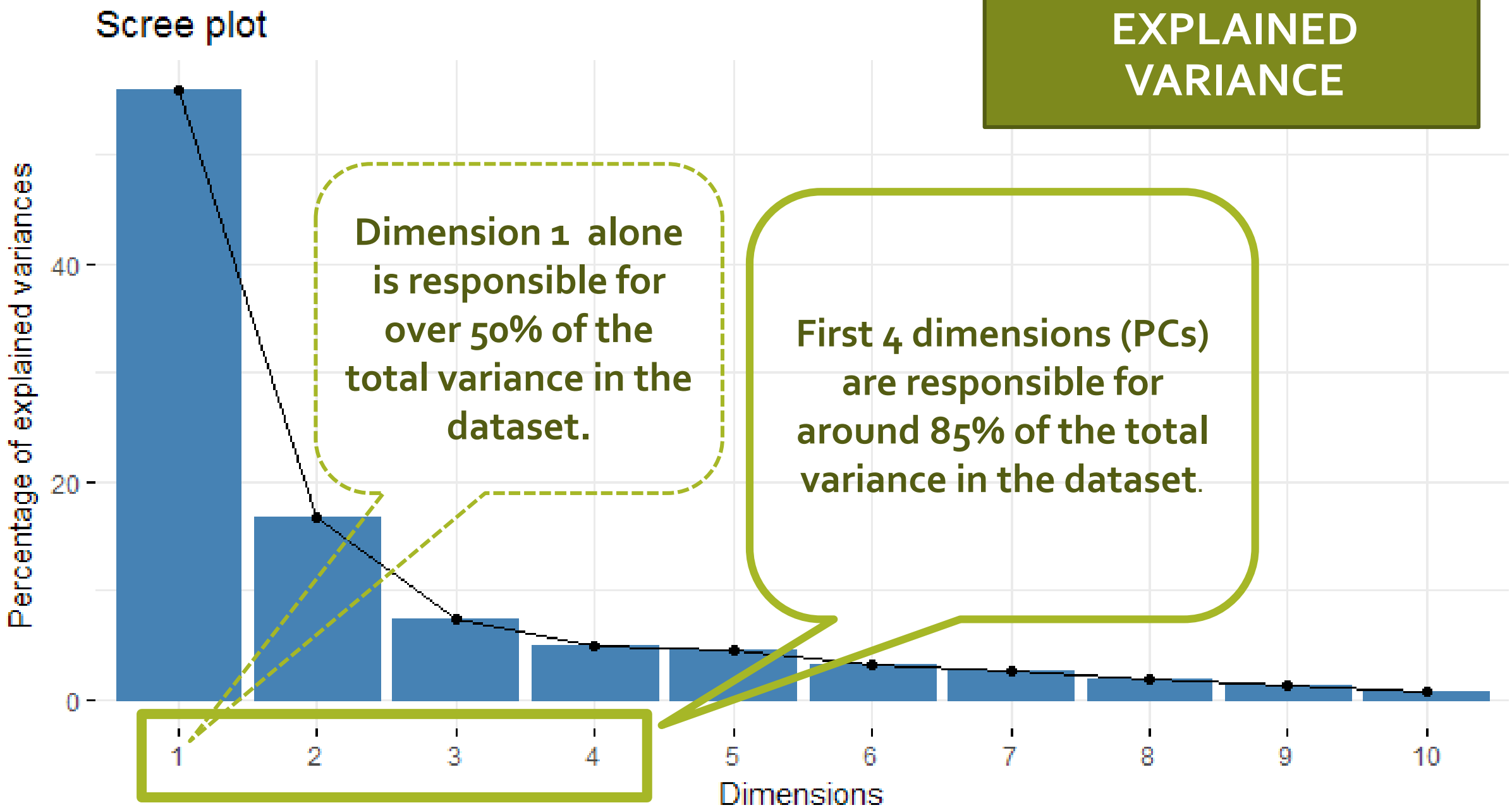
Value Of Industrial Production
(VOP)

CMI

Road Length Per Area
(ROAD)

PDS

EXPLAINED VARIANCE



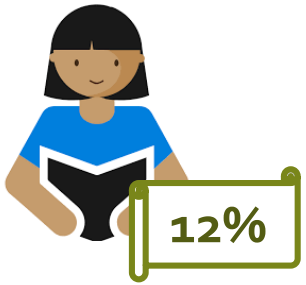
Dimension 1 alone is responsible for over 50% of the total variance in the dataset.

First 4 dimensions (PCs) are responsible for around 85% of the total variance in the dataset.

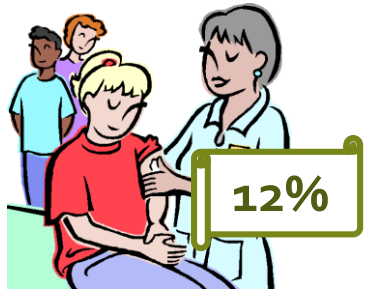
CONTRIBUTION OF FIRST LEVEL EXPLANATORY VARIABLES (PC-1)

Gender Parity Index For Secondary School (GPIS)

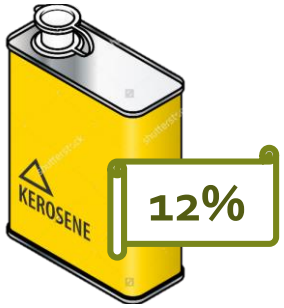
Use of Gas for cooking % (GAS)



Female Literacy % (FEMLIT)



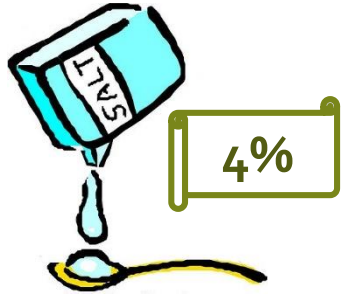
Immunization % (IMMUN)



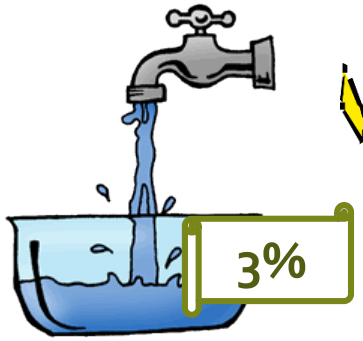
Use Of Non-solid Fuel For Cooking % (NONSOL)

Gender Parity Index For Primary School (GPIP)

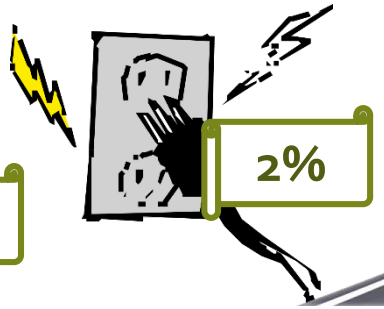
Value Of Industrial Production (VOP)



Use Of Iodized Salt % (IODIZ)

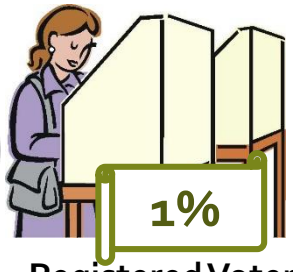


Improved Drinking (MPDW)



Use Of Electricity For Lighting % (ELEC)

Road Length Per Area (ROAD)



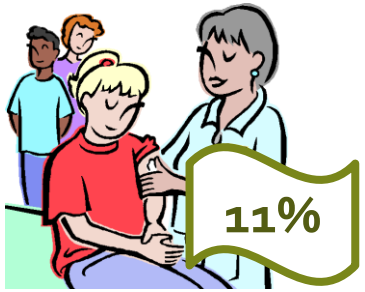
Registered Voter % (VOTER)

CONTRIBUTION OF SECOND LEVEL EXPLANATORY VARIABLES (PC-2)

Use Of Non-solid Fuel For Cooking % (NONSOL)

Use Of gas For Cooking % (GAS)

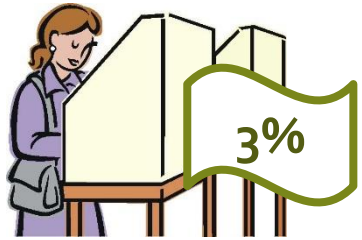
Gender Parity Index Secondary School (GPIS)



Immunization % (IMMUN)

Road Length Per Area (ROAD)

Value Of Industrial Production (VOP)



Registered Voter % (VOTER)

Improved Drinking (MPDW)

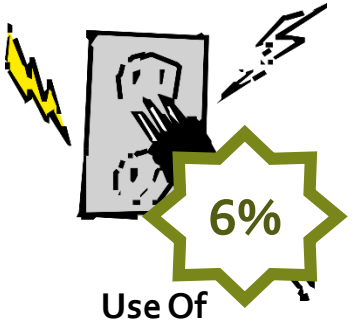
Gender Parity Index For Primary School (GPIP)

CONTRIBUTION OF THIRD LEVEL EXPLANATORY VARIABLES (PC-3)

Road Length Per Area
(ROAD)

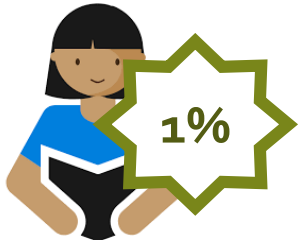
Immunization %
(IMMUN)

Value Of Industrial Production
(VOP)



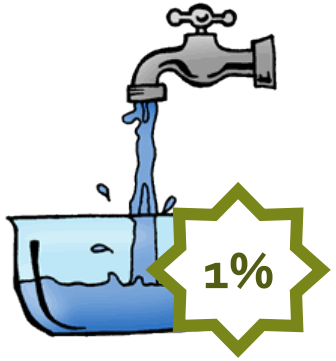
Use Of
Electricity For
Lighting %
(ELEC)

Registered Voter %
(VOTER)



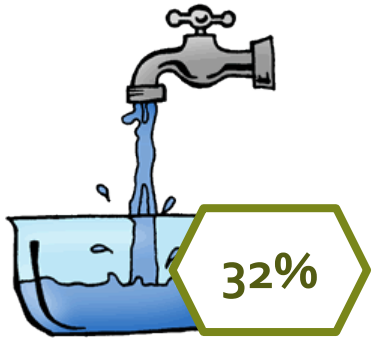
Female Literacy %
(FEMLIT)

Use Of Iodized Salt %
(IODIZ)



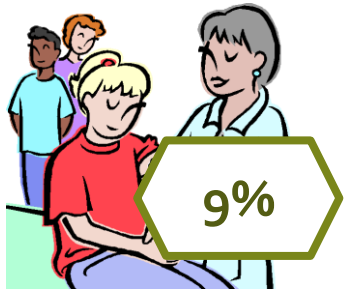
Improved Drinking
(MPDW)

CONTRIBUTION OF FOURTH LEVEL EXPLANATORY VARIABLES (PC-4)



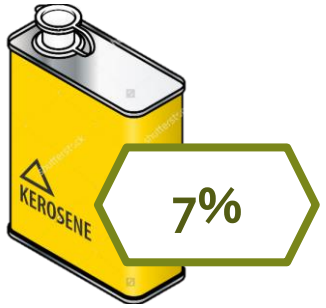
Improved Drinking (MPDW)

Value Of Industrial Production (VOP)



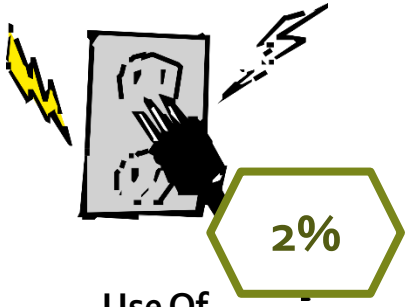
Immunization % (IMMUN)

Road Length Per Area (ROAD)



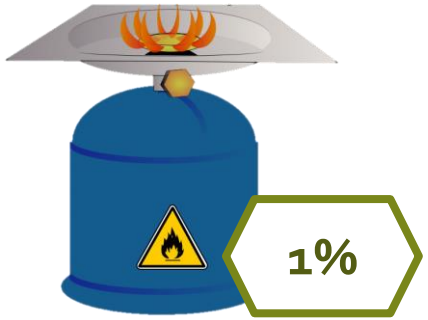
Use Of Non-solid Fuel For Cooking % (NONSOL)

Use Of Iodized Salt % (IODIZ)



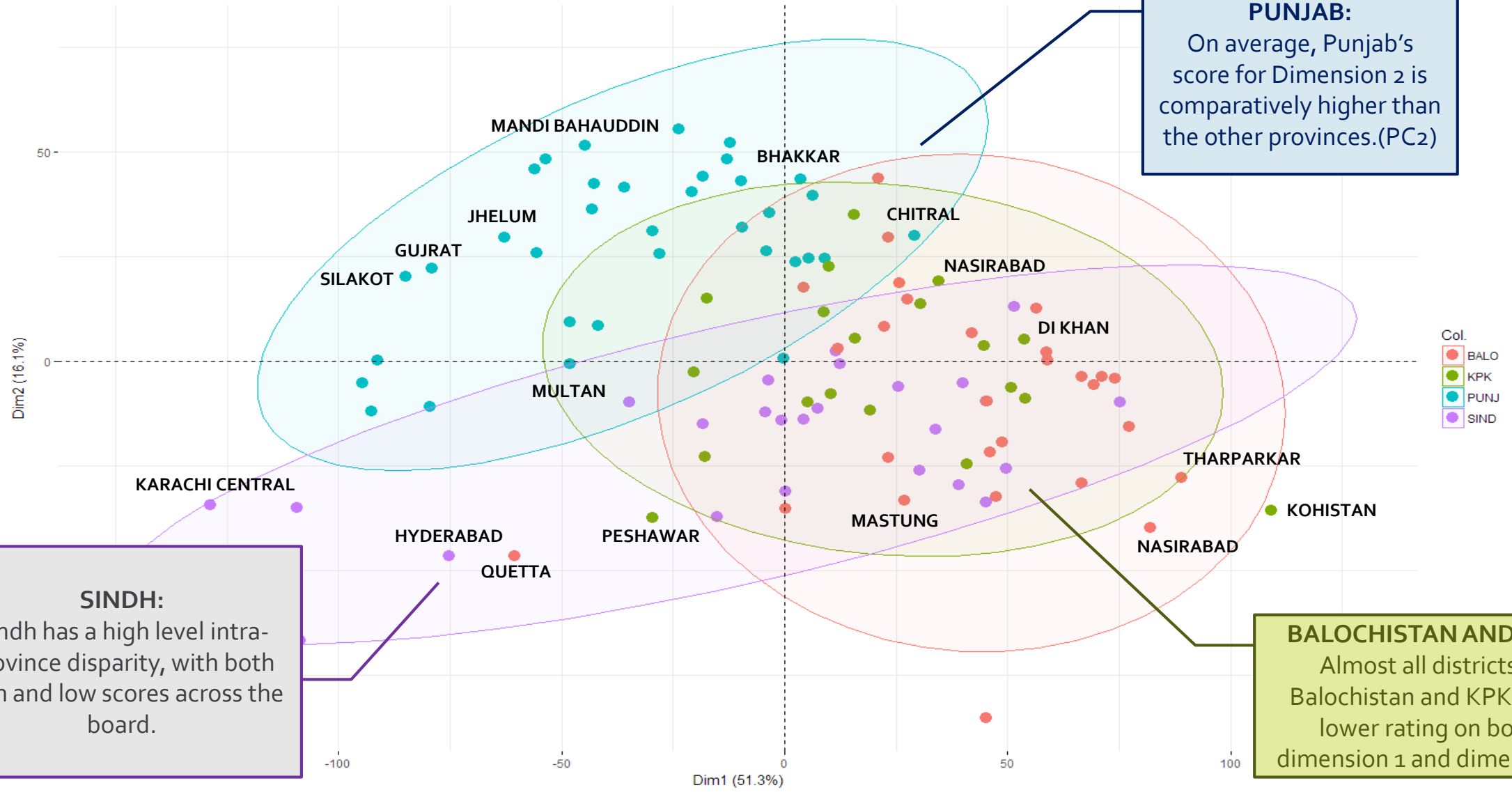
Use Of Electricity For Lighting % (ELEC)

Gender Parity Index For Secondary School (GPIS)



Use of gas For Cooking % (GAS)

DISPARITY OF DISTRICTS ACROSS PROVINCES

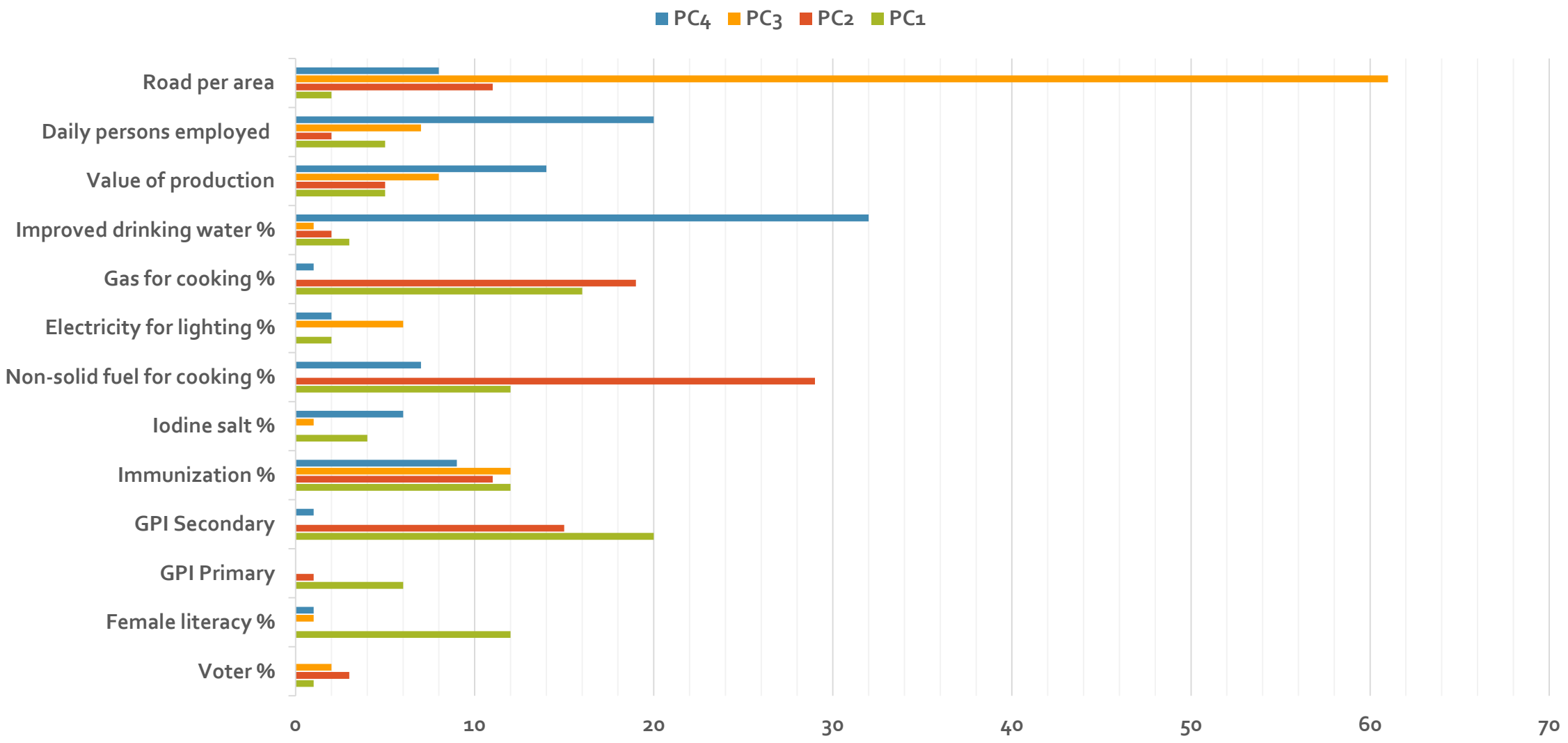


PUNJAB:
On average, Punjab's score for Dimension 2 is comparatively higher than the other provinces.(PC2)

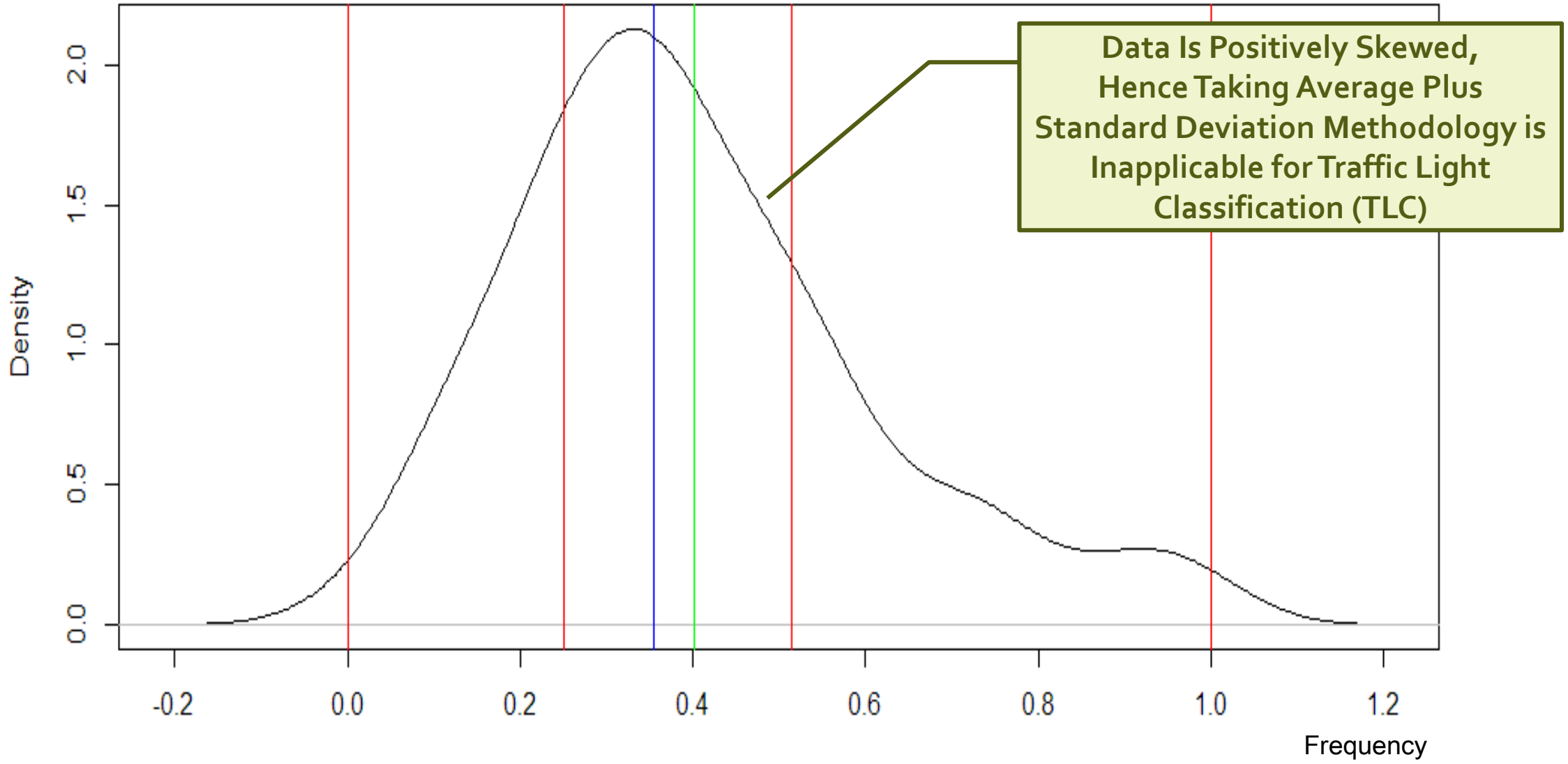
SINDH:
Sindh has a high level intra-province disparity, with both high and low scores across the board.

