

An Appraisal of Social Welfare Across Districts of Pakistan: Role of Resource Allocation and Terrorism

By
Nazia Malik
Ph.D. Student



SCHOOL OF ECONOMICS
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By
Nazia Malik
Ph.D. Student

Supervisor
Dr. Muhammad Jamil
Professor of Economics
Ghulam Ishaq Khan Memorial Chair (SBP)
Kashmir Institute of Economics
The University of Azad Jammu & Kashmir, Muzaffarabad

School of Economics,
Faculty of Social Sciences,
Quaid-i-Azam University, Islamabad.
May 2024

**Dedicated To
My Mother**

Certificate of Approval

This is to certify that the research work presented in this thesis, entitled "*An Appraisal of Social Welfare Across Districts of Pakistan: Role of Resource Allocation and Terrorism*" was conducted by **Ms. Nazia Malik** under the supervision of **Dr. Muhammad Jamil**, Professor of Economics. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the School of Economics, Quaid-i-Azam University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the field of Economics, School of Economics, Quaid-i-Azam University, Islamabad.

Student Name: Nazia Malik

Signature: _____

Examination Committee:

a) External Examiner:

Signature: _____

b) External Examiner:

Signature: _____

Supervisor Name:

Dr. Muhammad Jamil

Professor of Economics

Ghulam Ishaq Khan Memorial Chair of SBP

KIE, The University of Azad Jammu & Kashmir, Muzaffarabad.

Signature: _____

Dr. Muhammad Tariq Majeed

Director

School of Economics,

Quaid-i-Azam University, Islamabad.

Signature: _____

Declaration Form

I, Nazia Malik, daughter of Malik Alam Sher, Registration no: 03091611002, candidate for Ph.D. Economics at School of Economics, Quaid-i-Azam University Islamabad, hereby declare that the thesis "**An Appraisal of Social Welfare Across Districts of Pakistan: Role of Resource Allocation and Terrorism**" submitted for the partial fulfillment of the Doctor of Philosophy (Ph.D.) degree in Economics is my work. All the errors and omissions are lonely goes to me, and I also somberly pronounce that it will not be submitted for attaining any other degree in the future from any institution.

Nazia Malik

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List of Abbreviations

ADB	Asian Development Bank
AINC	Per Capita Real Average Income of District
ACLED	Armed Conflict Location and Event Data Project
BHU	Basic Health Unit
CGE	Computable General Equilibrium
DGMM	Difference Generalized Method of Moments
DHQ	District Headquarter hospital
DI	Dimension Indices
ERAg	Economic Resources in Agriculture
ERE	Economic Resources in Education
EREC	Economic Resources in Energy
ERH	Economic Resources in Health
ERII	Economic Resource Indicator Index
ERS	Economic Resources in Security
ERTnC	Economic Resources in Transport and Communication
ESDA	Exploratory Spatial Data Analysis
GDP	Gross Domestic Product
GED	Georeferenced Event Dataset
GNI	Gross National Income
GTD	Global Terrorism Database
GTI	Global Terrorism Index
H	Headcount Ratio
HDI	Human Development Index
HHINC	Per Capita Real Income
HS	Household Size
IHDI	Inverse of HDI
IoV	Index of Vulnerability
KP	Khyber Pakhtunkhwa
LISA	Local Indicators of Spatial Association
MCH	Maternal and Child Health Centers
MLE	Maximum Likelihood Estimation
MPI	Multidimensional Index
NAP	National Action Plan

OECD	Organization For Economic Cooperation and Development
PBS	Pakistan Bureau of Statistics
PPHI	People's Primary Healthcare Initiative
PSLM	Pakistan Social and Living Standards Measurement (PSLM)
R_INC	Real Household Income
SAR	Spatial Autoregressive Model
SBP	State Bank of Pakistan
SDM	Spatial Durbin Model
SEM	Spatial Error Model
SGMM	System generalized method of moments
SPI	Sensitive Price Index
SW1	Social Welfare Index (1)
SW2	Social Welfare Index (2)
SW3	Social Welfare Index (3)
THQ	Tehsil Headquarter hospital
TI	Terrorism Index
TTP	Tehrik-i-Taliban Pakistan
UC	Union Council
UNDP	United Nations Development Program
VAR	Vector Auto Regression
WAPDA	Water and Power Development Authority
WDI	World Development Indicators