BALOCHISTAN AND KPK:
Almost all districts of Balochistan and KPK show lower rating on both, dimension 1 and dimension 2

SUMMARY OF THE CONTRIBUTION OF DIMENSIONS



DISTRICT INDEX SCORES – DISTRIBUTION OF RESULTS



Data Is Positively Skewed, Hence Taking Average Plus Standard Deviation Methodology is Inapplicable for Traffic Light Classification (TLC)

DISTRICT SCORING - METHODOLOGY

By using the weightages, final score is calculated for each district

$$W_v = (Cv_i \times \lambda_i) + (Cv_{i+1} \times \lambda_{i+1}) + \cdots + (Cv_n \times \lambda_n)$$

Cv_i is the contribution of variable v to dimension i;
λ_i is the eigenvalue of dimension i; and
n is the upper bound for dimensions to consider

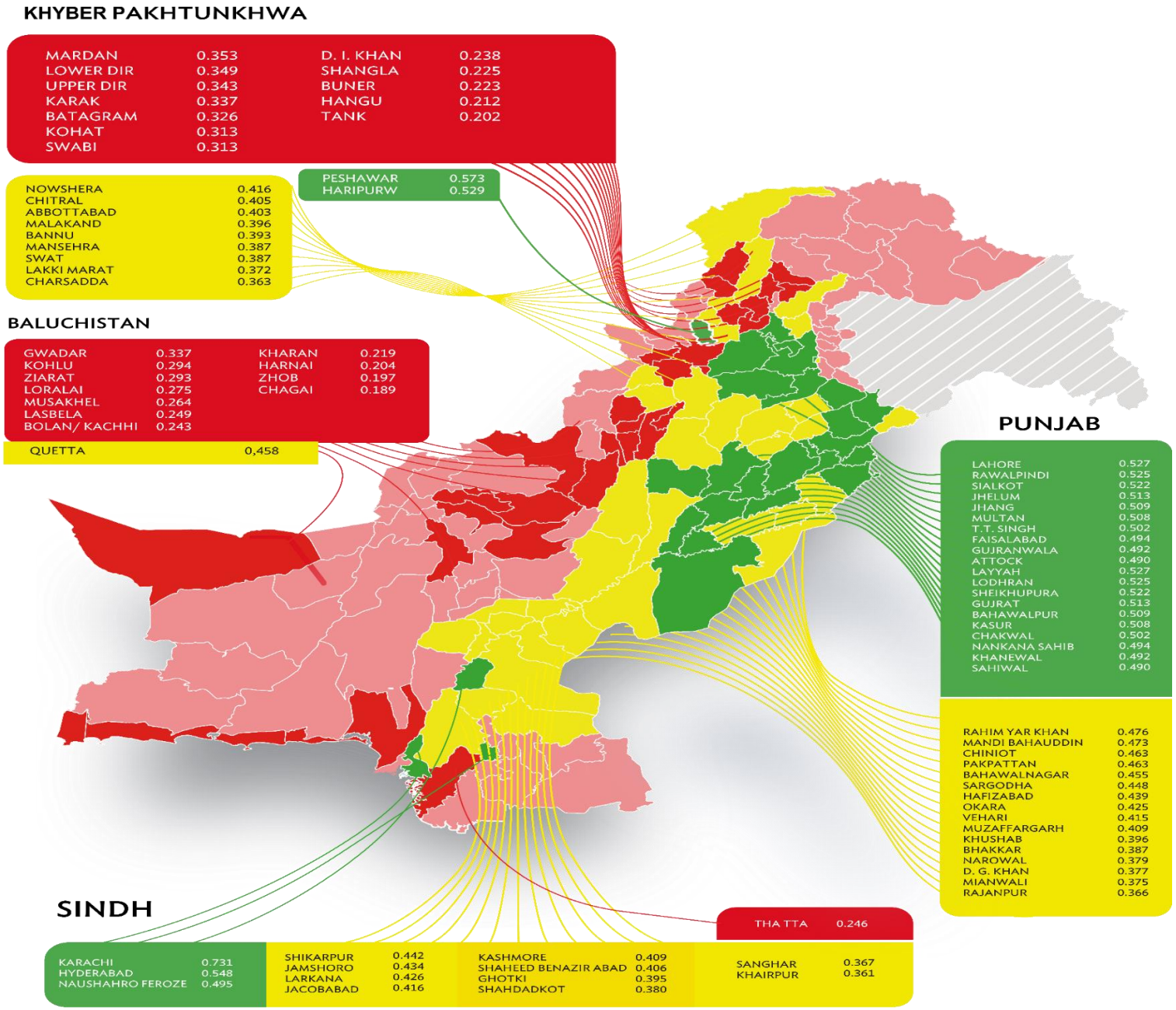
This score, once appropriately scaled, is a composite index for relative development amongst the districts of Pakistan

Districts with score above 300 are ranked green while below 150 are the red districts. Districts with score between 150-300 are ranked yellow

DISTRICTS CLASSIFICATION

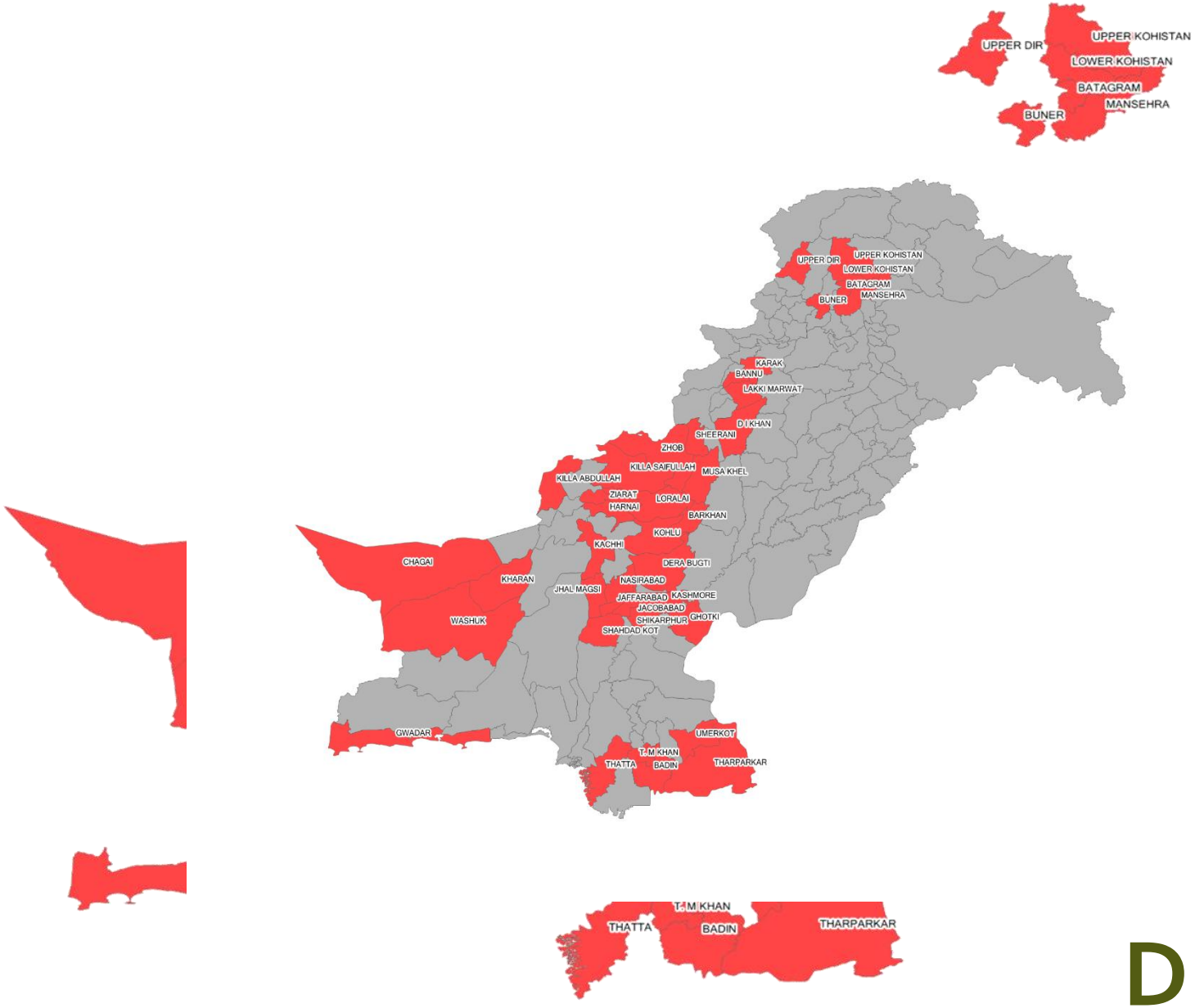
RESULTS FROM ADB'S PREVIOUS STUDY ON DISTRICT DEVELOPMENT DISPARITY IN PAKISTAN

RESULTS OF PREVIOUS ADB STUDY ON DISTRICT DISPARITY

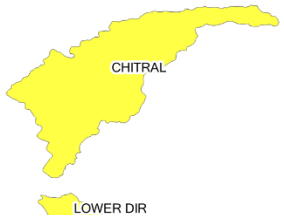


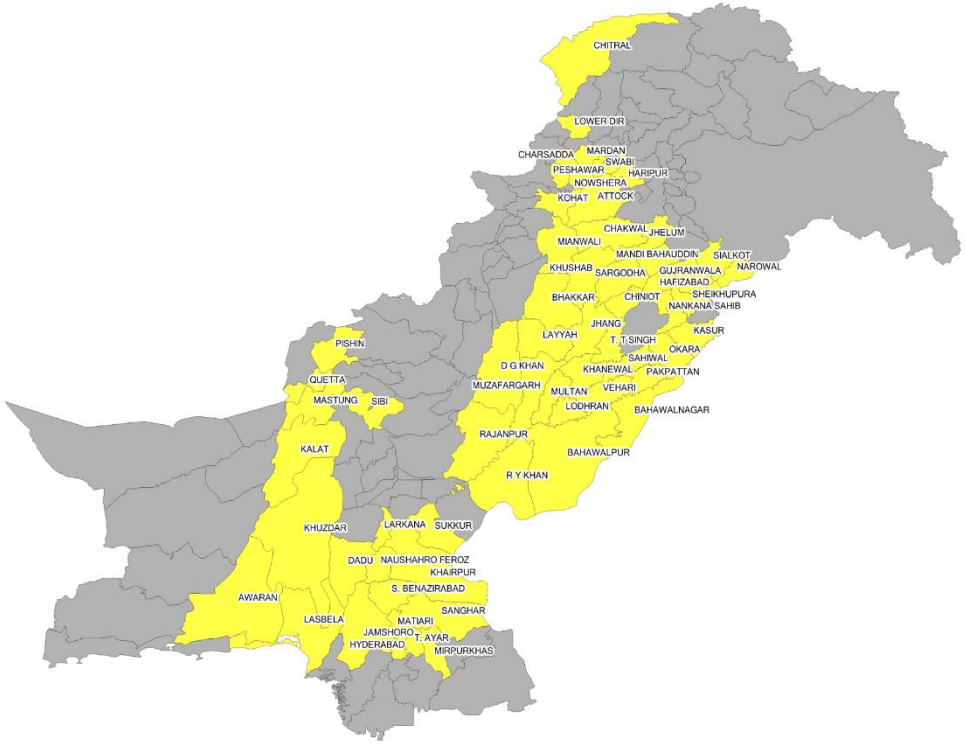
DISTRICTS CLASSIFICATION

RESULTS OF OUR STUDY

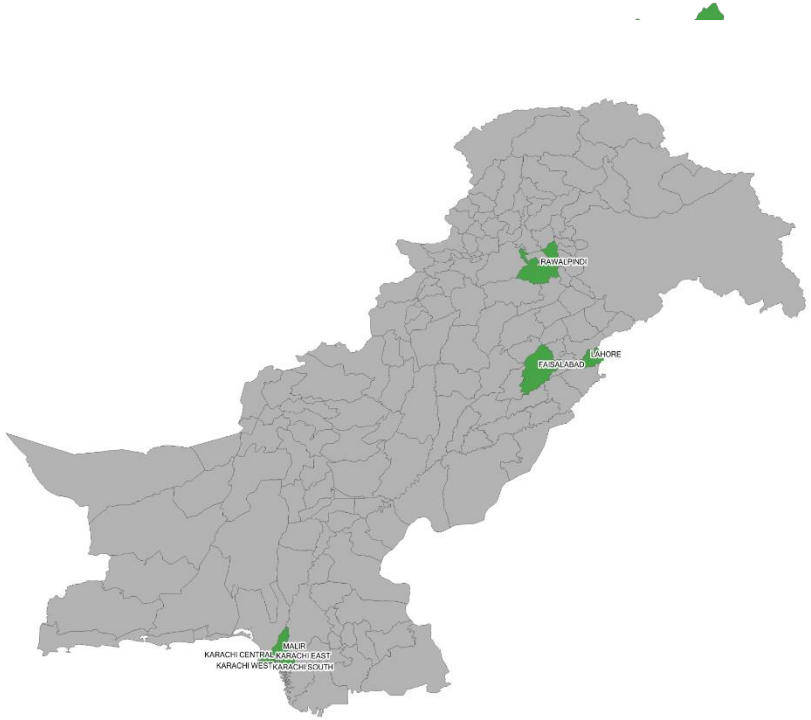


RED DISTRICTS

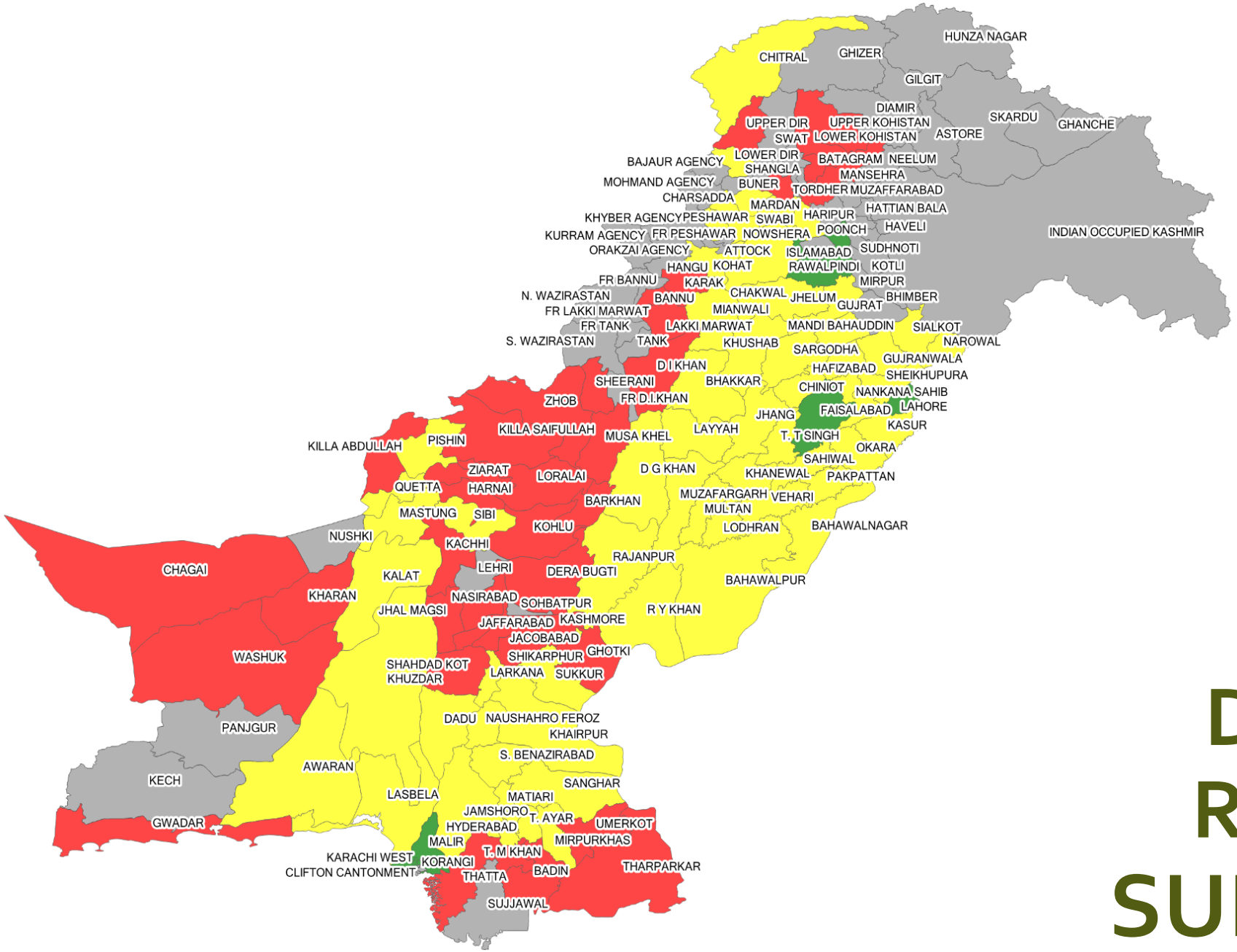




YELLOW DISTRICTS



GREEN DISTRICTS



DISTRICT RANKING SUMMARY

DISTRICT ASSESSMENT

DISTRICT ASSESSMENT

- INDUSTRIAL DIVERSIFICATION ASSESSMENT
- INDUSTRIAL SPECIALIZATION
- CATCH UP ANALYSIS
- STRENGTHS AND WEAKNESSES OF DISTRICTS
- INDEPTH CASE STUDIES

INDUSTRIAL ASSESSMENT

INDUSTRIAL ASSESMENT MEASURES

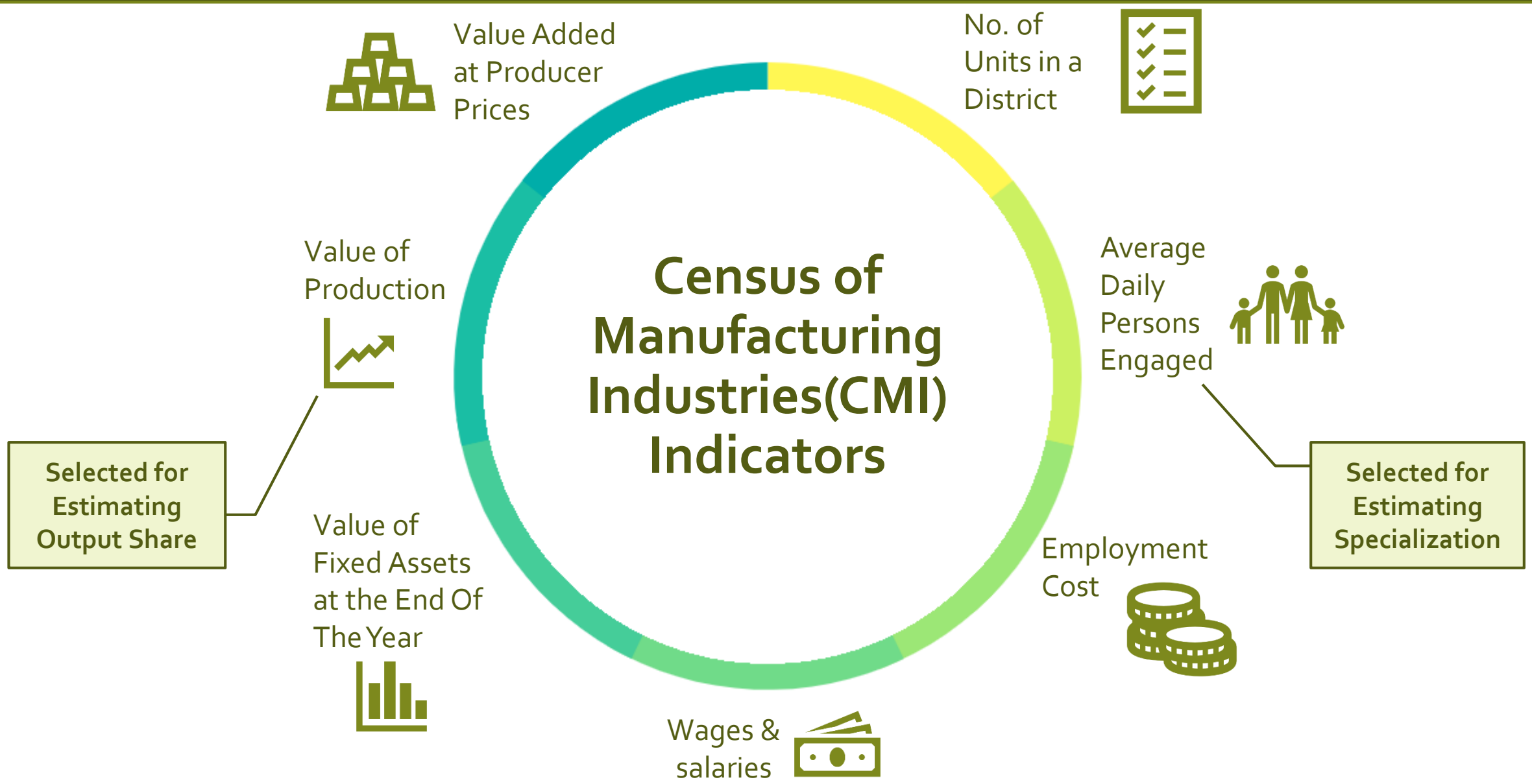
- $$SHARE\ IN\ TOTAL\ OUTPUT_{ij} = \frac{Value\ of\ Output_{id}}{Value\ of\ National\ Output_i}$$

- $$SPECIALIZATION\ QUOTIENT_{ij} = \frac{E_{id}/_{TDE}}{NE_i/_{TNE}}$$

i is the industry sector and d is the district

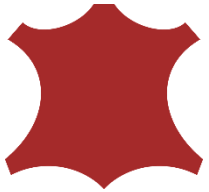
Data Source: *Census of Manufacturing Industries 2005 by Pakistan Bureau of Statistics*

DATA FOR INDUSTRIAL ASSESMENT

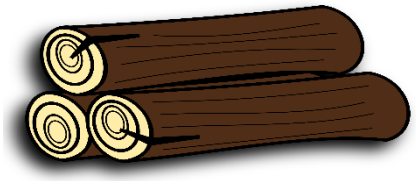


INDUSTRIAL GROUPS COVERED IN CMI

FOOD AND BEVERAGES



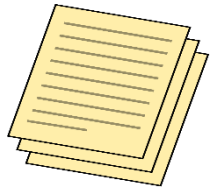
LEATHER GOODS



WOOD PRODUCTS

COKE , PETROLEUM

CHEMICALS



PAPER GOODS

TEXTILE

WEARING APPAREL

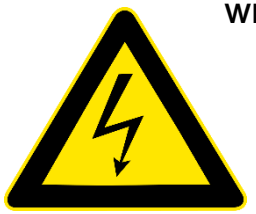
VEHICLES

MEDICAL INSTRUMENTS

PUBLISHING

Non Metallic Minerals

Electrical Machinery



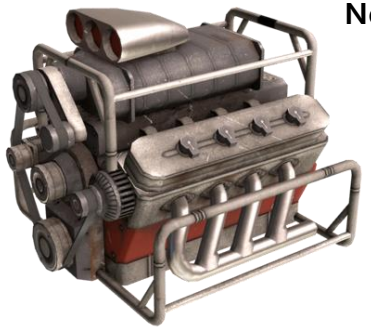
FURNITURE , SPORTS

RUBBER , PLASTIC

Fabricated Metals

TOBACCO

TRANSPORT EQUIPMENT



ENGINES , WATER PUMPS

Basic Metals

POSSIBLE SHIFT SHARE ANALYSIS

2005

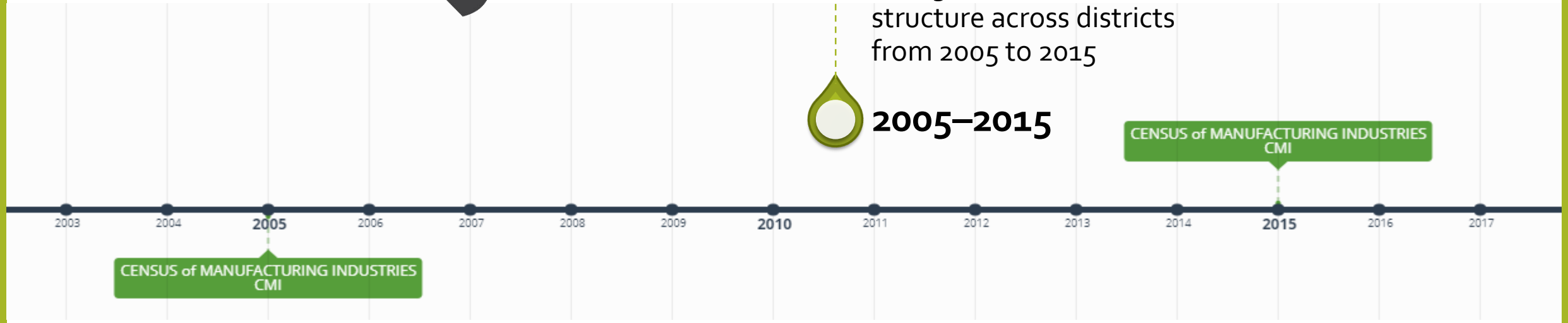
Our analysis only covers one time period for industrial assessment due to data limitation.

2015

CMI 2015 is expected to be published in last quarter of 2018

Shift Share analysis can be performed to asses the change in industrial structure across districts from 2005 to 2015

2005–2015

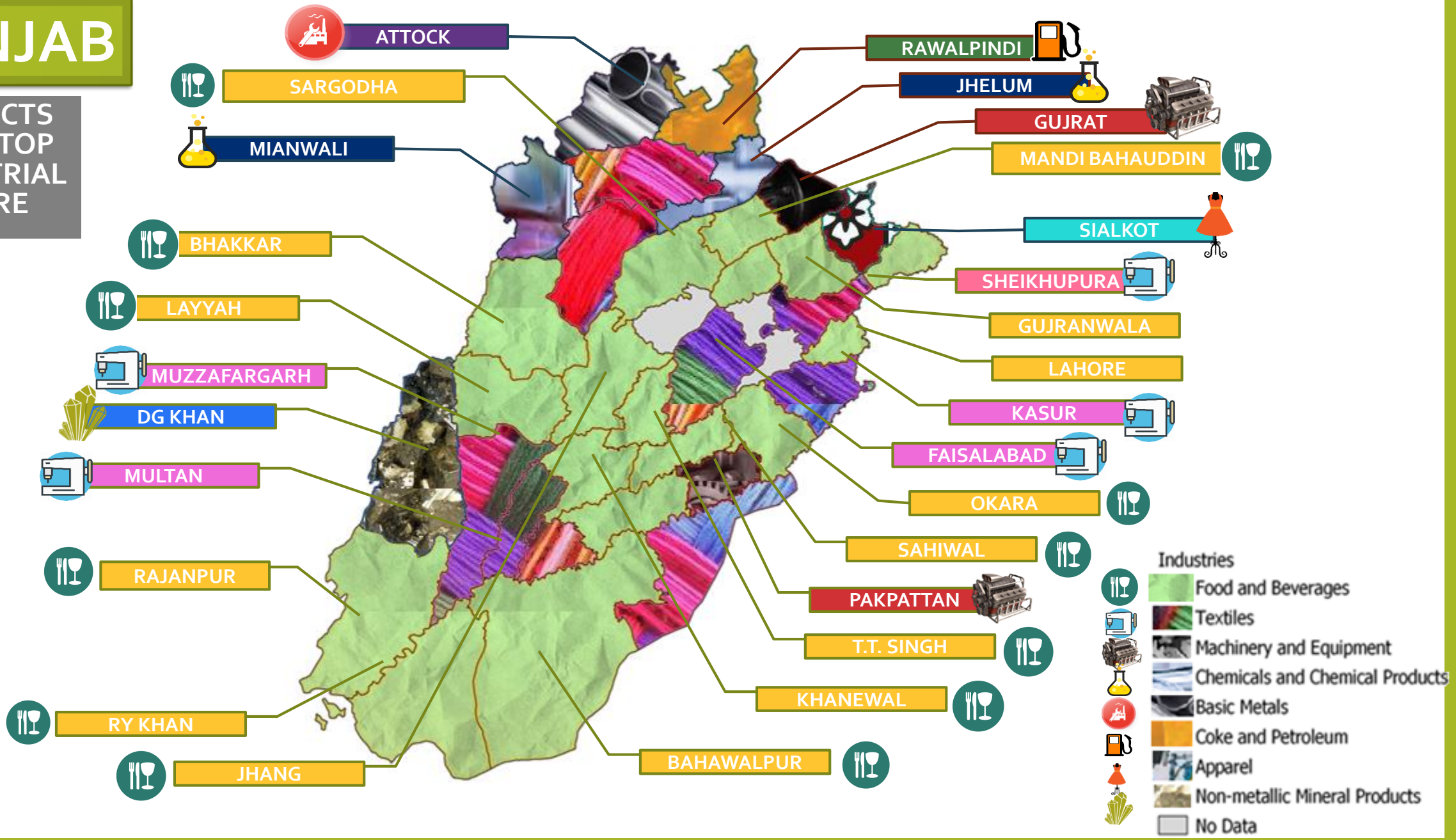


RESULTS

DISTRICTS W.R.T TOP INDUSTRIAL SHARE

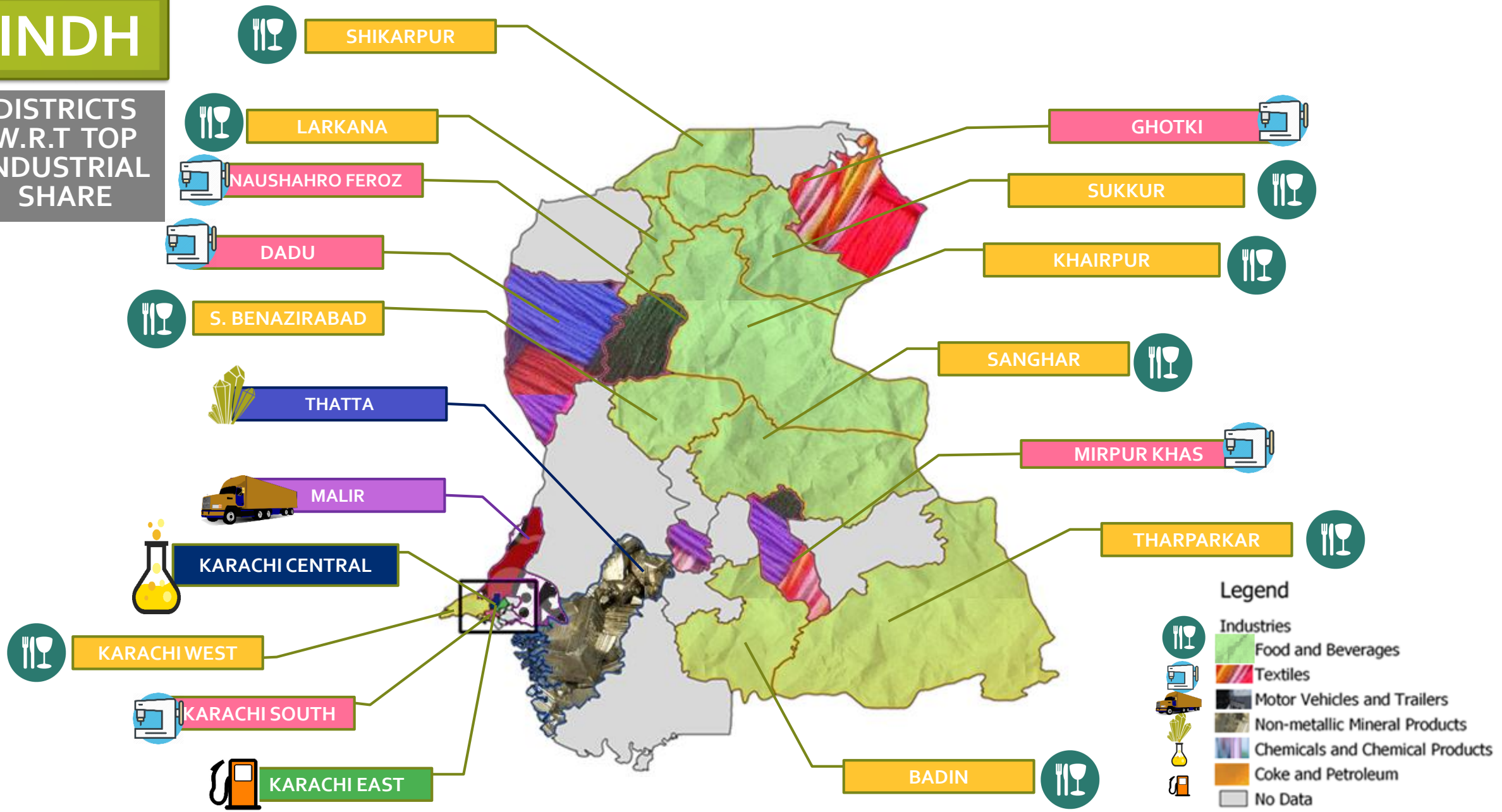
PUNJAB

DISTRICTS W.R.T TOP INDUSTRIAL SHARE



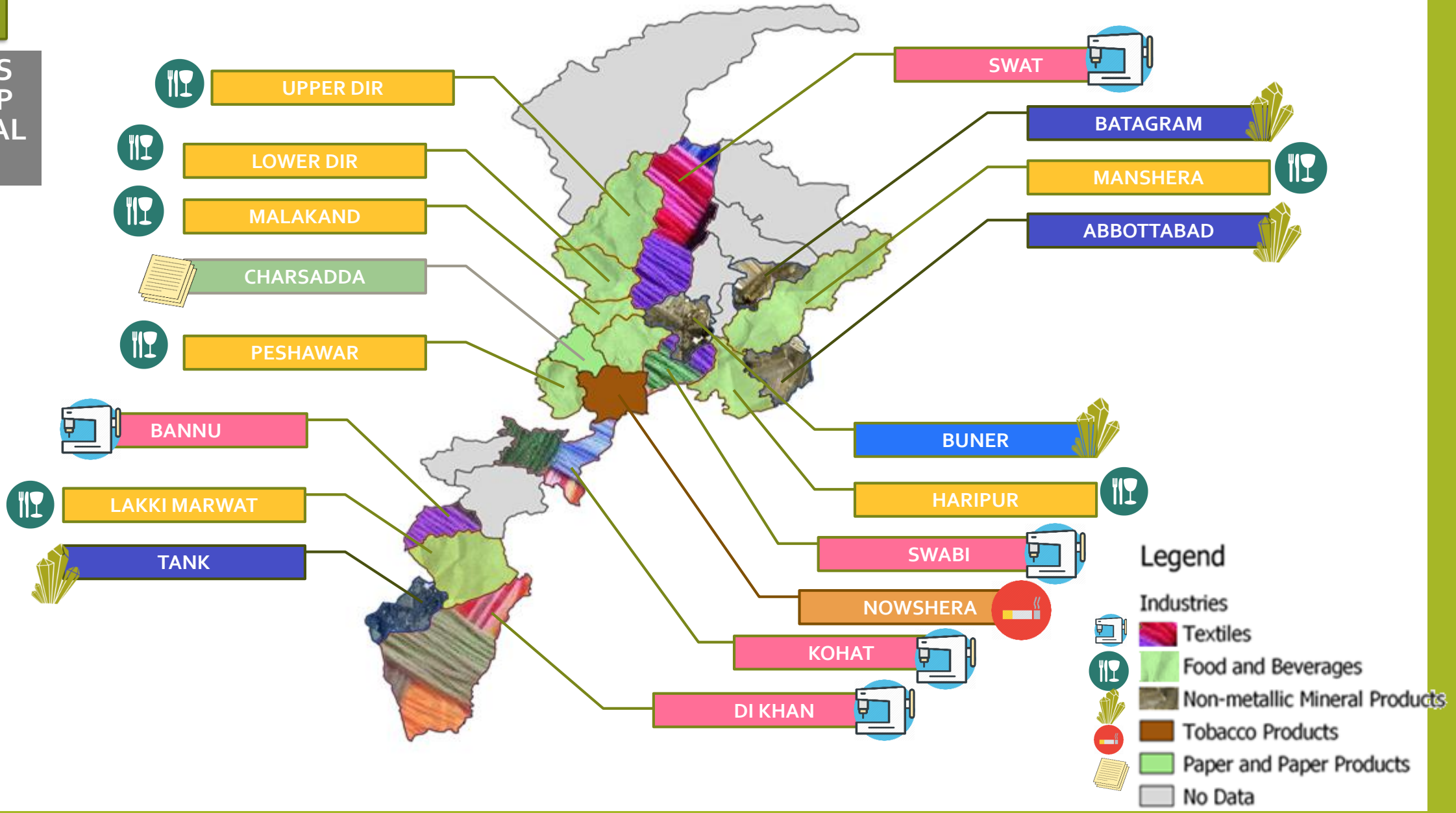
SINDH

DISTRICTS W.R.T TOP INDUSTRIAL SHARE



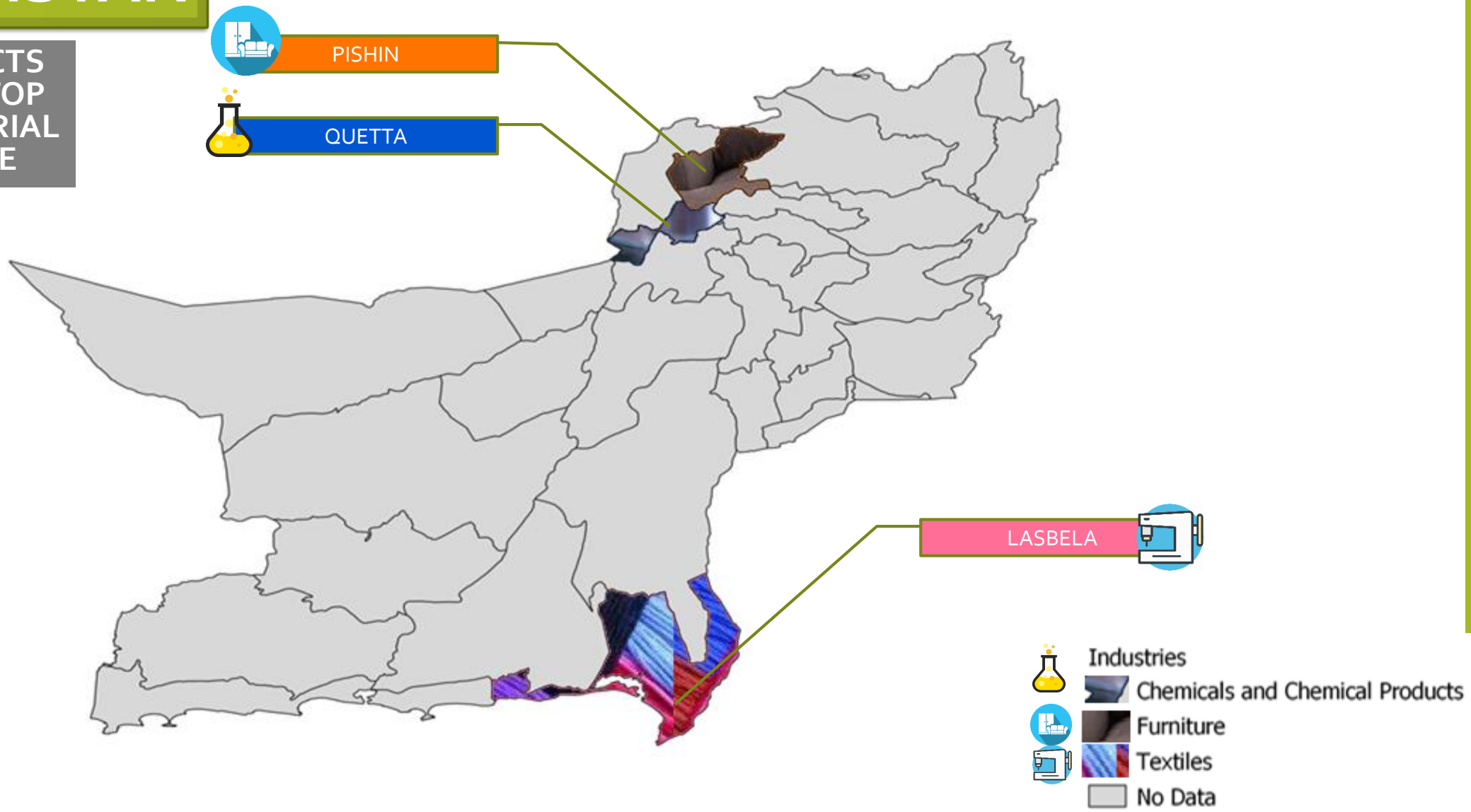
KPK

DISTRICTS W.R.T TOP INDUSTRIAL SHARE



BALOCHISTAN

DISTRICTS W.R.T TOP INDUSTRIAL SHARE

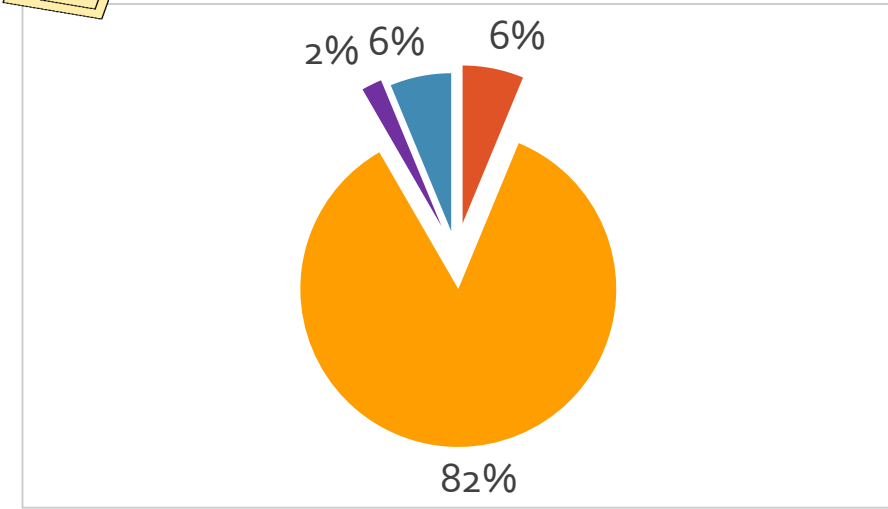


RESULTS

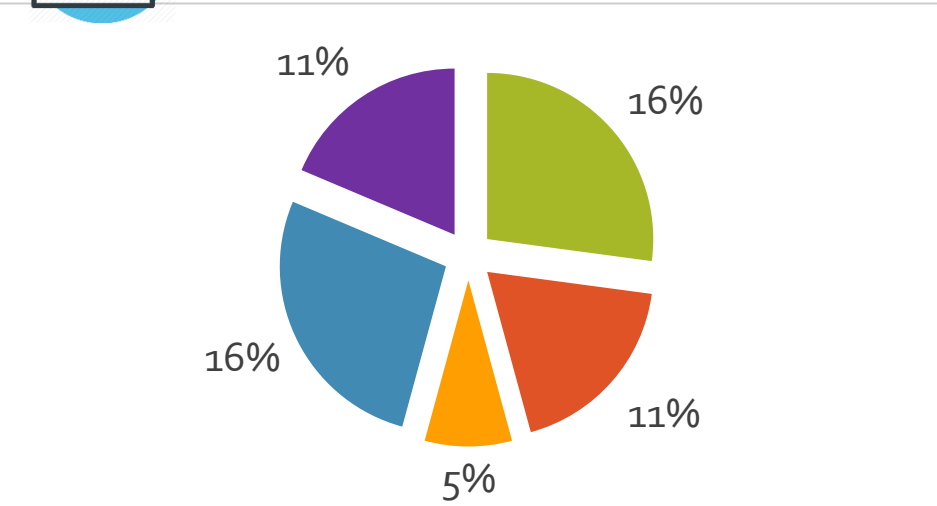
INDUSTRY WISE OUTPUT SHARE

INDUSTRY WISE OUTPUT SHARE

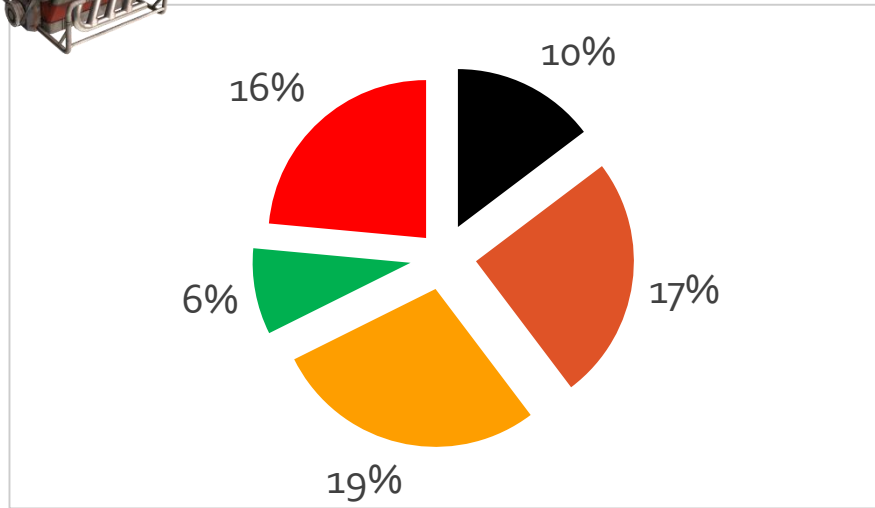
PAPER PRODUCTS



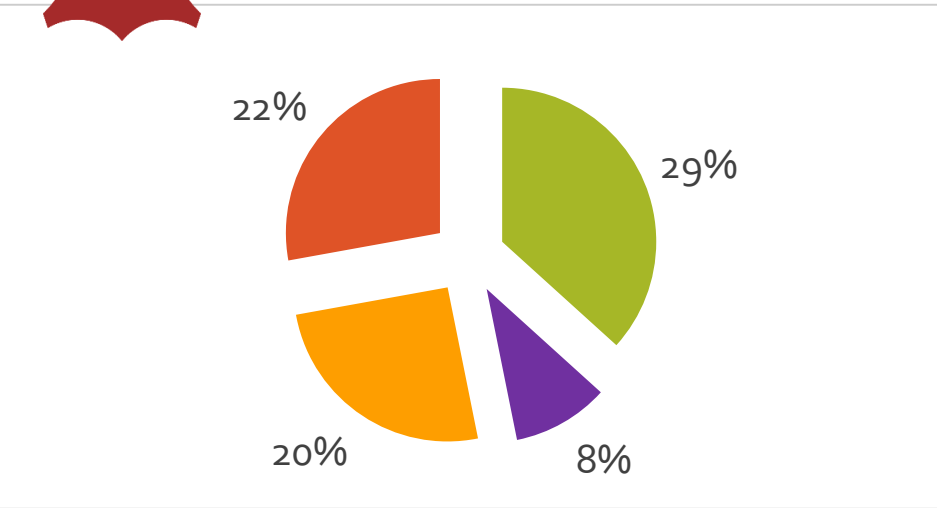
TEXTILES



MACHINERY & EQUIPMENTS



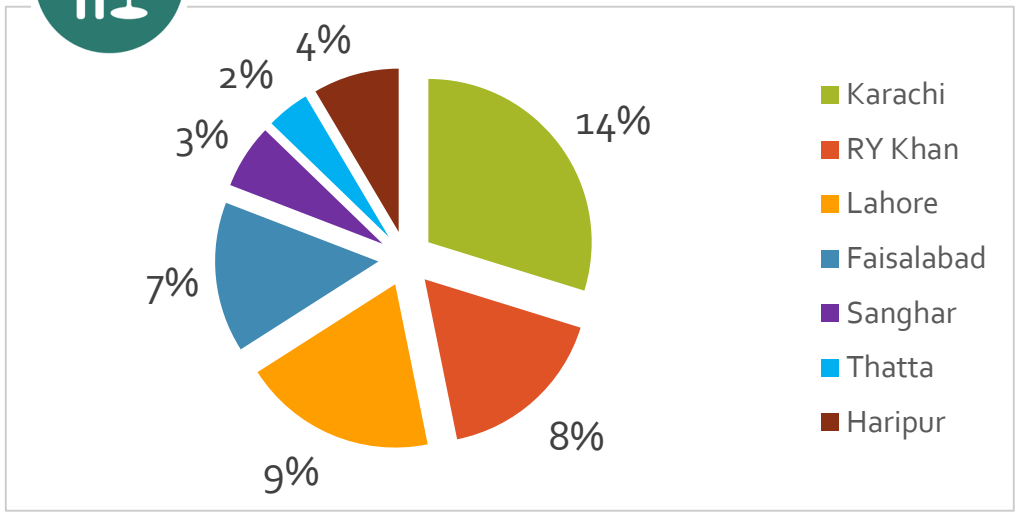
LEATHER GOODS



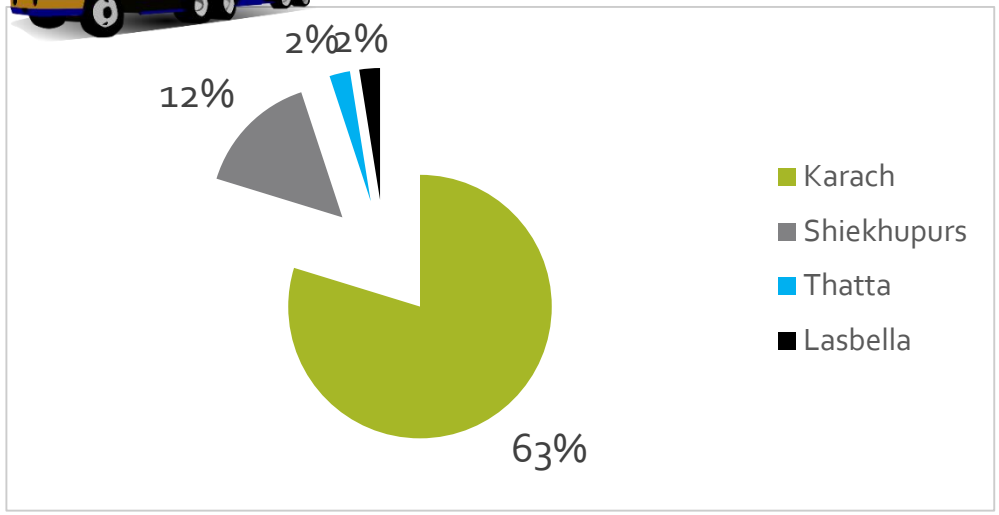
- Karachi
- Shiekhupura
- Lahore
- Faisalabad
- DG Khan
- Gujarat
- Pak Pattan
- Kasur