Abstract

The objective of the present study is to examine the multidimensional nature of the welfare concept and its measurement. The measurement of welfare has long been a contentious issue in economic literature. The complexity and controversy surrounding this issue have prompted many researchers to seek a unique criterion to examine the level of welfare. However, despite the numerous attempts, a definitive welfare measure remains elusive. Given the importance of welfare in policy design, it is essential to establish a reliable and comprehensive measure of welfare. The measurement of welfare is not limited to economic indicators alone. To capture the constitutive elements of human life and measure wellbeing, additional indicators are required. Therefore, social welfare can only be assessed through a multidimensional approach, which is crucial for analyzing the standard of living and promoting economic development. To measure the level of welfare across the various districts of Pakistan, a variety of indicators must be employed. The average level of per capita income, income distribution, poverty, and human development in a particular region are all important indicators of social welfare. By analyzing the disparities in these indicators among different regions, it is possible to determine the level of social welfare prevalent in each district. The present study aims to examine the level of social welfare among different districts of Pakistan. By analyzing the welfare levels of provinces and districts, the study will provide a comprehensive view of the disparities that exist in social welfare across the country. The study will employ data from the Pakistan Social and Living Standards Measurement (PSLM) to measure the level of welfare in districts and provinces. This data will provide a detailed view of the socioeconomic conditions of selected households in different regions of Pakistan. The study's results indicate that certain districts have a higher level of social welfare than others. The factors contributing to these disparities include the allocation of resources in health, education, transport and communication, agriculture, security, and energy. The resource allocation by the public and private sectors, as well as the demographic conditions across districts, also play a significant role in determining the level of welfare. The study employs a cross-sectional spatial regression analysis to examine the impact of resource allocation on social welfare. The analysis reveals that the allocation of resources in health, education, transport, communication, agriculture, and energy by public and private sectors have a significant positive impact on social welfare from 2008 to 2020. However, the cross-sectional data analysis also reveals that economic resources in education have a significant negative impact on social welfare in the year 2008-09.

Overall, the study's findings demonstrate the importance of a multidimensional approach to measuring welfare. The analysis highlights the need for a comprehensive measure of welfare that accounts for economic as well as social indicators. This is crucial for promoting economic development and enhancing the standard of living in different regions of Pakistan.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The concept of welfare is very deep in history. Different theorists have interpreted economic literature differently. It can be taken both in an absolute as well as in a relative sense. All scholars of the social sciences have convergence on the focal point that social welfare is a key issue not only for developing but also for advanced countries. Scholars like Adam Smith, Pigou, Paul Krugman, and Karl Marx are of the view that the economic welfare of a society cannot be achieved without improving economic development. For this purpose, the best economic planning and sustained economic development are the key to achieving the goals. According to [Sen \(1981\)](#), any upward trajectory of an economy in a country will contribute nothing if it does not result in the wellbeing of the population.

In the eyes of [Sen \(1999\)](#), economic development is a vast and broader concept than the meaning of economic growth. Human and social improvements are amalgamated with economic growth while measuring development. Hence for all practical approaches, development reflects in the improvement of all variables of social and economic progress. This can only be achieved through economic growth. Growth is pivotal and the most necessary condition for development ([Berg, 2016](#)). Economic liberty results in freedom for people and removes obstacles from the path of greater freedom. The highest stage of freedom increases peoples' choices to develop their destinies. Major obstacles in the way of development are poverty ([Todaro and Smith, 2020](#)), non-availability of economic opportunities, poor public policy, and lack of quality education and health services. Measuring welfare is a difficult job and is beyond the capacity of the masses. In developing countries, disparities exist, and this cannot be removed without economic development. The scholars of economics and political science Joseph Hobbs and Schumpeter are of the view that no doubt measuring welfare is an important issue, but it cannot be addressed with a single approach, it requires multiple approaches. It is a normal custom that the welfare of a

country is interpreted in the form of GDP per capita, inequality, or poverty measures. The researchers' focus of study has always remained on the definition and interpretation of welfare.