INDUSTRY WISE OUTPUT SHARE

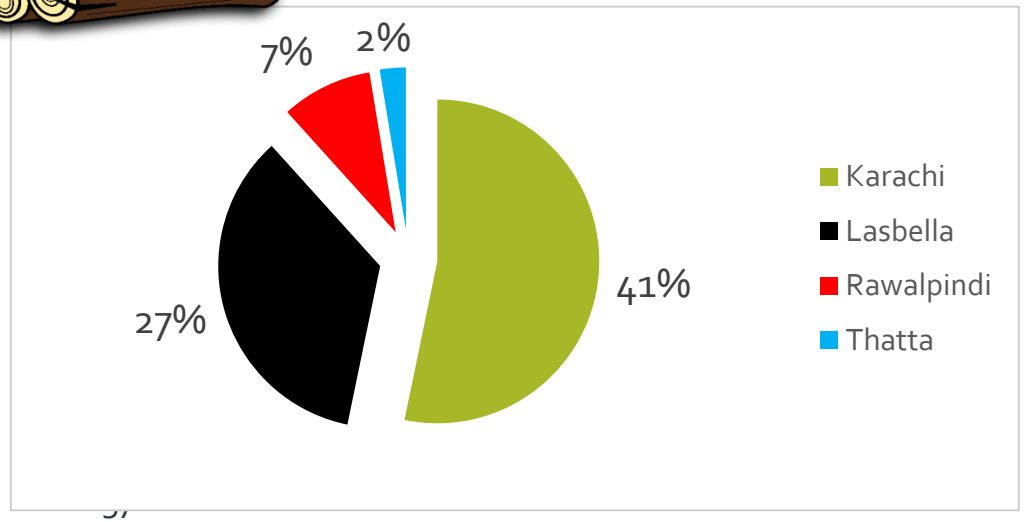
FOOD & BEVERAGES



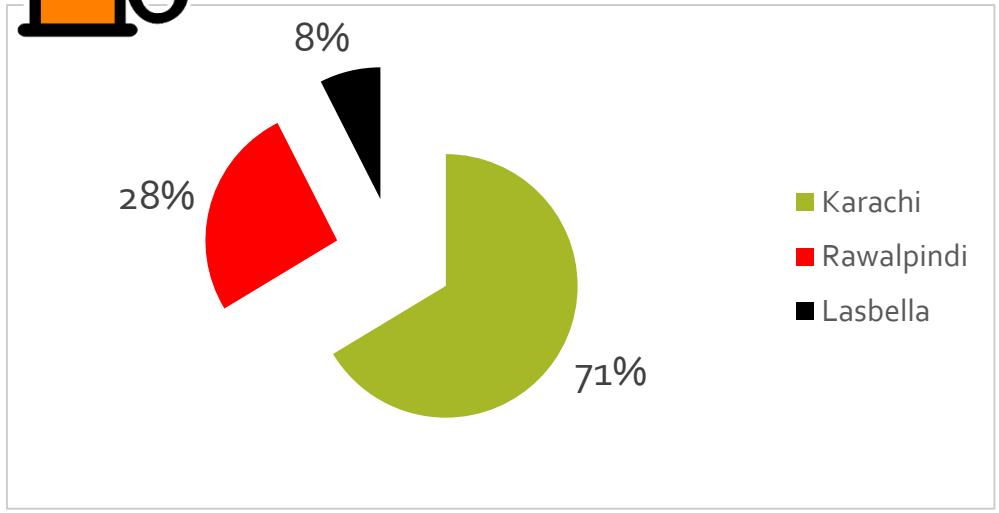
VEHICLES



WOOD PRODUCTS



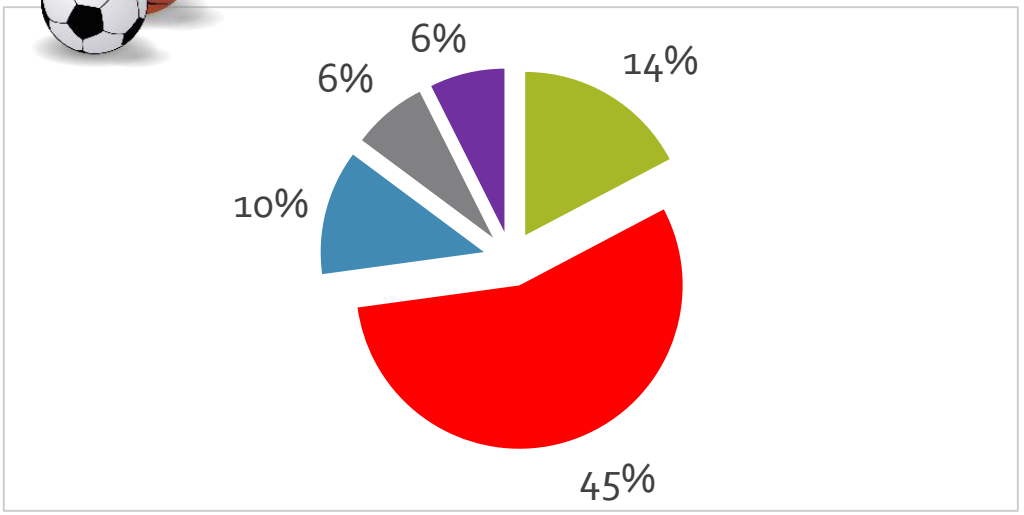
PETROLEUM



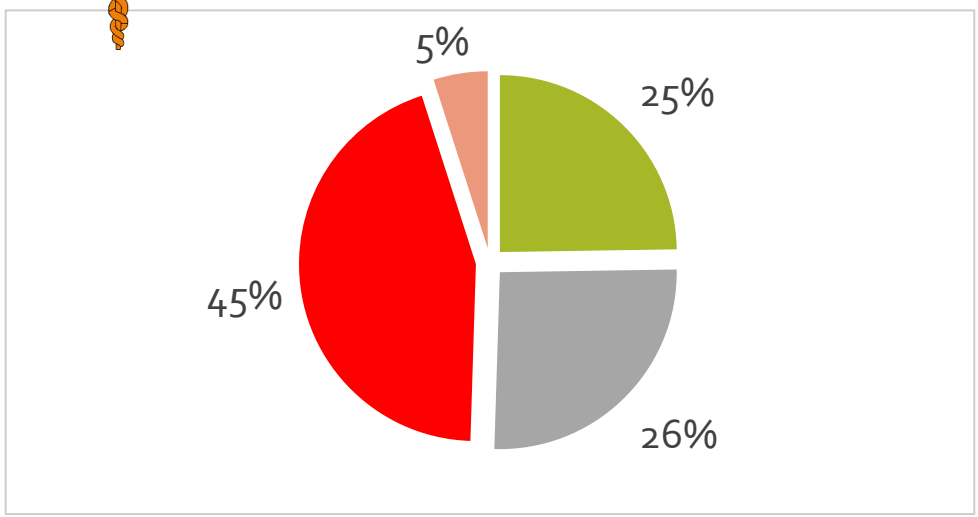
- Karachi
- Rahim Yar Khan
- Lahore
- Faisalabad
- Thatta
- Sheikhupura
- Haripur
- Lasbella
- Sanghar
- Rawalpindi

INDUSTRY WISE OUTPUT SHARE

SPORTS & FURNITURE



MEDICAL INSTRUMENTS



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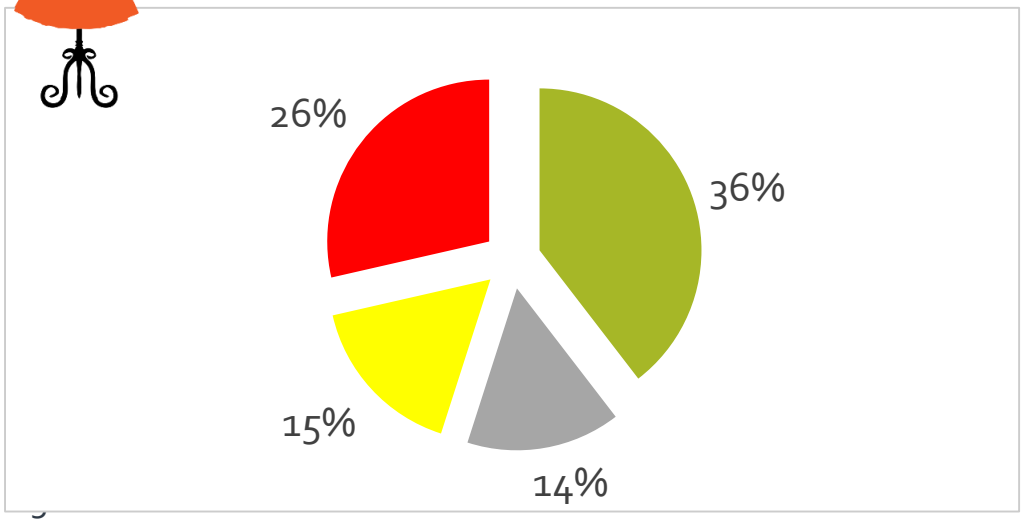
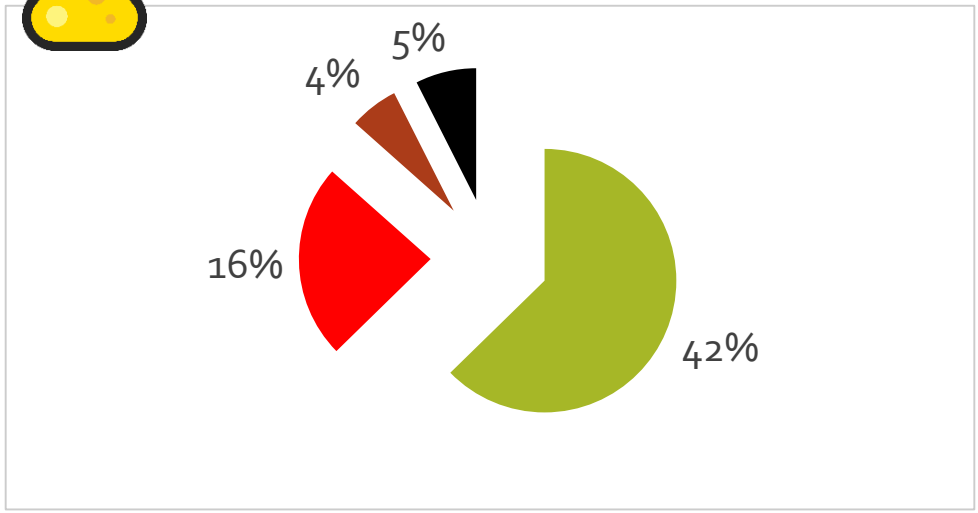


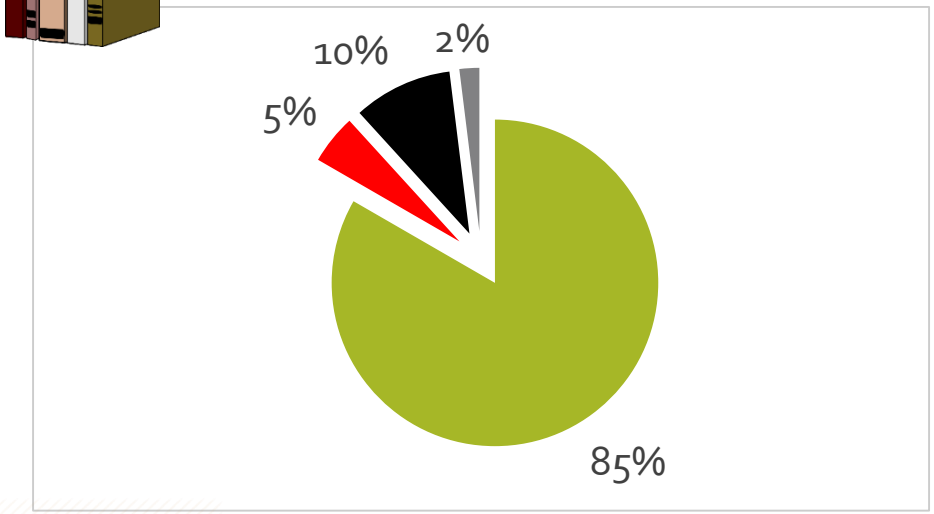
CHEMICALS



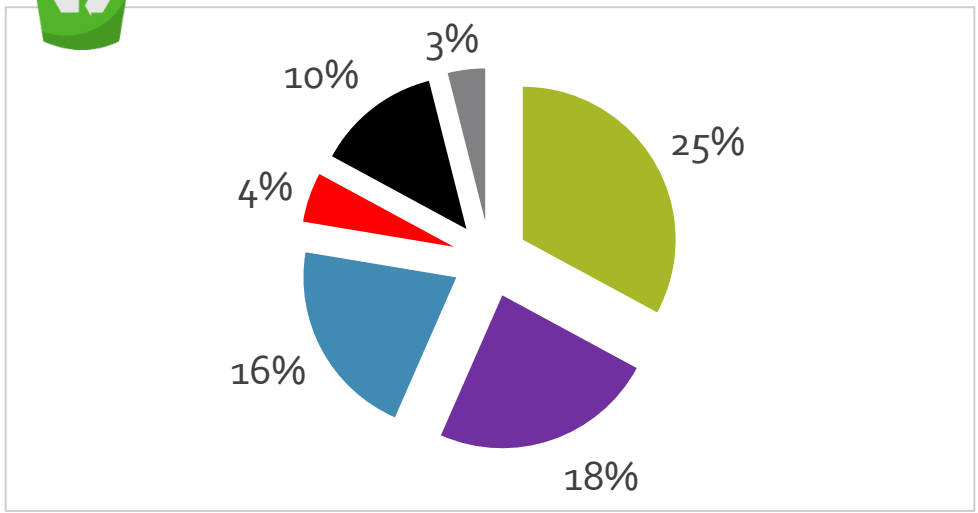
- Sialkot
- Karachi
- Hafizabad
- Lahore
- Quetta
- Peshawar
- Ghotki
- Lasbella
- Gujranwala

INDUSTRY WISE OUTPUT SHARE

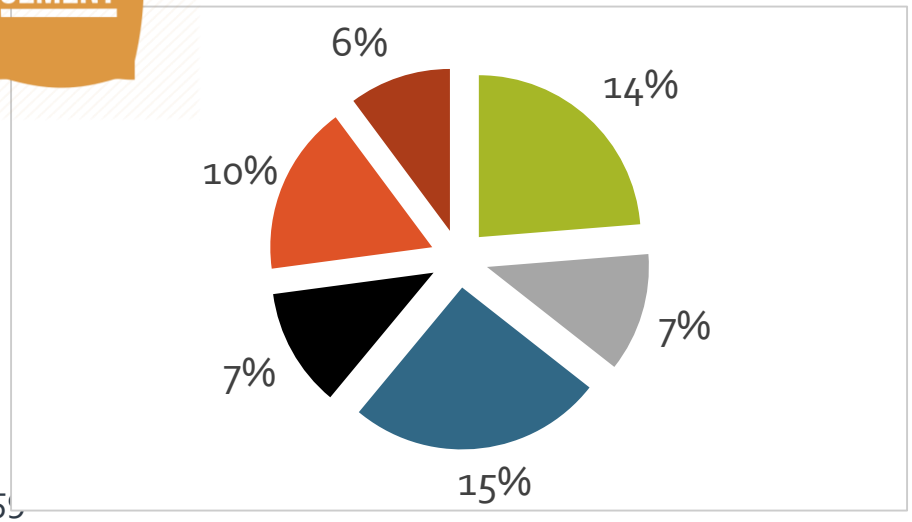
PUBLISHING & PRINTING



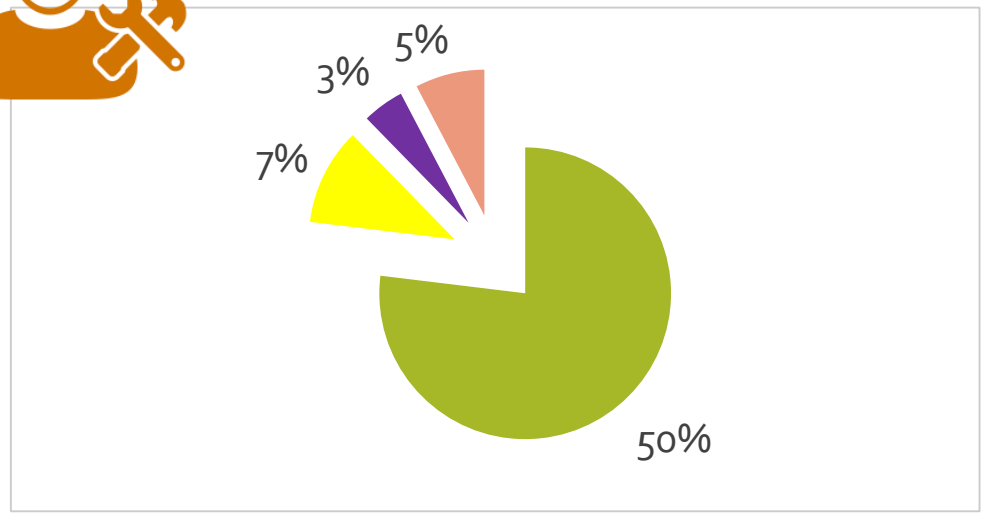
RUBBER & PLASTIC



NON METALLIC MINERALS

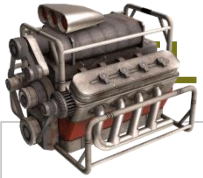


FABRICATED METALS

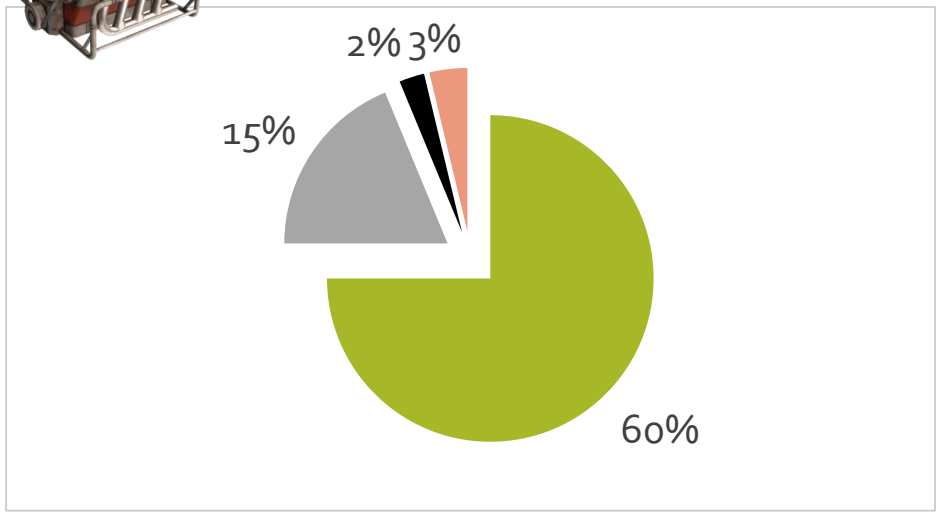


- Islamabad
- Karachi
- Hyderabad
- DG Khan
- Dadu
- Bhakar
- Noushera
- Lasbella
- Haripur
- Thatta

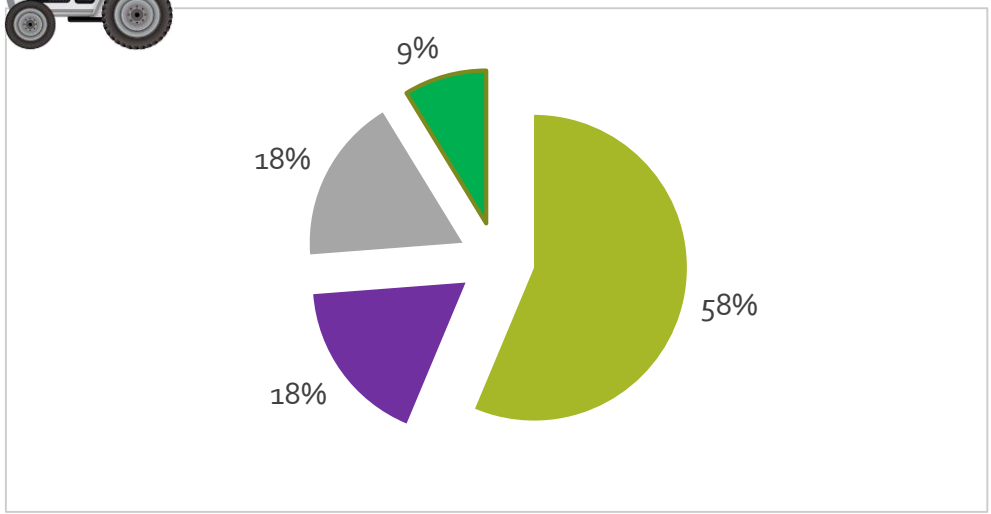
INDUSTRY WISE OUTPUT SHARE



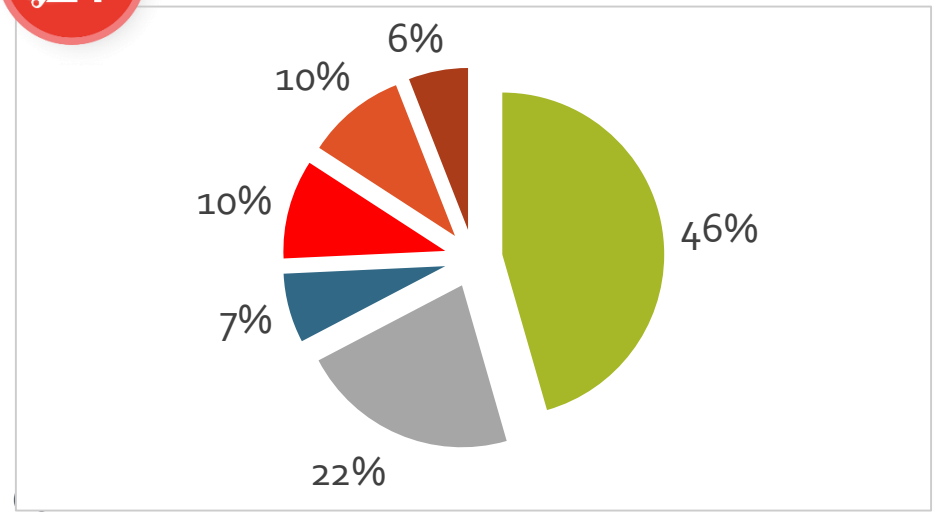
ELECTRICAL MACHINERY



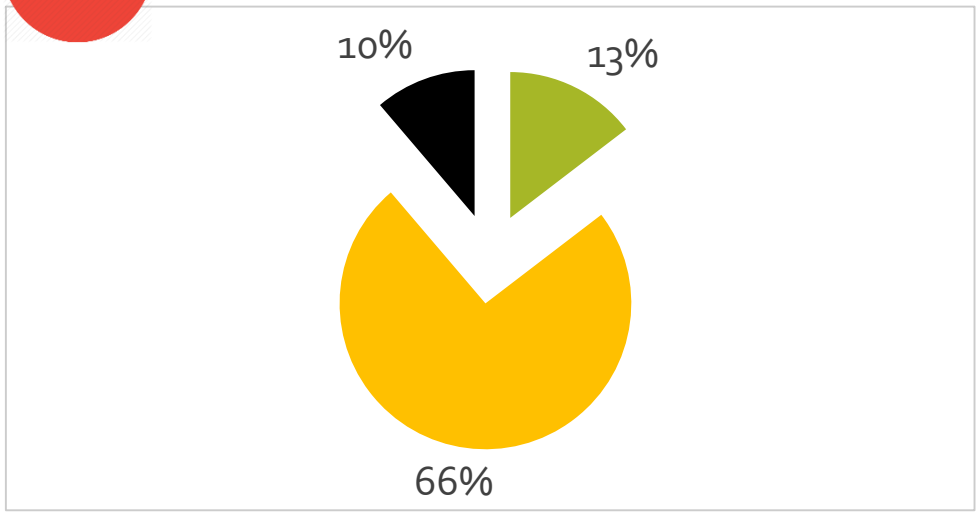
TRANSPORT EQUIPMENT



BASIC METALS



TOBACCO

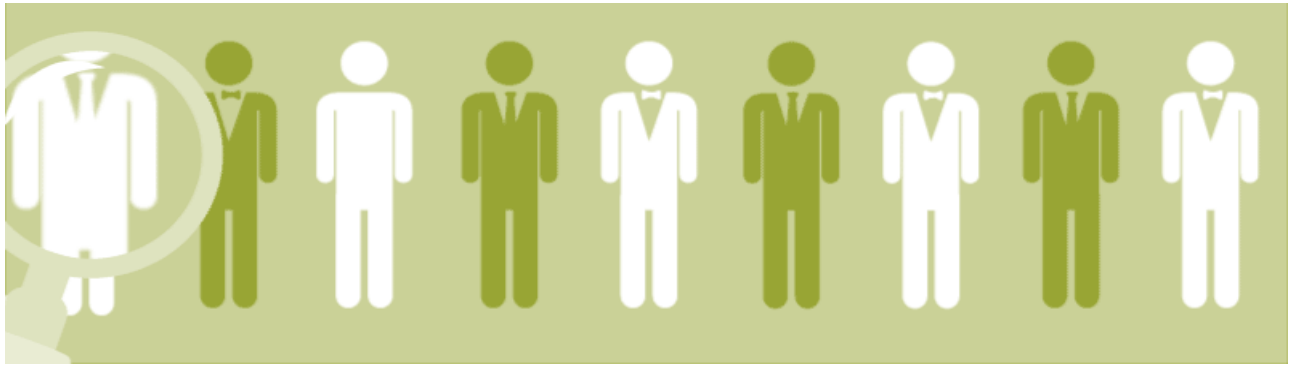


- Shiekhupura
- Karachi
- Hyderabad
- Lahore
- Noushera
- Quetta
- Gujranwala
- Sahiwal
- Haripur
- Thatta

INDUSTRIAL SPECIALIZATION OF DISTRICTS

SPECIALIZATION METHODOLOGY

Specialization Quotient (SQ) is share of employment by industry in total district industrial employment divided by share of employment by industry in total national industrial employment



SQ = 1 → Average Specialization

SQ > 1 → Above Average Specialization

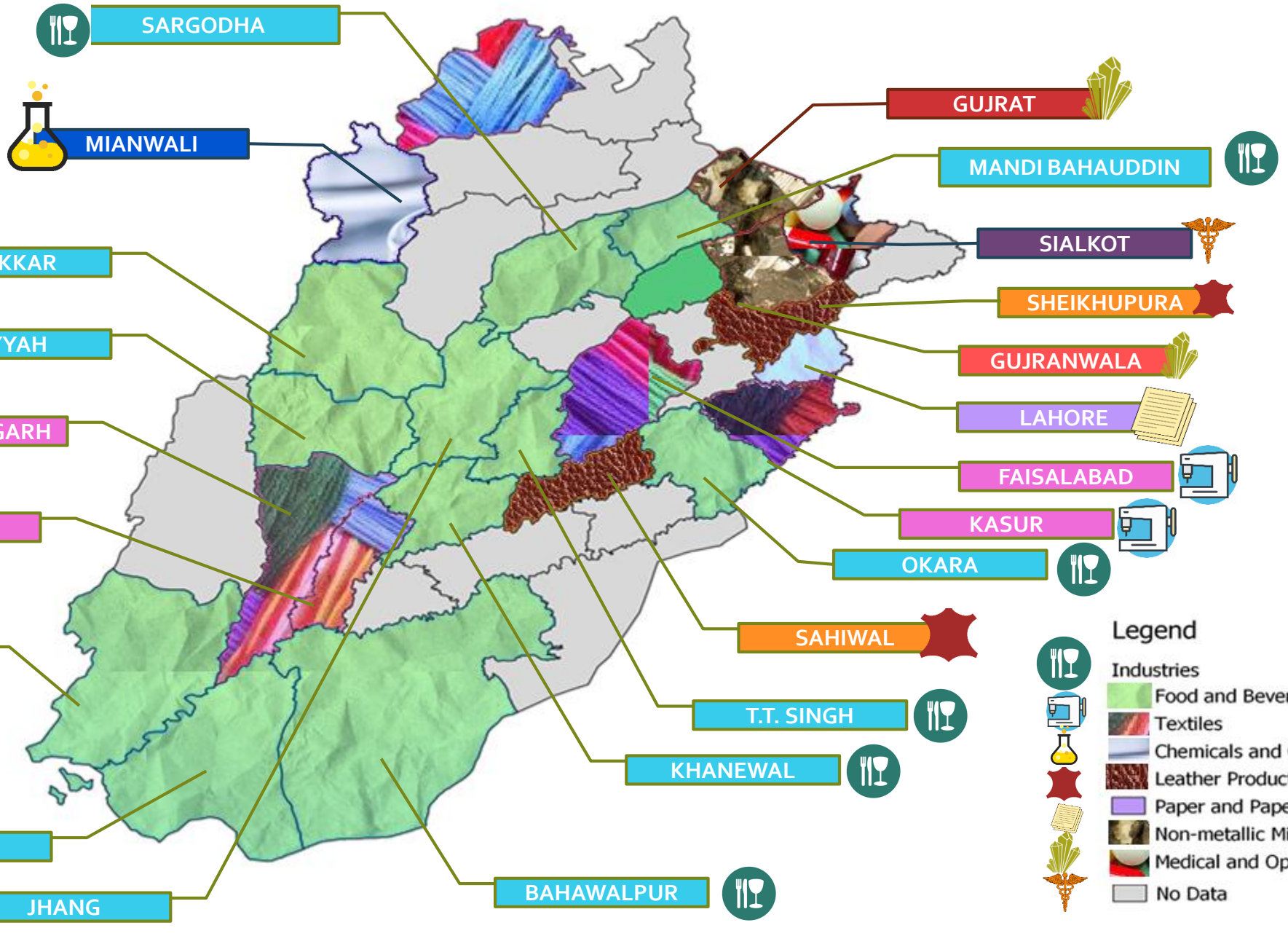
SQ < 1 → Below Average Specialization

RESULTS

DISTRICTS W.R.T HIGHEST INDUSTRIAL SPECIALIZATION

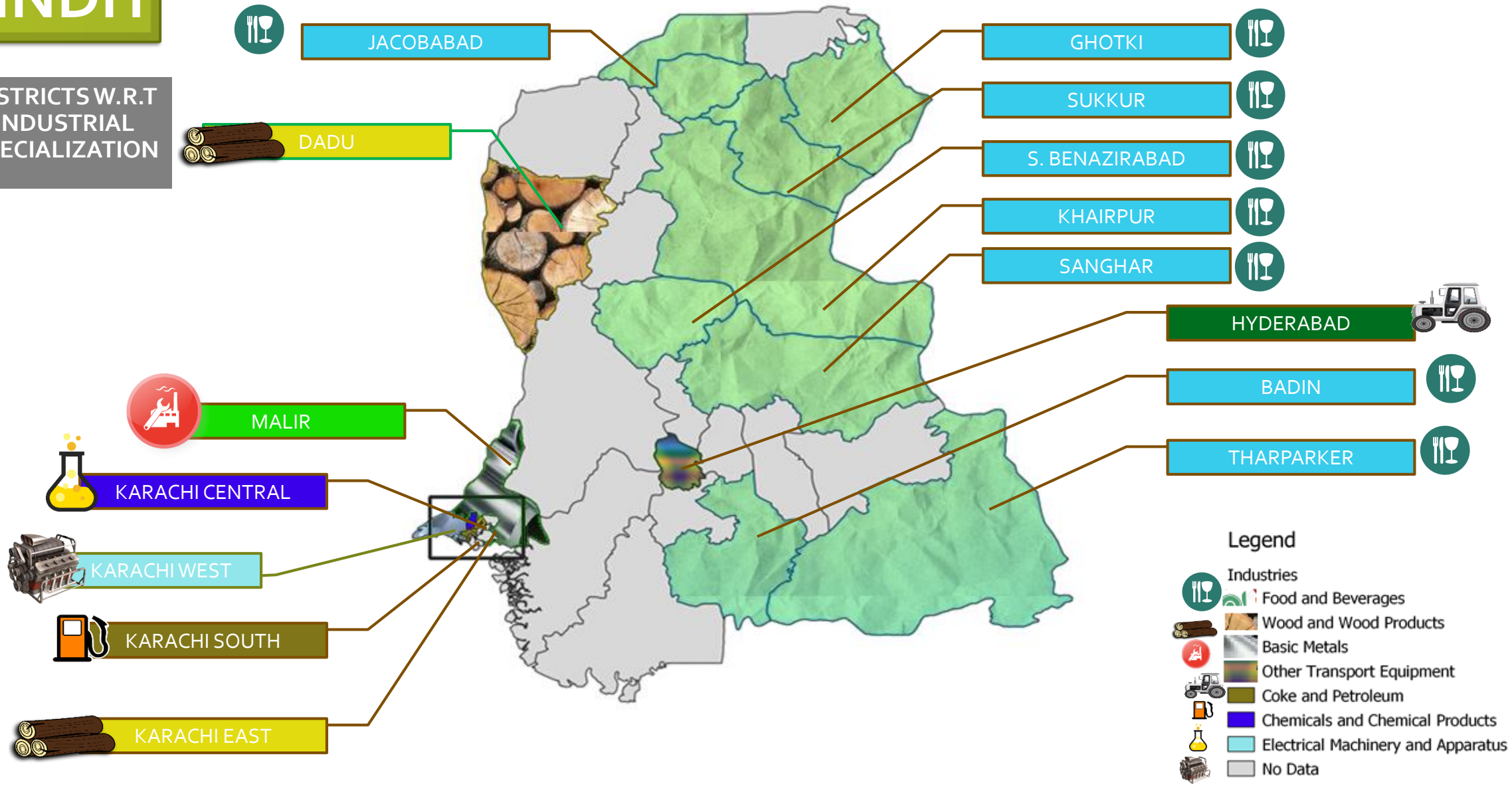
PUNJAB

DISTRICTS W.R.T INDUSTRIAL SPECIALIZATION



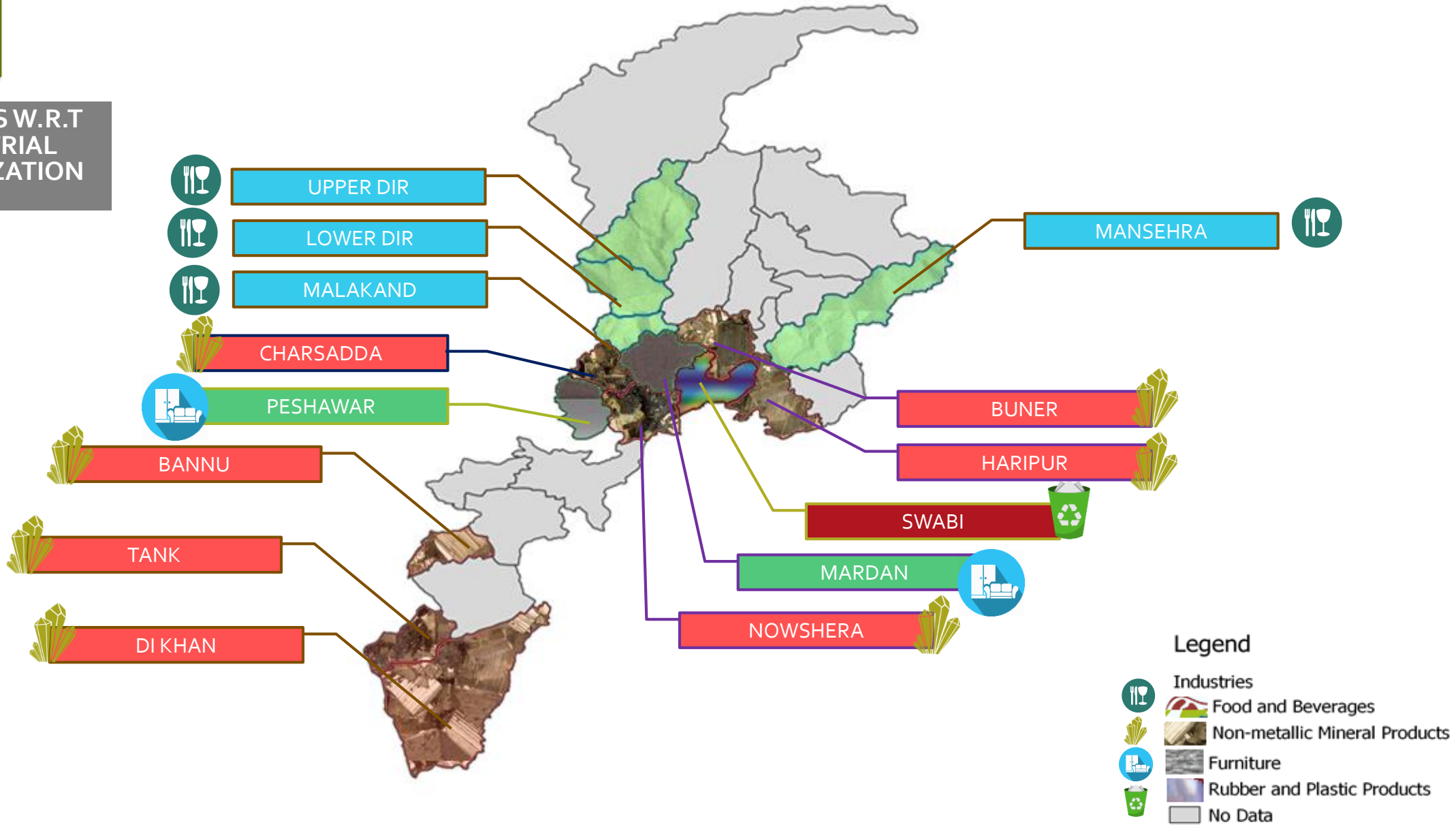
SINDH

DISTRICTS W.R.T INDUSTRIAL SPECIALIZATION



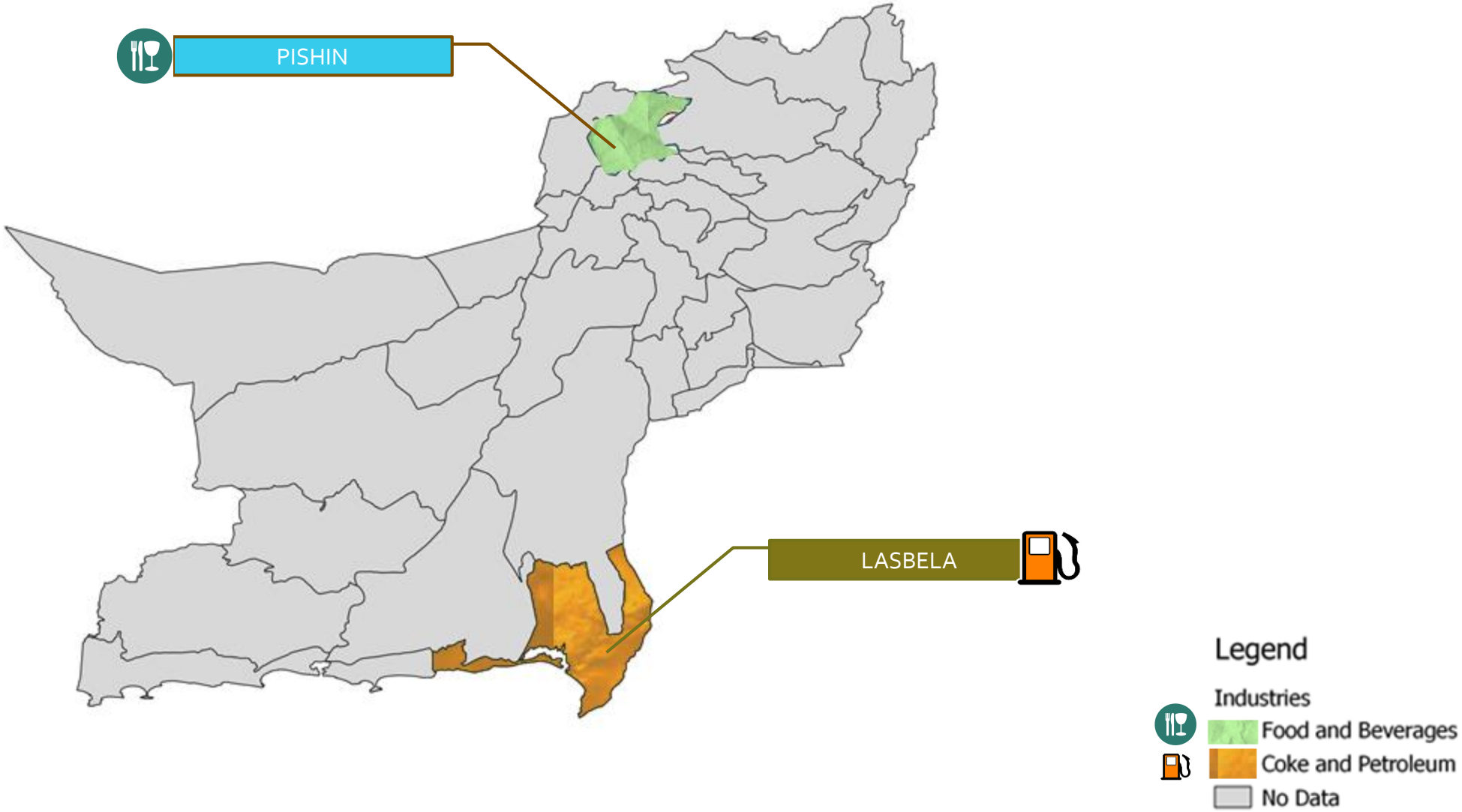
KPK

DISTRICTS W.R.T INDUSTRIAL SPECIALIZATION



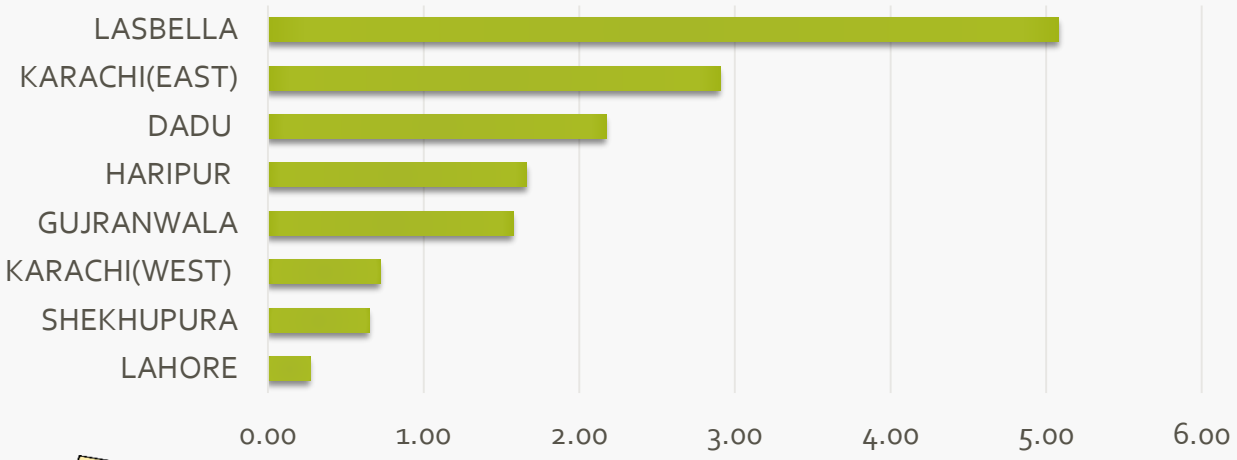
BALOCHISTAN

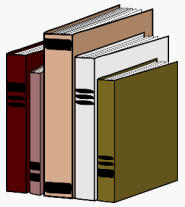
DISTRICTS W.R.T INDUSTRIAL SPECIALIZATION