[Pigou \(1952\)](#) states:

“The greatest economic goal of human society should be to achieve the highest level of economic wellbeing for its members. Economic wellbeing or welfare is itself part of overall welfare.”

Researchers, keeping in view different academic backgrounds, employed multiple indicators who appraise social welfare models; because of this reason, different measures are presented in the economics literature. The attempt to record and measure changes in welfare in the past six decades have been influenced by many factors, which include changing ideology in social chronological climate, particularly after the demise of the Soviet Union, selection of data, and speedy changes due to rapid innovations and technological innovations in social conditions. Different scholars have defined welfare goals differently and have constructed distinct regimes or sets of policies and institutions, to give measured responses to these goals. Further [Armstrong et al. \(2002\)](#) have divided social indicators of development into two categories one is objective, and the other is subjective.

Taking into consideration different perspectives welfare comparison in different societies, countries, and regions is done. However, particularly in the context of Pakistan composite indices are prevalent to measure the welfare of different regions in Pakistan. Two major indicators are employed or considered in this study to analyze the prosperity of society. It incorporates poverty and income inequality to measure the welfare of society.

Another pathway for looking at the economic conditions of various regions of Pakistan is to analyze the tense security conditions. Since the Afghan war in the 1970s, Pakistan is facing high terrorist attacks with every passing year. Over the last two decades, terrorist attacks in various regions not only caused the loss of human capital through death but also caused a human capital flight from these regions. Other than this, these terrorist attacks caused the loss of infrastructure as well as the loss of trust by foreigners which lead to a reduction in foreign investment. According to the

report of the [Institute of Economics and Peace \(2015\)](#) during the era 2000 to 2014, Pakistan has been featured 13 times most affected by terrorism in the worst ten countries that suffered from terrorism. Such a situation can create an effect on the welfare of the individuals in society and disparities may also occur. Most vulnerable regions may face loss due to the terrorist attacks there.

The disparities in welfare also occur in different regions like in rural and urban sectors and in the case of Pakistan, the inequality in welfare occurs on the district level as well. This may be due to the attributes of the households and the marginal returns of the attributes that differ. Moreover, public policy was adopted to provide protection and social services in different regions, causing disparities in the welfare levels of the households. On the other side law and order situation is also having effects on employment and other economic indicators which influence the living conditions of the individuals in these districts.

1.2 Introduction

The 17 Sustainable Development Goals (SDGs) and 169 targets represent a new development of global compact which encompasses the three main dimensions i.e., economic, social, and environmental development, adopted by 193 member states of the United Nations in 2015 for the 2030 agenda of sustainable development ([UNDP, 2023](#)). Welfare is the ultimate goal a country should try to achieve at its best possible by promoting economic development because the decline in welfare is the outcome of economic decline or failure. These targets are set to be achieved because it is the right of the members of society to raise their living standards and economic wellbeing. So that a person carries a healthy life, with the highest education and political freedom, independent in making decisions to improve economically and live well. It will help households in approaching more resources to enhance their standard of living. That is why the objective of raising the welfare of society carries much importance which is achieved by improving the standard of life of the households in society. The work of [Sen \(1984\)](#) also emphasized this way:

“A concrete way to raise economic wellbeing is to raise living standards of the society.”

So, it is better to raise living standards to achieve high wellbeing in society. Developing countries including Pakistan are unable to catch the standard of life that developed countries have achieved historically. According to the report of the United Nations Development Program (UNDP), in terms of the Human Development Index rank of Pakistan is 164th among 193 countries (UNDP, 2024). The expanding trends of chronic poverty are sustained shown in the case of Pakistan. Market failure is the main reason and may be the result of nepotism due to which the poor are vulnerable to taking advantage of growth opportunities. The reason may be the inherent structure of most developing countries like Pakistan, where the poor are unable to approach growing opportunities. Additionally, the type of structure of the developing countries has alike attributes in which inefficient markets, weak institutions, corruption, nepotism, and poor security situations prevail and affect at large the welfare of the poor class in the economy.