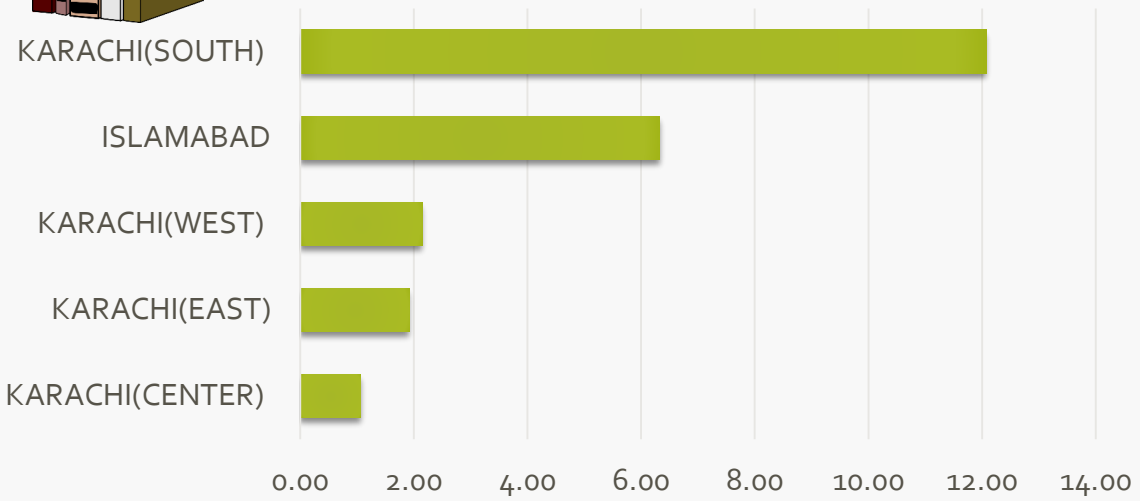
INDUSTRY WISE DISTRICTS SPECIALIZATION

Specialization in Wood Industry

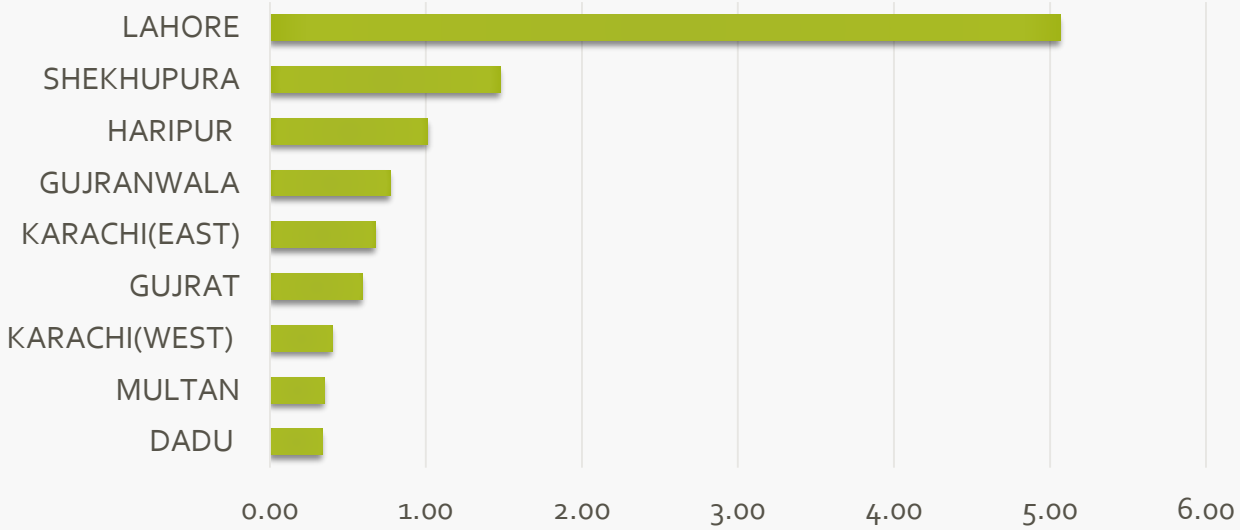




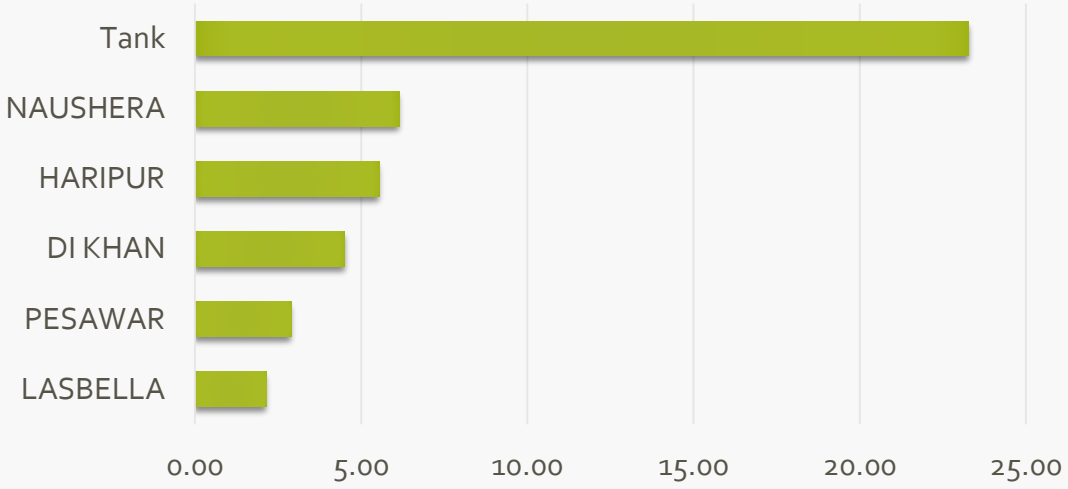
Specialization in Publishing & Printing



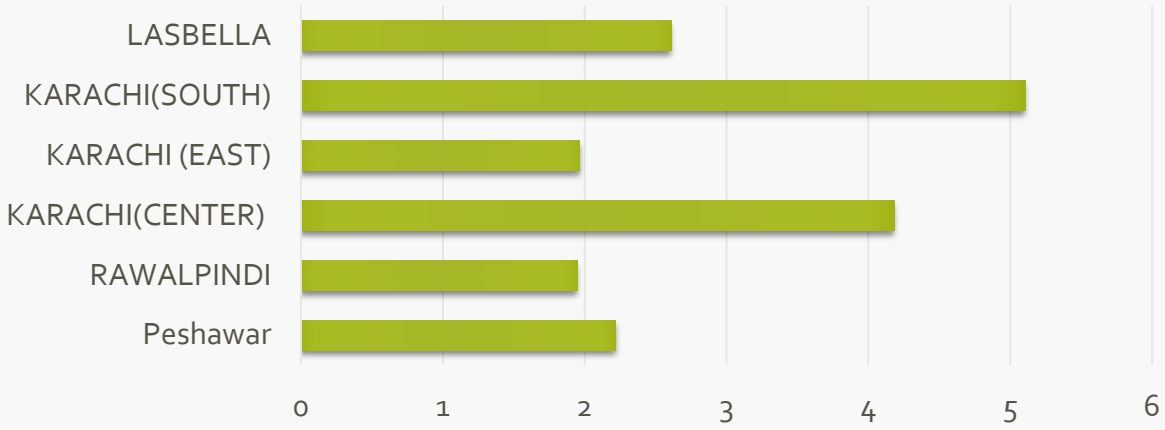
Specialization in Paper Industry



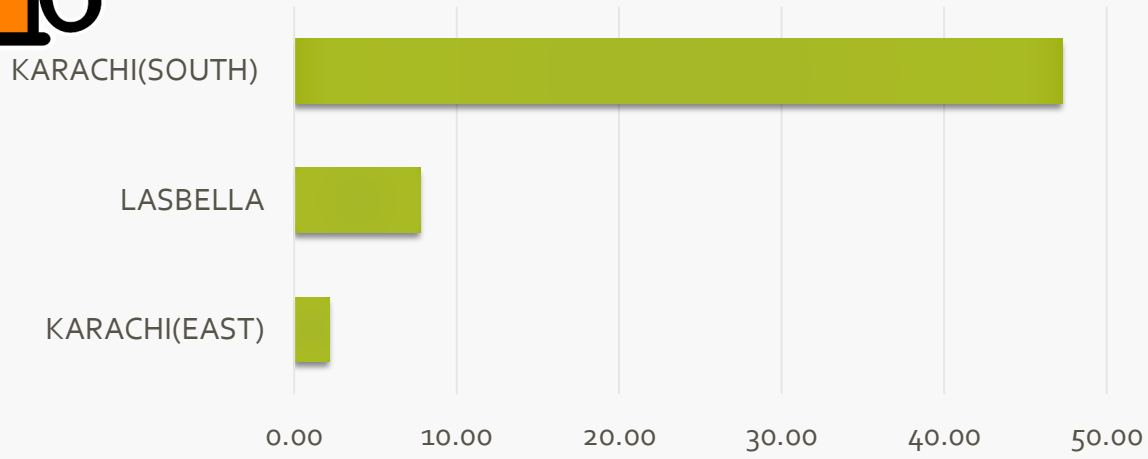
Specialization in Non Metallic Minerals



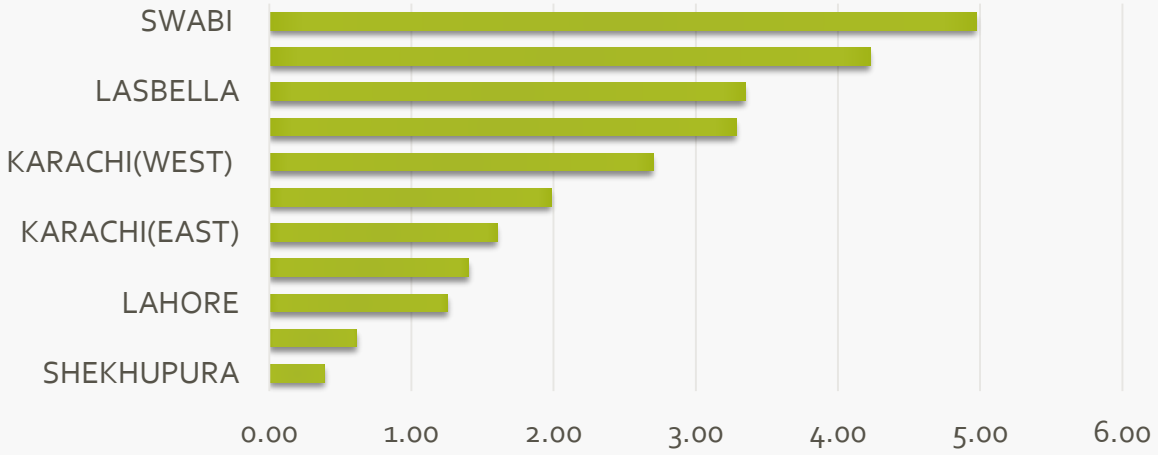
Specialization in Chemicals Industry



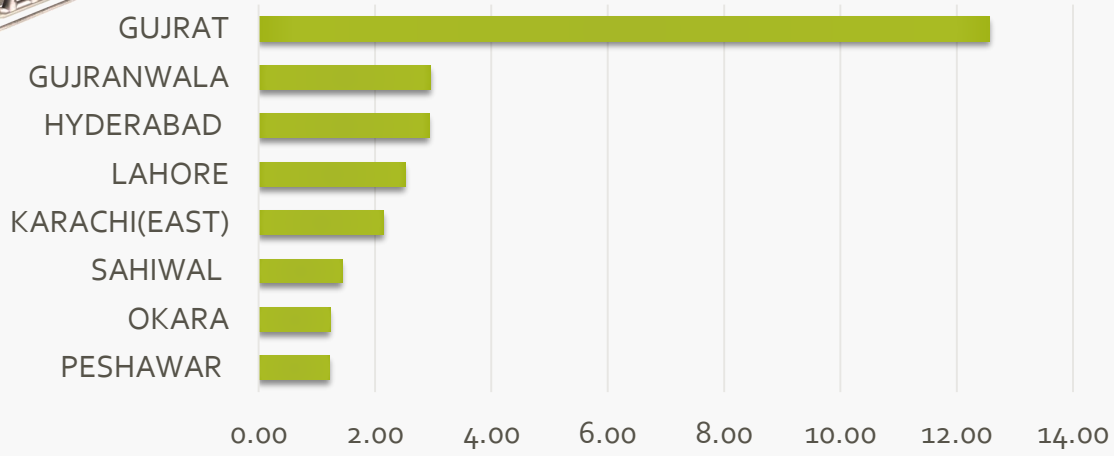
Specialization in Coke & Petroleum Industry



Specialization in Rubber & Plastic Industry

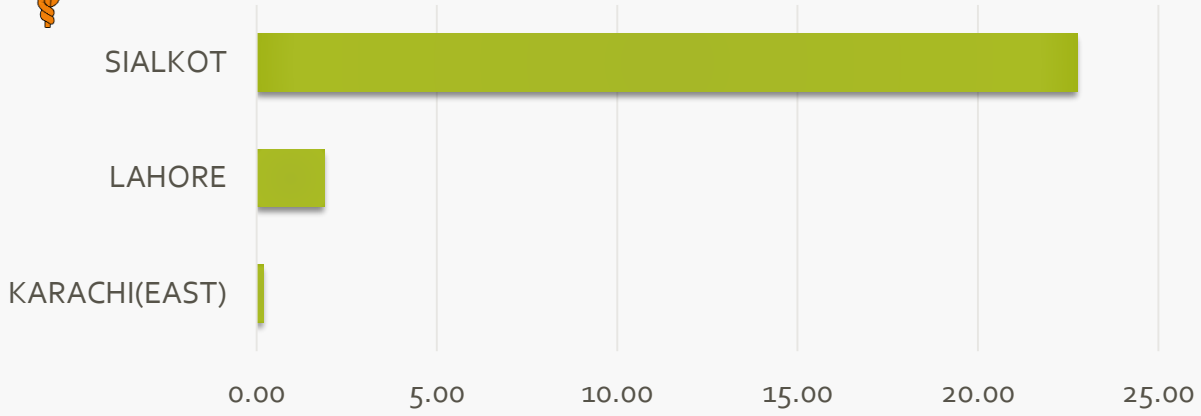


Specialization in Machinery & Equipments

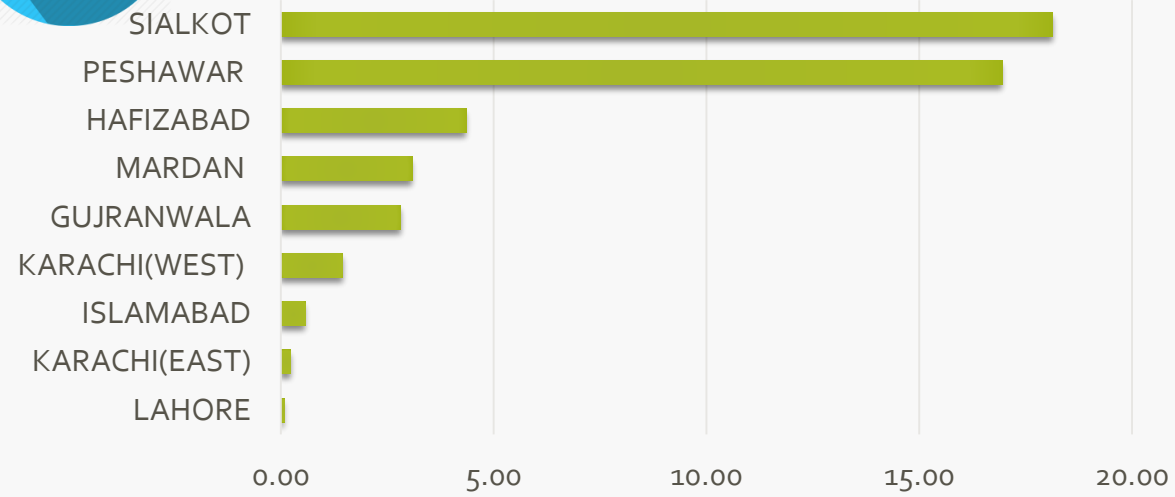


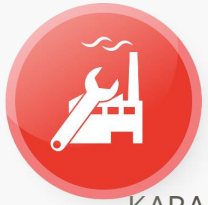
Specialization in Electrical Machinery

Specialization in Medical & Optical Instruments Industry

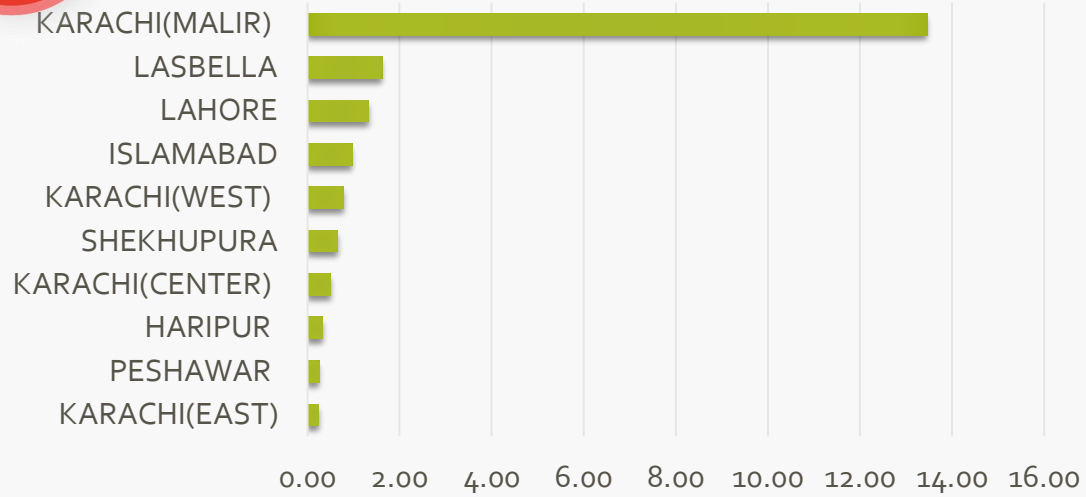


Specialization in Furniture/Sports Industry

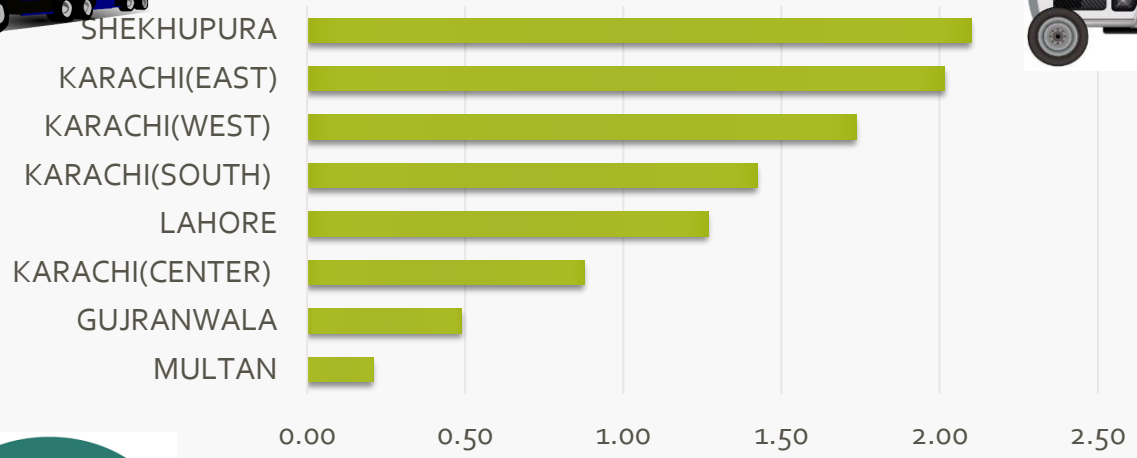




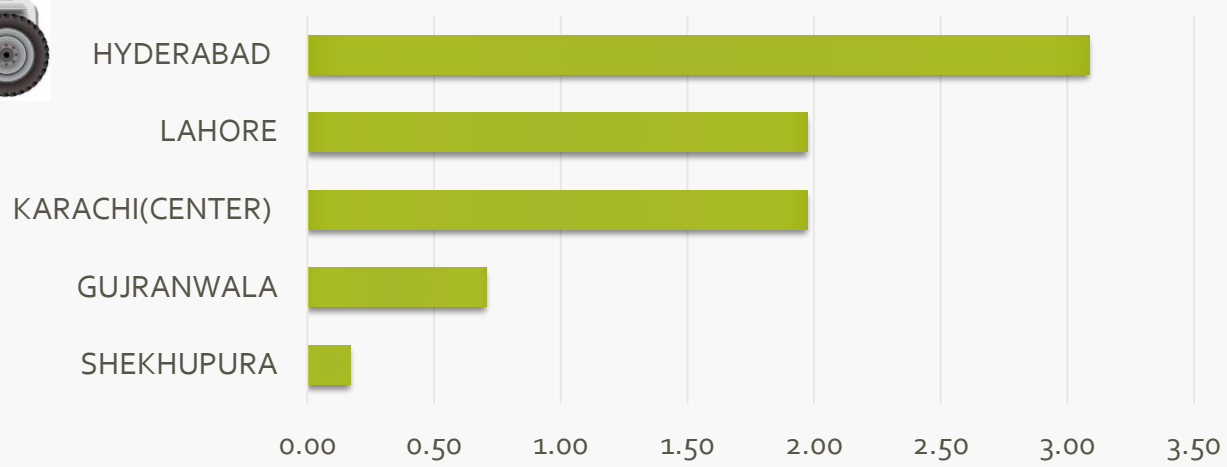
Specialization in Basic Metals Industry



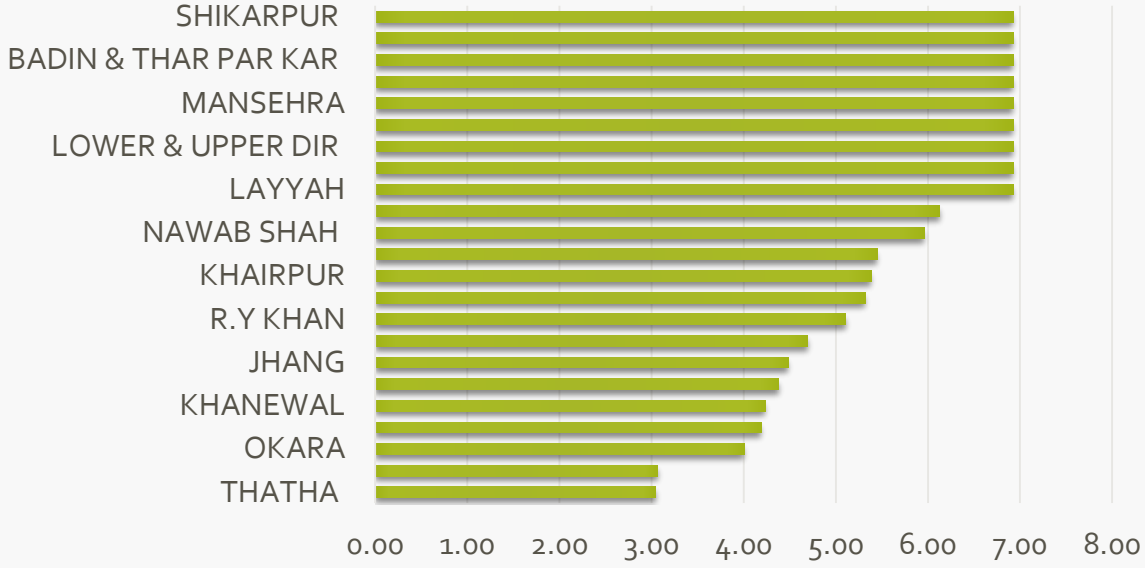
Specialization in Motor Vehicles & Trailers



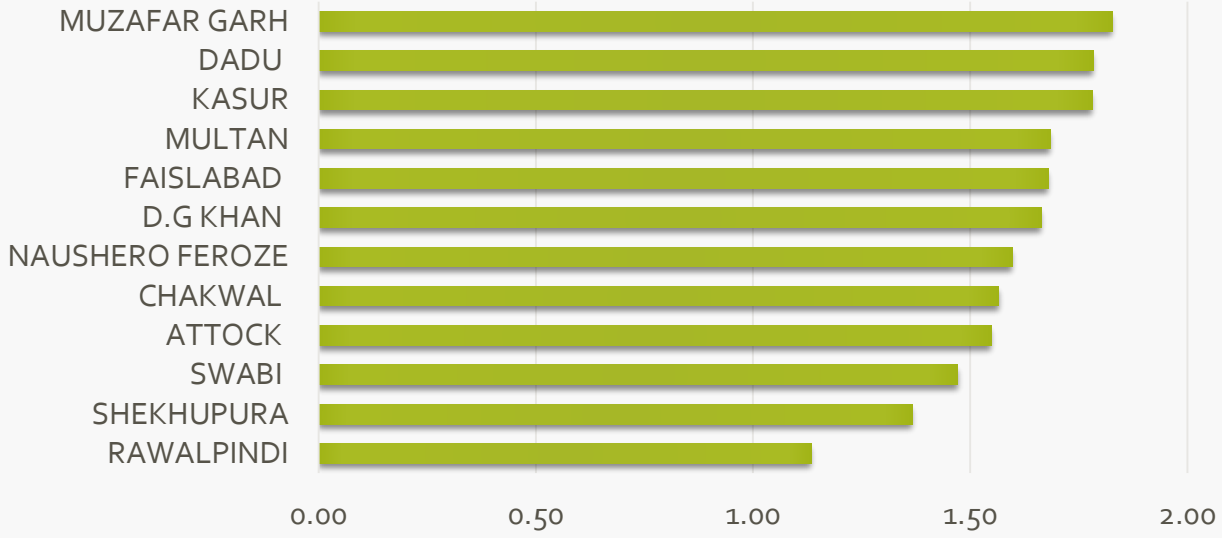
Specialization in Transport Equipment Industry



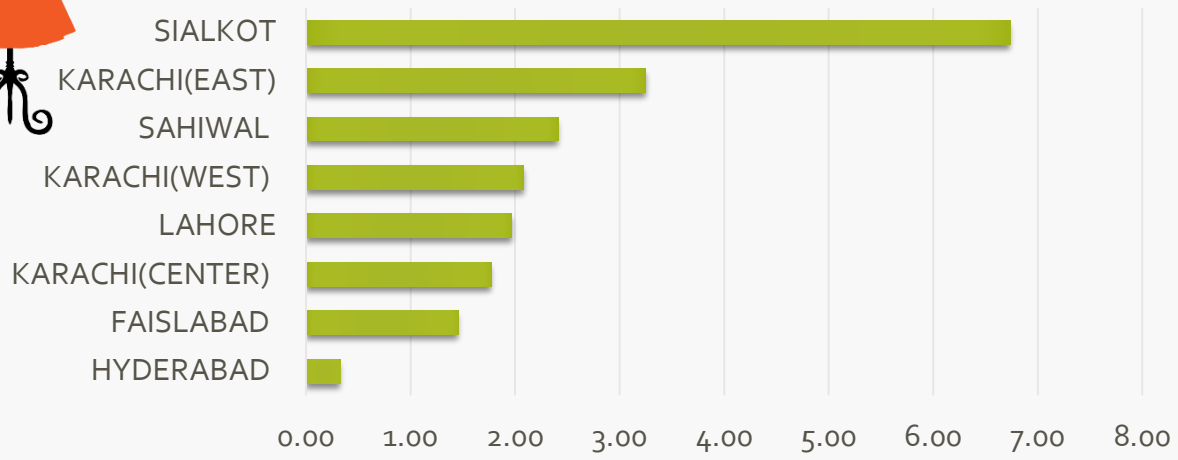
Specialization in Food & Beverages

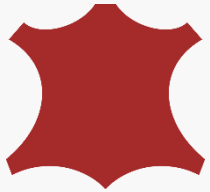


Specialization in Textile Industry

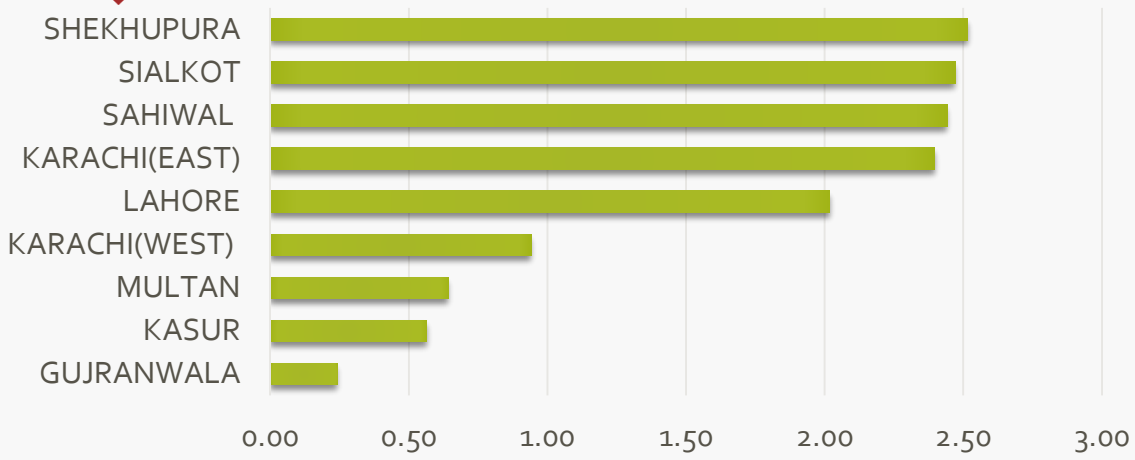


Specialization in Wearing Apparel

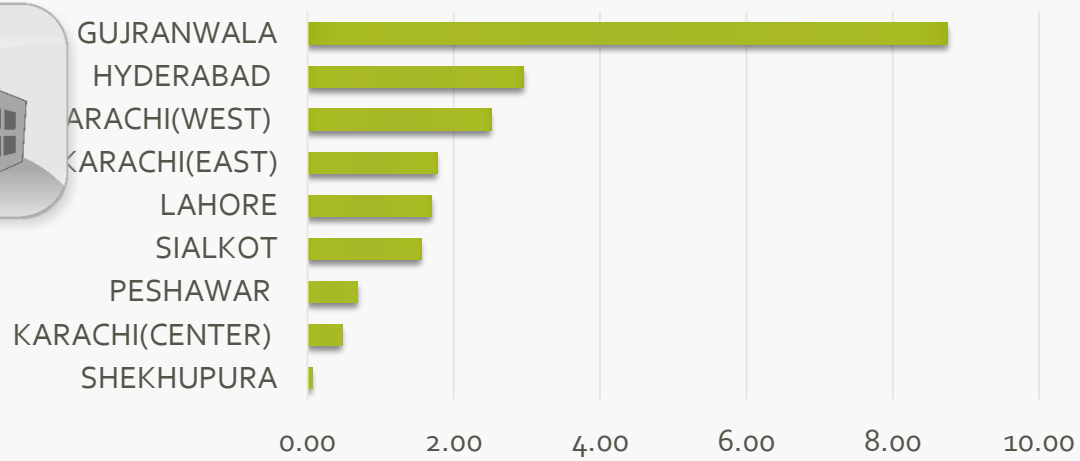




Specialization in Leather Goods



Specialization in Fabricated Metals



ECONOMIC CONVERGENCE BETWEEN DISTRICTS

Downward trend will show convergence between districts while upward trend will show divergence between districts

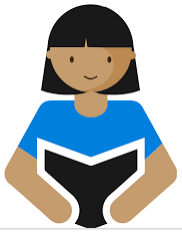
Convergence is estimated through Coefficient of Variation (CV)

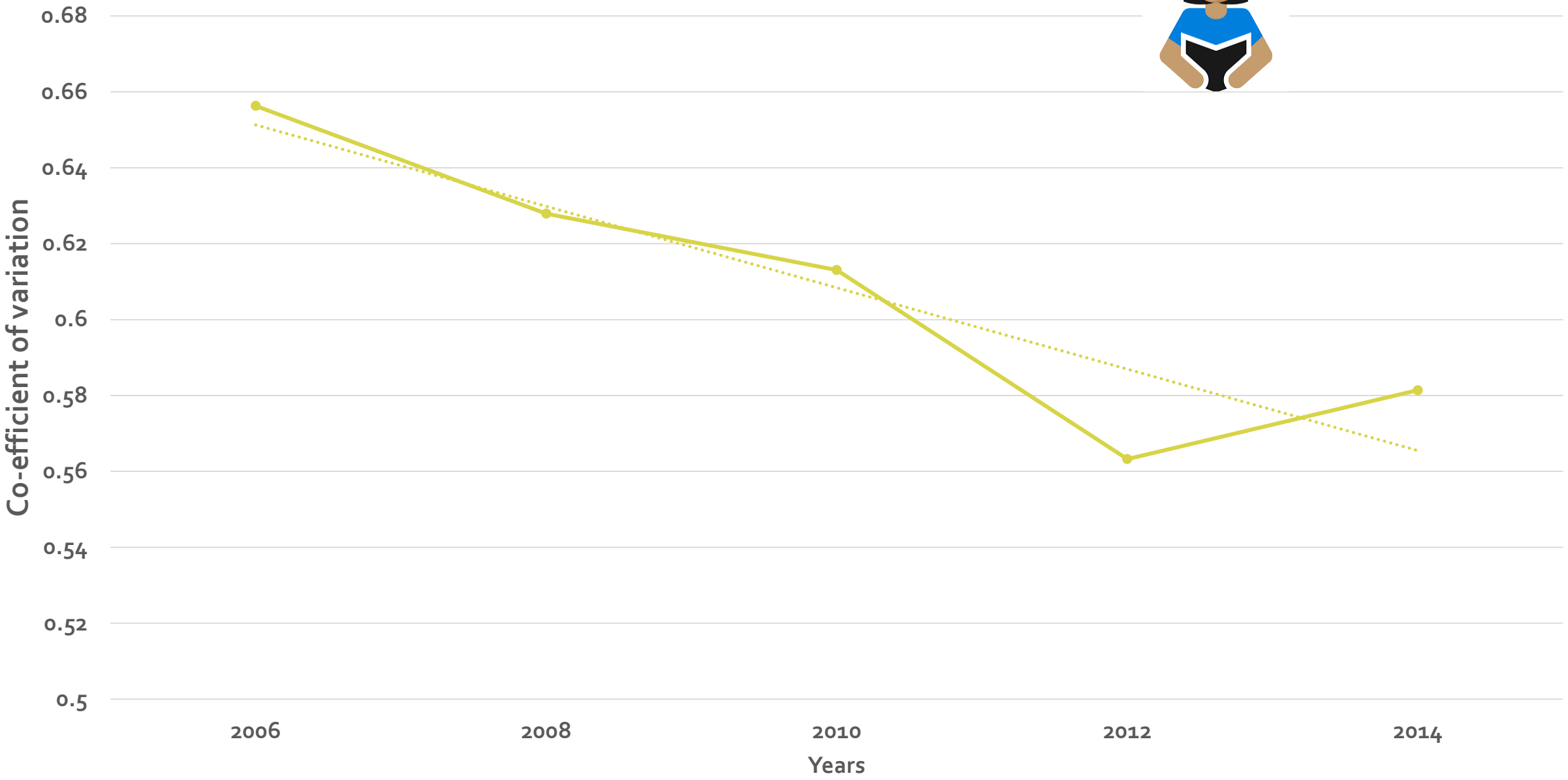
$$CV = \frac{\textit{Standard Deviation for all Districts}}{\textit{Mean of all Districts}}$$

Convergence between districts implies the economic disparity between districts is decreasing overtime and districts are catching up with each other.

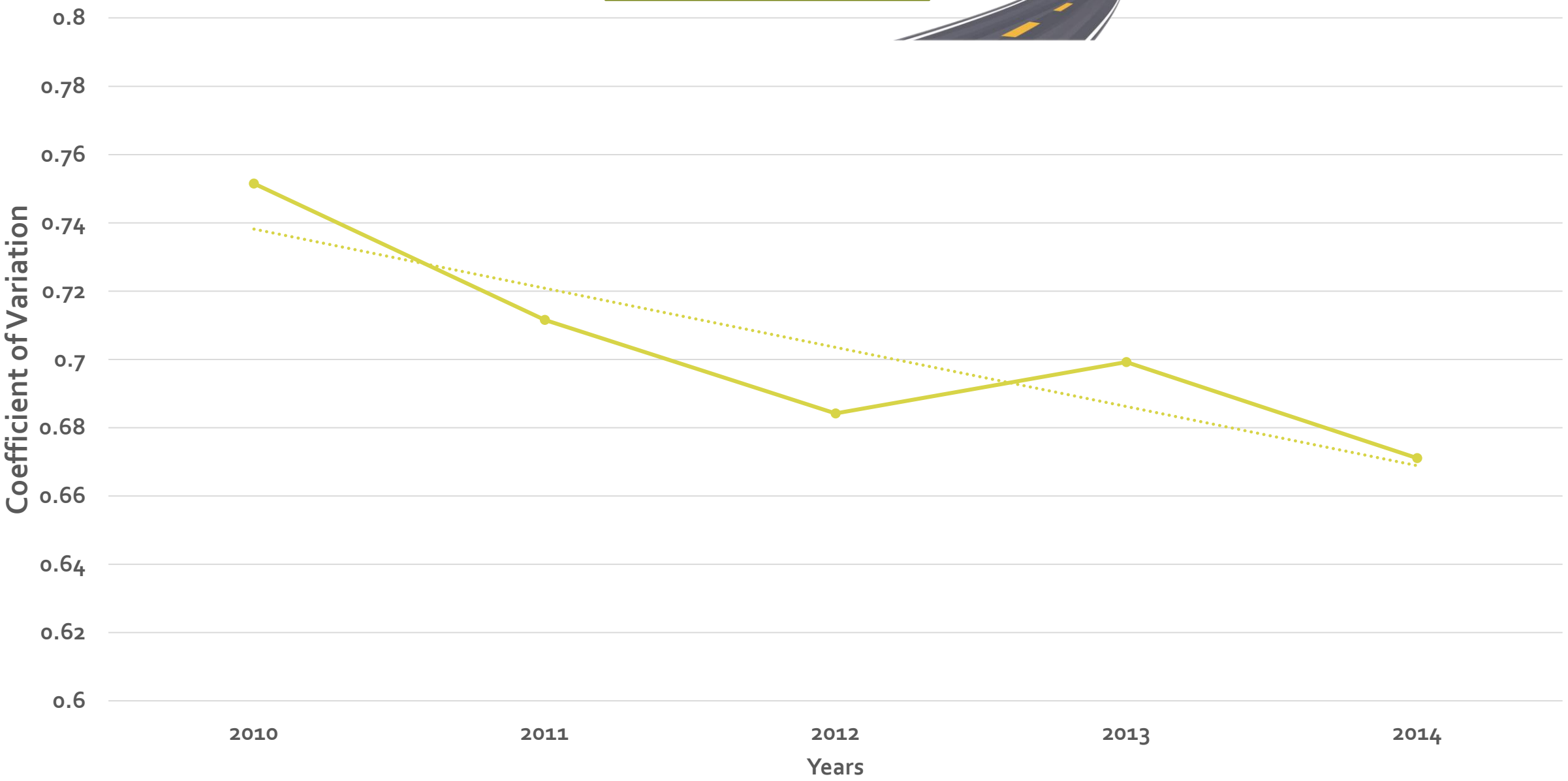
Convergence will be checked through one education variable , female literacy rate (PSLM 2006-2014), and one infrastructure variable , roads density (Provincial Development Statistics 2010-2014)

FEMALE LITERACY RATE



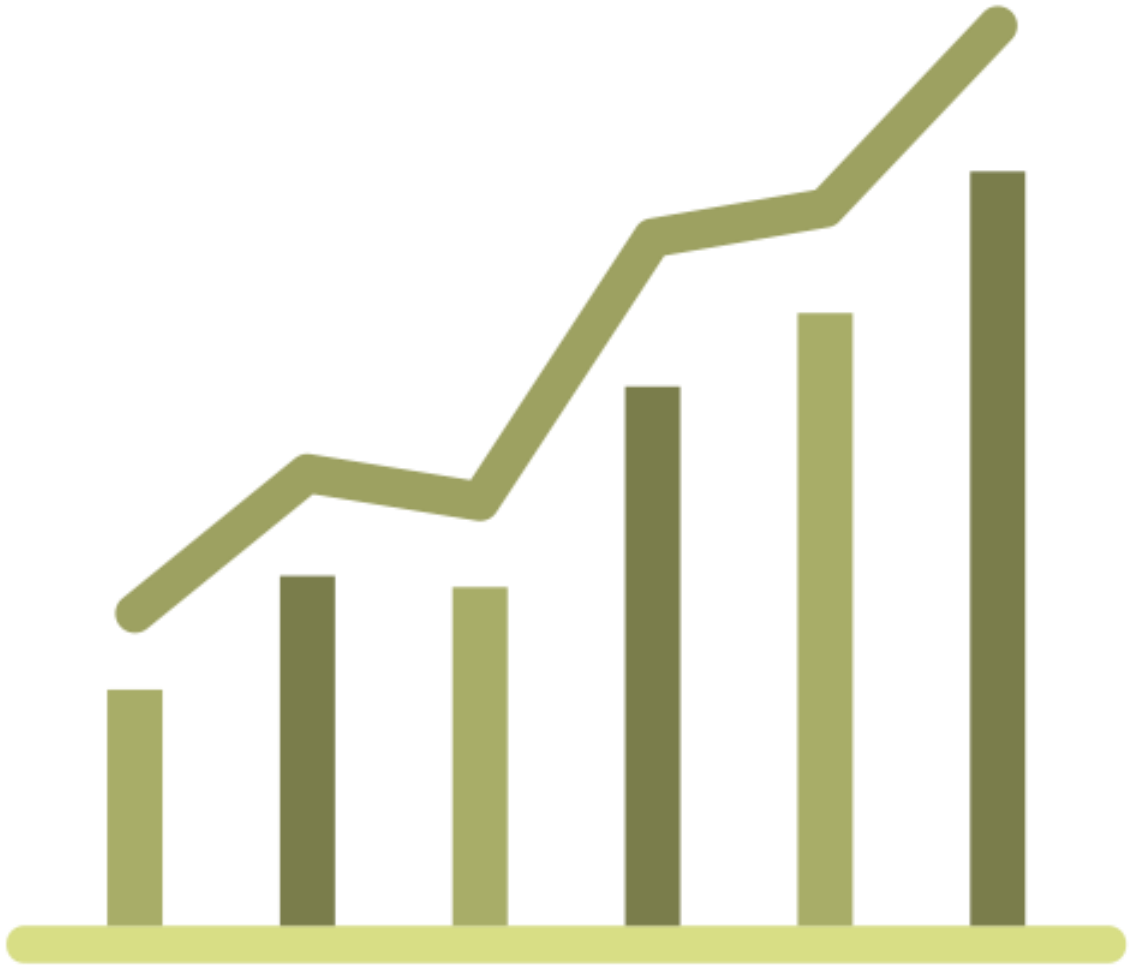


ROADS DENSITY



ECONOMIC CONVERGENCE IS PROVED

Analysis show convergence is occurring implying the economic disparity between 110 districts of Punjab, Sindh, Balochistan and KPK is decreasing and districts are catching up with each other's level of development.



IDENTIFYING THE ECONOMIC DISTANCE

By taking female literacy rate(Y) as proxy for district economic growth and regressing its past 5 years values on number of years(X), we get time trend slope.

The slope of regression is used to forecast the years (X) required to reach the average literacy rate (Y) of green districts.

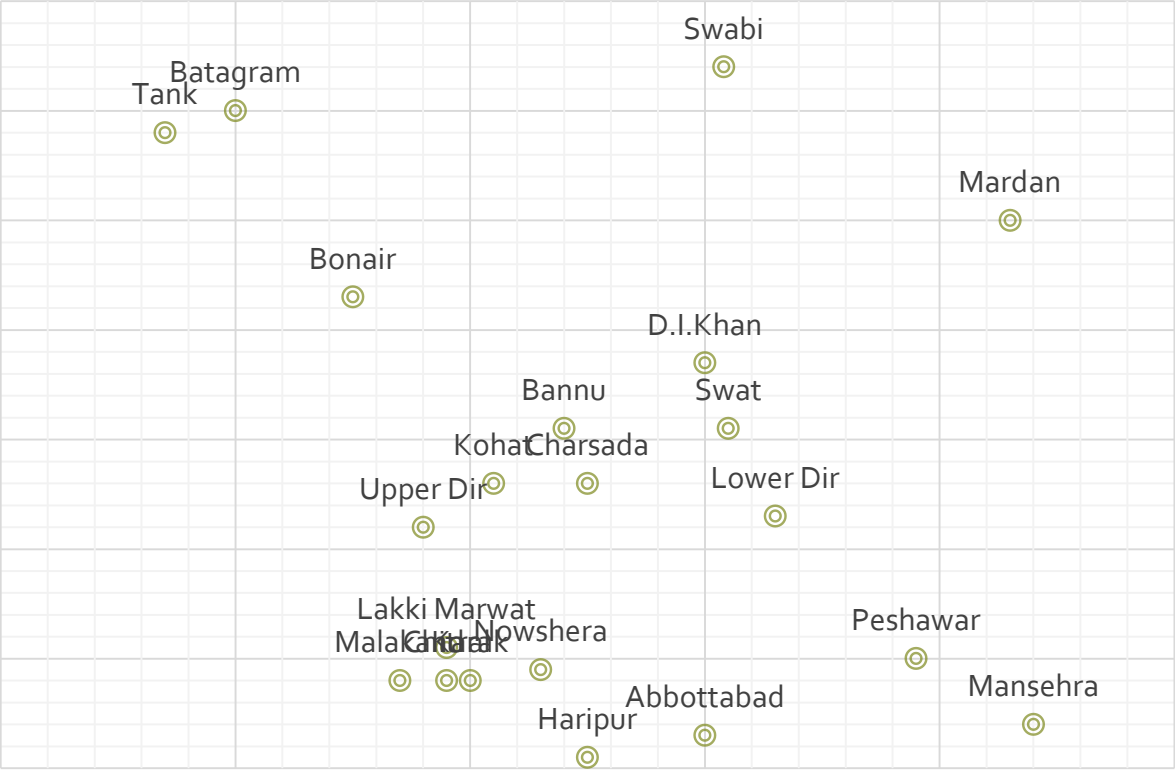
This is compared with the district level budgets to relate the time with the resources for the catch up of less developed districts

GRAPHICAL REPRESENTATION

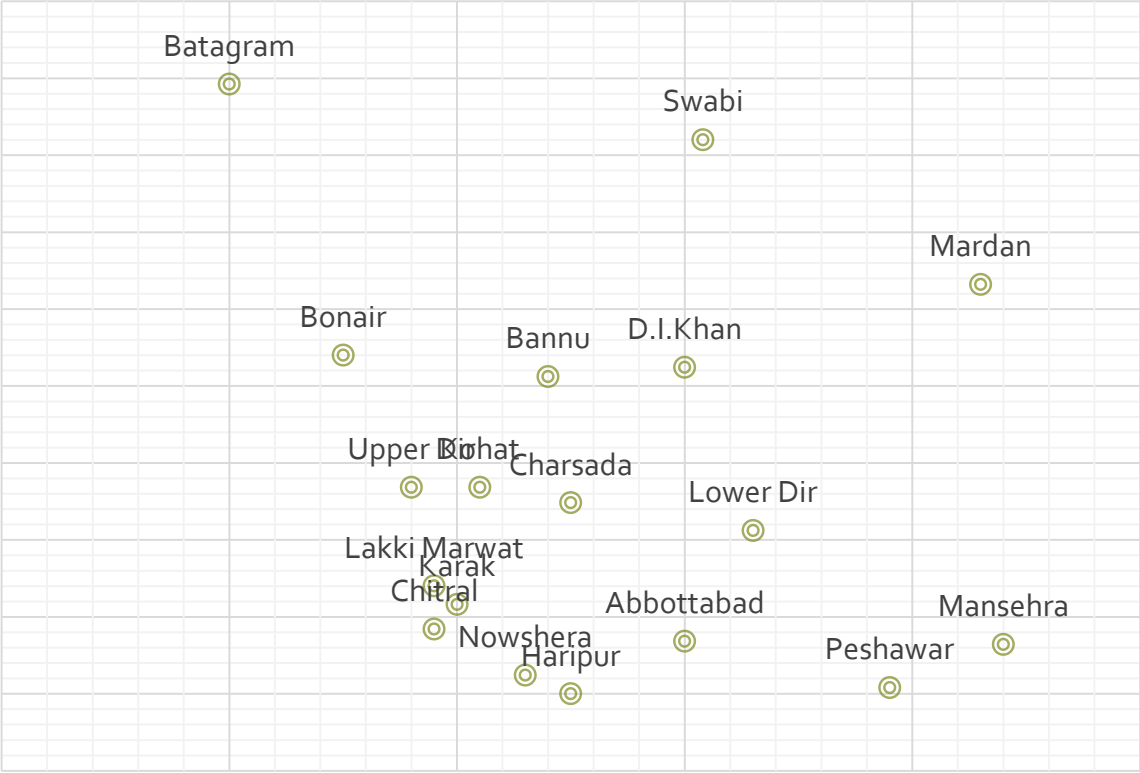
Plotting of time and budget required for eliminating district disparity