The aggregate social welfare programs of a country are financed through public finance and are complemented by the private sector. Waniak-Michalak (2014) has confirmed the importance of nongovernmental organizations in providing social welfare services. So, the increasingly important role is seen and usually played by the private sector also in an economy in financing health and medical care expenditures, group life insurance, education, and social services from private outlays. With the measurement of welfare in a society, it is also important to highlight the issue of the occurrence of disparities in the living conditions of households in different regions. Keeping in view this aspect of the role of policies on economic welfare, the important question that carries attention while designing social policy for the provision of social benefits and services is to whom and how benefits and services are provided and, who pays? As the policy measures have effects on regional disparities (Dash, 2014). It is required to judge whether a policy of redistribution must not be counterproductive in improving the standard of living in a region. In the case of Pakistan, it is also required to evaluate the role of public as well as private sector spending to see the effects on the social welfare of the households in different districts.

The broader concept of welfare allows seeing the living conditions through another dimension of safety and security of the regions. This may affect the wellbeing of

individuals in society. So, the measurement of the governance of any nation through the safety or security of the people is a critical index. It will lead to other development indices on the back seat like education, technology, and international relations however it tends to consider life first than all other indices of development and welfare.

It is a pragmatic fact that in the current world more threatening atmosphere is created through terrorist activities or insurgencies and other forms of armed conflicts than in the past decades, especially before 9/11. According to [Institute for Economics and Peace \(2015\)](#), Pakistan ranked in the top 5 countries among 162 countries of the world targeted by severe terrorist activities which are Iraq, Afghanistan, Nigeria, Pakistan, and Syria. The percentage of terrorist attacks is high in these five countries according to the Global Peace Index of 2015 depicts that 78% of attacks in total hit these regions of the world ([Institute for Economics and Peace, 2015](#)). There were around 5113 attacks that hit Pakistan from 2004 to 2013 ([SATP, 2014](#)). It is observed clearly by discerned society that the households in the districts of Pakistan face such type of susceptible security conditions. The welfare of the community and individuals is seriously threatened due to militancy, terrorism/insurgency in various regions of Pakistan. This is the reason that in recent times poverty and terrorism are burning issues that cannot be denied. So, an investigation is required to see the effects of terrorism on the welfare of the society in the districts of Pakistan which is why this aspect is included in the study for analysis.

Objectives of the Study

The complex network of elements contributes to the social welfare of the households in a region. A comprehensive framework needs to be developed by converting the concept of social welfare into a measurable index. This approach has a benefit over analyzing districts using individual metrics. By merging diverse characteristics of social welfare into a single score, the Index of Welfare offers a more comprehensive view of social welfare differences. This information is important not only for policymakers but also for development agencies and non-governmental organizations

(NGOs) striving to promote social equity and improve the lives of individuals in all districts of Pakistan.

This study extends beyond rankings and focuses on the investigation of the fundamental causes of the disparities in welfare levels across Pakistan's districts. Another objective of the study is to examine the intricate interplay of aspects influencing social welfare by investigating factors such as resource access, infrastructural development, security conditions, and potential geographic barriers.

The present study aims to analyze the following objectives:

- To explore the historical development of social welfare and demonstrate its evolving understanding
- To develop a framework for measuring social welfare across Pakistan's districts and to rank those districts
- To see the transition in the status of households' overtime at the district level in Pakistan
- To elicit the sources for different levels of social welfare of the households in the districts of Pakistan
- To analyze the security conditions in various districts of Pakistan
- To examine empirically, the effects of terrorism on social welfare in Pakistan

The questions related to the measurement of social welfare, determinants of disparities in social welfare among different regions, and the impact of security conditions on social welfare are raised here. The main research questions are:

- What are the different theoretical perspectives that evolved on social welfare and how has literature contributed to the development and application of social welfare indices?
- How many differences occur in the level of social welfare among different provinces and districts of Pakistan?

- How has resource allocation by the private sector, and government affected the social welfare of various regions? How do demographic conditions influence various districts to stand at the upper cadre of economic welfare?
- What are the major security challenges and terrorism faced by Pakistan? What is the incidence of terrorist activities occurring in the districts of Pakistan and their impact on social welfare?

1.3 Significance and Scope of the Study

The challenge of measuring welfare and deprivation is always remaining alive for policymakers and economists. The fulfillment of this challenge of measuring welfare always remains in debate and economic theorists mainly utilize income as a standard norm for this purpose. Average income and wealth have been predominantly used to gauge welfare levels even in the second half of the twentieth century. Generally, a subsistence threshold is used to identify households as destitute in many countries by observing and comparing their income levels. In this way, the monetary measure includes a single dimension that leads toward the measurement of prosperity and deprivation.

On the other side nonmonetary measures of deprivation are also being supported by the proponents of the basic need approach ([Streeten et al., 1981](#)) and later capability approach ([Sen, 1985](#)). According to them, the destituteness of individuals and households not only determines insufficient income but is also associated with insufficient outcomes. These outcomes may be insufficient in terms of health, nutrition, and education, deficient social relations, insecurity, and low self-confidence and powerlessness. So, the exaggerated emphasis on growth has been shifted in the field of development studies toward the issue of personal wellbeing, agency, and freedom. According to [Clark \(2005\)](#), the idea to judge personal wellbeing or human development given by Sen is not only focused on growth and material prosperity but the argument also presented to compel and develop thinking beyond the notion of utility.

The indices of welfare and poverty have been designed under the inspiration of these approaches over the last few decades. Hence the policymakers and international organizations tried to develop a multidimensional framework by embracing these

approaches to analyze the level of deprivation and wellbeing of society. The composite measure is required which inculcates different dimensions along with monetary attributes to analyze the living conditions of households in a region. It in return facilitates the government to highlight the needs of each region to develop a comprehensive public policy to make improvements in the living conditions of households in any particular region. As a result, they will find a way forward to approach the upper trajectory of society.

Improving the welfare of society by accelerating growth, ameliorating poverty, and deterioration in income inequality always caters importance to policymakers throughout the world particularly in Pakistan. It becomes the main concern of any society to improve living standards a have an approach towards resources to fulfill the needs of life. According to the Asian Development Bank (ADB, 2002) during the phase between 1993 and 1999 around 12 million people added to the group of poor in Pakistan showing a rise in poverty. In Pakistan, almost 24.3 percent of people during 2015-16 were living below the poverty line, as reported in the [Economic Survey of Pakistan \(2018\)](#).

According to [WDI \(2018\)](#), 46 million people in 2015 lived below the poverty line, and the value of the Gini Index is 33.5 in Pakistan. Around 37 million are destitute among its population are there, as compared to East Asia and the Pacific where 25 million destitute people live ([Alkire and Robles, 2017](#)). The score of the [Global Hunger Index \(2018\)](#) in the case of Pakistan is 32.6 showing the serious level of hunger while bordering on the alarming level and hence ranked 106th among 119 countries. It is also seen that the living conditions for households in the rural region are poorer than the households in the urban region. SDPI reports that the malnourished individuals are around 58.7 million in Pakistan among which the share of the rural side is 46%.

This study incorporated the theoretical perspective related to the multidimensionality of social welfare. The literature is silent related to spatial analysis of social welfare specifically in the case of Pakistan. Most of the researchers and policymakers focus on one dimension and analyze a single aspect to capture the living conditions. Poverty is mainly discussed as an indicator to highlight poor living conditions. Another

indicator is income inequality to elucidate the distribution of income among the population. It is realized that a multidimensional assessment of living conditions is needed. The provincial side of Pakistan is somewhat captured in the literature by employing uni-dimensional measures of social welfare. However, analysis related to districts' profiles is not available. This study contributes in a sense to measuring multidimensional social welfare and a move towards the utilization of an alternative to the traditional single attribute income-based measures. The analysis is further extended to the district level from national and provincial levels. The empirical analysis provides a comprehensive and extensive exploration of all the provinces and districts of Pakistan. It will be helpful for policy-making and designing strategies to make improvements in the different regions of Pakistan as it will broaden the information base for the relevant institutions and policymakers.