VALIDATION OF PROXY INDICATOR (FEMALE LITERACY RATE)

- The slope of the time trend analysis using the literacy rate as proxy indicator was also applied to the district indices (ranks) to evaluate the accuracy of literacy rate as being a good proxy indicator for district development
- The results proved that literacy rate based trend analysis produce similar results as of the district indices , hence literacy rate is a strong proxy indicator for district development catch up analysis

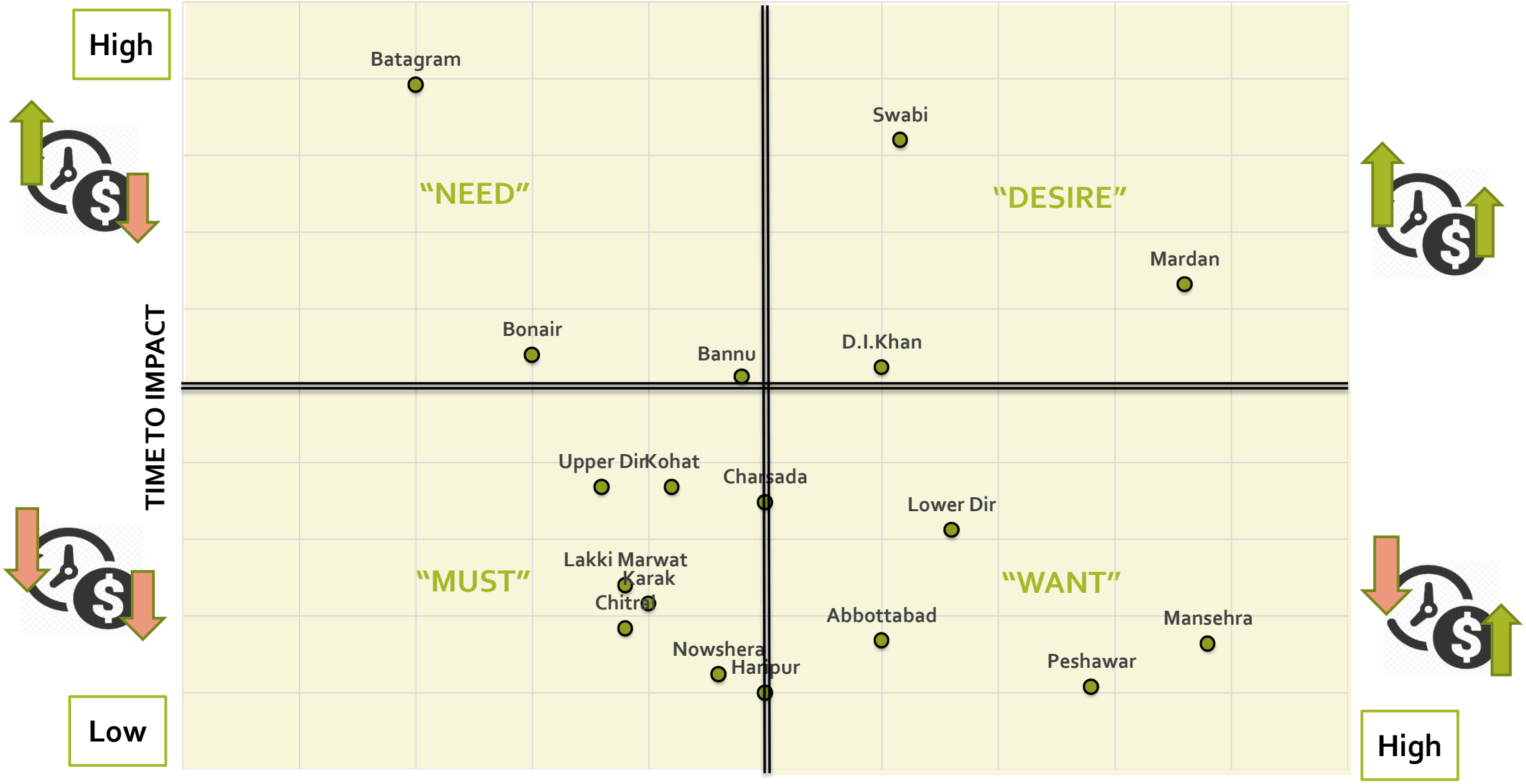


APPLYING SLOPE TREND TO LITERACY RATE (KPK)

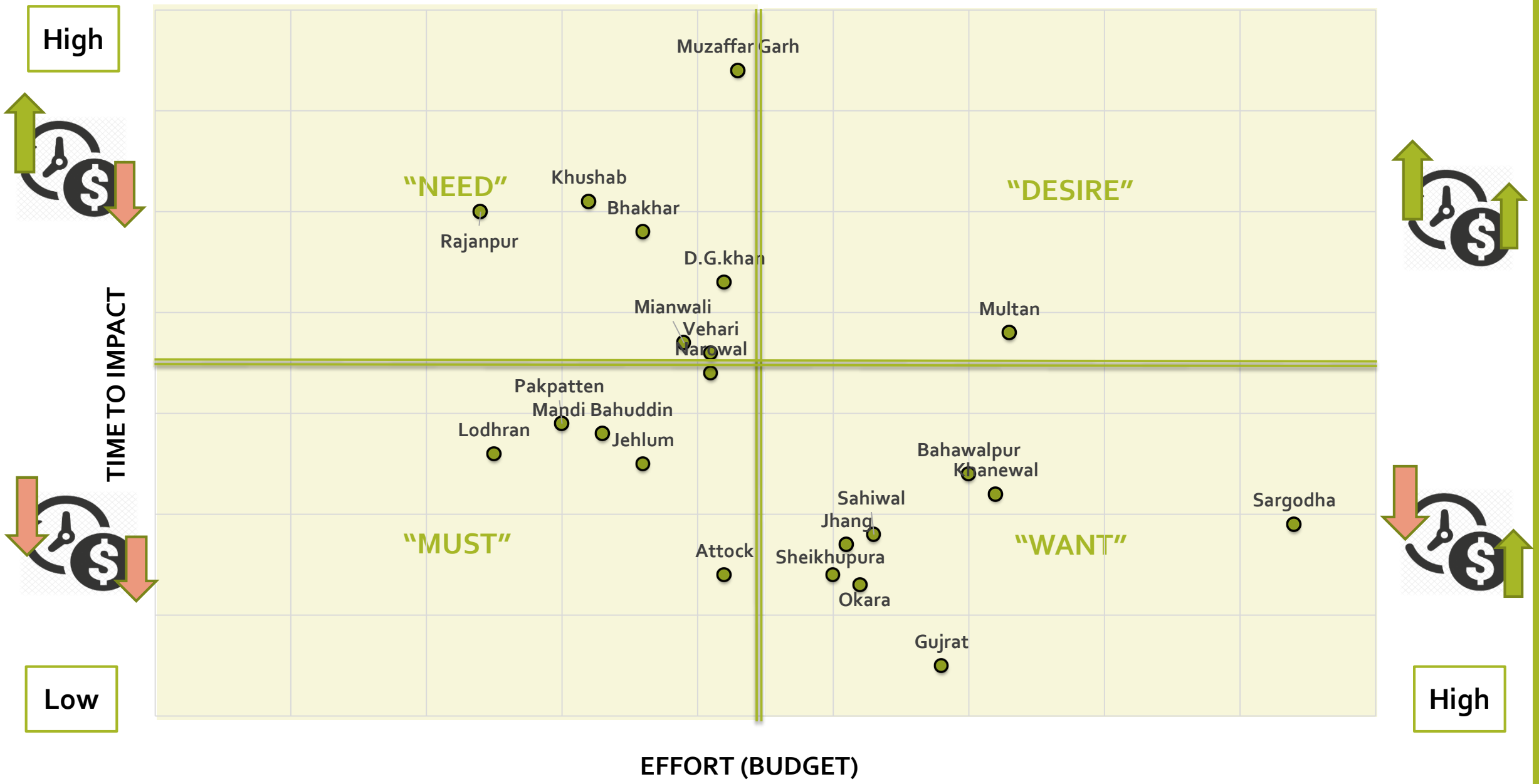


APPLYING SLOPE TREND TO DISTRICT INDEX (KPK)

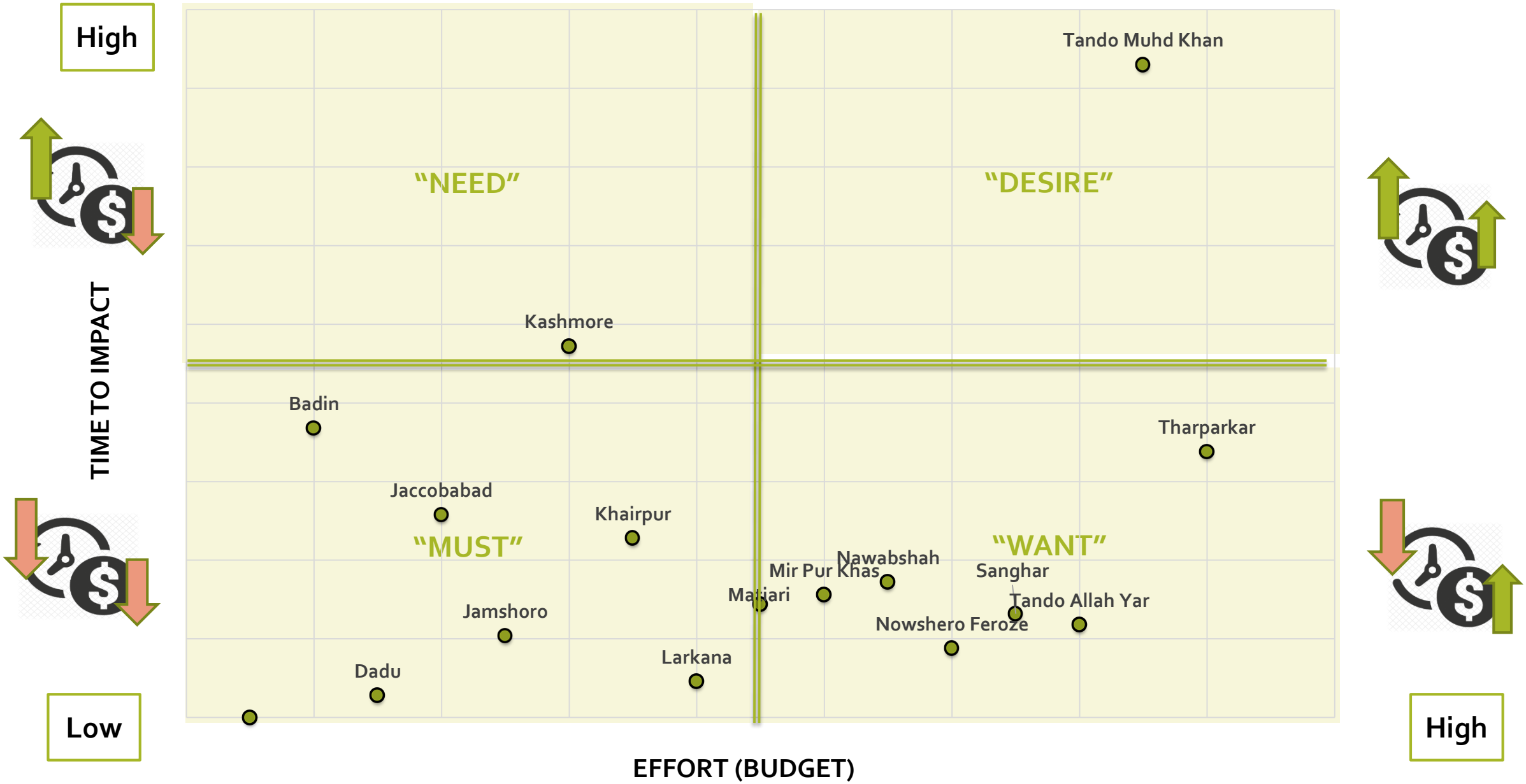
KHYBER PAKTUNKHWA (KPK)



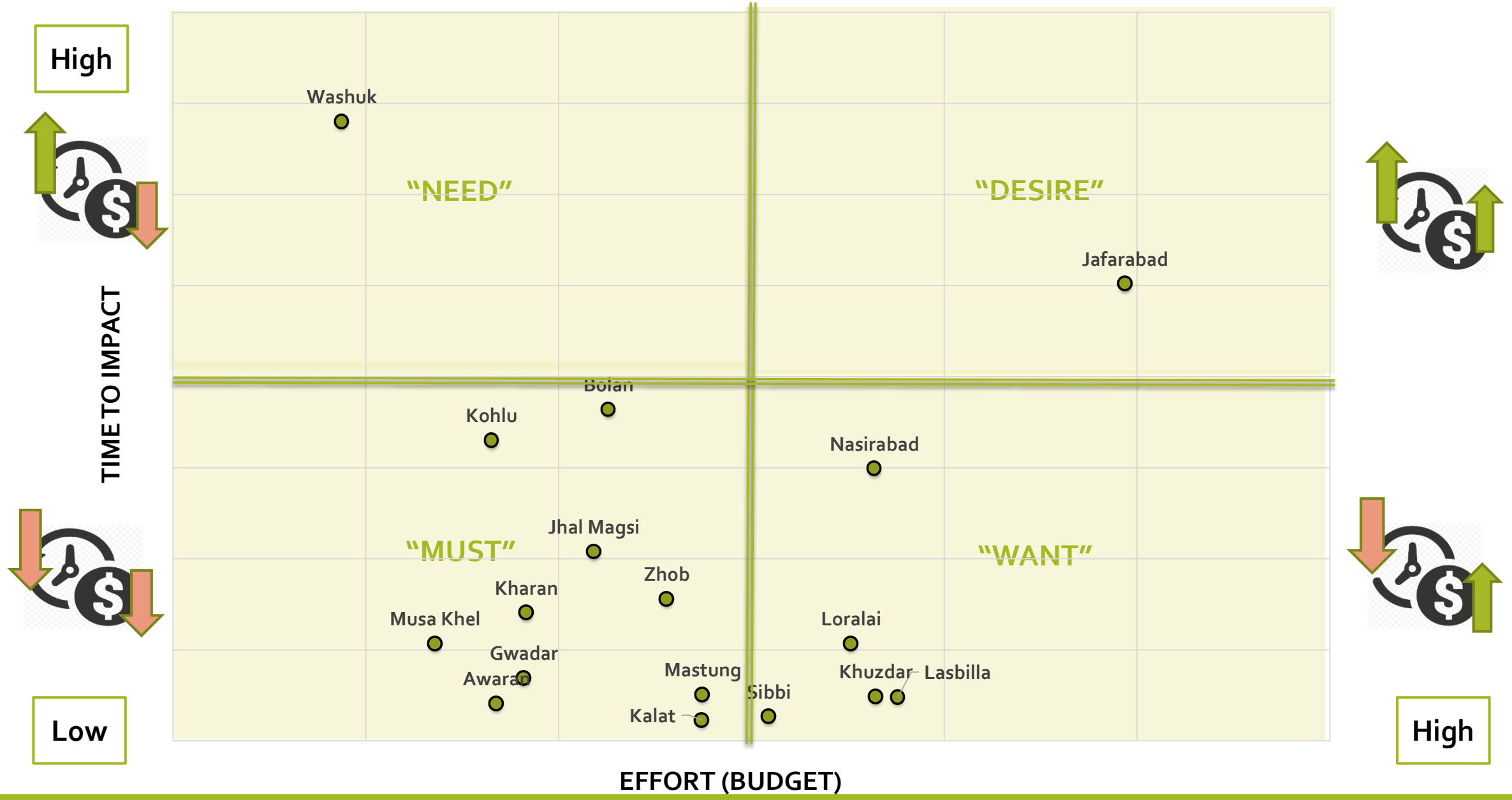
PUNJAB

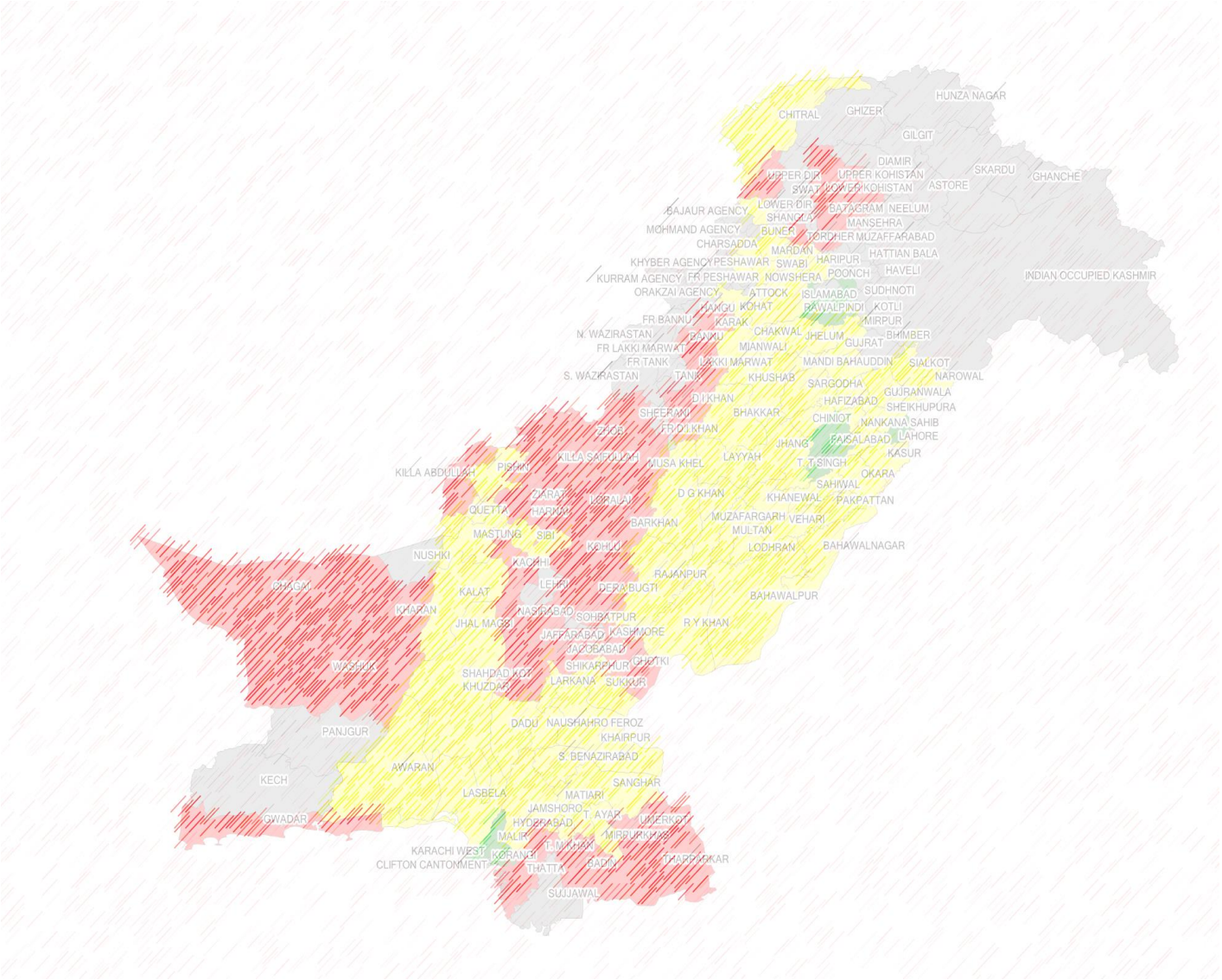

High
Low
TIME TO IMPACT
EFFORT (BUDGET)
High
"NEED"
"DESIRE"
"MUST"
"WANT"
Muzaffar Garh
Khushab
Bhakhar
Rajanpur
D.G.khan
Mianwali
Vehari
Narowal
Multan
Pakpatten
Mandi Bahuddin
Lodhran
Jehlum
Bahawalpur
Khanewal
Sahiwal
Jhang
Sargodha
Attock
Sheikhupura
Okara
Gujrat

SINDH


High
Low
TIME TO IMPACT
"NEED"
"DESIRE"
"MUST"
"WANT"
Tando Muhd Khan
Kashmore
Badin
Tharparkar
Jaccobabad
Khairpur
Nawabshah
Mir Pur Khas
Sanghar
Matiari
Tando Allah Yar
Jamshoro
Nowshero Feroze
Larkana
Dadu
High
EFFORT (BUDGET)

BALUCHISTAN




HUNZA NAGAR
CHITRAL
GHIZER
GILGIT
DIAMIR
SKARDU
GHANCHE
UPPER DIR
UPPER KOHISTAN
SWAT
LOWER KOHISTAN
ASTORE
BAJAUR AGENCY
LOWER DIR
BATAGRAM
NEELUM
SHANGLA
MANSEHRA
MOHMAND AGENCY
BUNER
TORGHER
MUZAFFARABAD
CHARSADDA
MARDAN
HATTIAN BALA
KHYBER AGENCY
PESHAWAR
SWABI
HARIPUR
HAVELI
KURRAM AGENCY
FR PESHAWAR
NOWSHERA
POONCH
INDIAN OCCUPIED KASHMIR
ORAKZAI AGENCY
ATTOCK
ISLAMABAD
SUDHNOTI
HANGU
KOHAT
RAWALPINDI
KOTLI
FR BANNU
KARAK
MIRPUR
N. WAZIRASTAN
BANNU
CHAKWAL
JHELUM
BHIMBER
FR LAKKI MARWAT
MIANWALI
GUJRAT
FR TANK
LAKKI MARWAT
MANDI BAHAUDDIN
SIALKOT
S. WAZIRASTAN
TANK
KHUSHAB
SARGODHA
NAROWAL
GUJRANWALA
D I KHAN
HAFIZABAD
SHEIKHUPURA
SHEERANI
BHAKKAR
CHINIOT
NANKANA SAHIB
ZHOB
FR D I KHAN
FAISALABAD
LAHORE
JHANG
KILLA SAIFULLAH
MUSA KHEL
LAYYAH
T. T. SINGH
KASUR
KILLA ABDULLAH
PISHIN
OKARA
SAHIWAL
ZIARAT
D G KHAN
KHANEWAL
PAKPATTAN
QUETTA
HARNAI
LORALAI
MUZAFFARGARH
VEHARI
BARKHAN
MULTAN
MASTUNG
SIBI
KOHLU
LODHRAN
BAHAWALNAGAR
NUSHKI
KACHHI
RAJANPUR
CHAGAI
LEHRI
DERA BUGTI
KALAT
BAHAWALPUR
KHARAN
NASEERABAD
SOHBATPUR
JHAL MAGSI
R Y KHAN
JAFFARABAD
KASHMORE
JACOBABAD
WASHUK
SHIKARPUR
GHOTKI
SHAHDAD KOT
KHUZDAR
LARKANA
SUKKUR
DADU
NAUSHAHRO FEROZ
PANJGUR
KHAIRPUR
S. BENAZIRABAD
AWARAN
KECH
SANGHAR
LASBELA
MATIARI
JAMSHORO
T. AYAB
GWADAR
HYDERABAD
UMERKOT
MALIR
MIRPURKHAS
T.M.KHAN
KARACHI WEST
KORANGI
BADIN
THARPARKAR
CLIFTON CANTONMENT
THATTA
SUJJAWAL

THANK YOU.