1.4 Research Gap

Several studies took different measures of economic welfare for different regions. Some of the studies took a reduction in poverty as an indicator of an increase in social welfare, some considered a reduction in income inequality as an indicator of an increase in economic welfare (Chakravarti & Muliere, 2003; Kakwani & Son, 2016), some emphasized the increase in per capita income as a measure of the increase in economic welfare. According to Offer (2000), the addition of significant human welfare can be supported by adopting policies that help in increasing GDP growth. Some studies took measures of an increase in the living standards of the individuals as an indicator of an increase in economic welfare. Likewise, some studies took a combination of the indicators mentioned above as an indicator of the social welfare of any region.

The measurement of welfare is required for policy-making to improve living conditions. The analysis of social welfare on the district level leaves us to gauge the economic conditions of society. Most importantly, it is required to see the level of social welfare that prevails in different regions. So, to measure the level of welfare for regions of Pakistan, a composite index is used. This will help in measuring the social welfare of the households in the districts of Pakistan.

The sociopolitical problems also need to be addressed, as terrorism and poverty are the main contributing factors to it. Studies on this issue have been conducted but no decisive conclusion has yet been drawn. Pakistan is also suffering from both problems of terrorism and poverty. The welfare levels need to be explored so that improvement can be made through certain policy steps. The district-wise analysis of welfare as well as of terrorism in Pakistan does not exist however many studies tried to explore poverty, inequality, and welfare up to the provincial level and limited their analysis to the rural/urban sectors.

1.5 Plan of the Study

This study explores the level of social welfare, and the geographical distribution of social welfare in Pakistan is examined and presented through spatial maps. The comparison of social welfare levels has been made at the district and provincial levels using a multidimensional Social Welfare Index (SWI) created for this study. This comprehensive method captures the complex character of welfare in a way that goes beyond depending only on a single indicator.

The transitions analysis leaves us to make comparisons of the districts' living conditions and provides an overview of the changes that occur in the welfare levels of the regions. The investigation regarding security issues in Pakistan also helps us to highlight the impact causing differences in the social welfare of the households in different regions, especially at the district level of Pakistan. The study is organized in the following pattern:

Chapter 2 delves in to a detailed discussion of the meaning and concept of welfare. However social welfare is the focus of the discussion. It explains how welfare indices are modified overtime and explore the debate between the social welfarist and non-welfarist.

In chap 3 the focus of the research is on the measurement of the social welfare of the district of Pakistan. The comparison of welfare levels at the provincial, as well as district is presented. An extensive literature review regarding the debate on welfare indices is done. The theoretical framework of the welfare indices used in the study is

elaborated. Results and discussion following the data description along with the conclusion are also presented.

The study further explores the security conditions of the regions of Pakistan. This aspect is the focus of discussion because it may affect the economic conditions of the households. The descriptive and spatial analysis provides an overview of the security conditions of the districts of Pakistan. The data regarding terrorist activities are presented and a detailed analysis of the security conditions impacting social welfare is part of chapter 4.

In Chapter 5 the regression analysis is done to explore the sources of disparities by keeping in view the welfare levels in districts calculated in chap 3. The spatial analysis of social welfare and provision of services by different sectors is also part of it. The detailed description of the data employed for the analysis, along with the construction of the variable required for developing a model is explained. The theoretical framework of the model is also presented. The base of the model is to check what are the reasons behind disparities in living standards. At the end of the thesis, the conclusion of the thesis is presented.

CHAPTER 2

THE EVOLUTION OF WELFARE

ECONOMICS: A HISTORICAL

PERSPECTIVE

2.1 Introduction

The previous chapter provides an overview of the thesis proposal and serves as the foundation for the entire thesis. It outlines the scope and objectives of the study, highlighting the significance of the research topic and its potential contributions to the field. This chapter establishes the context and rationale for the research, presenting the research questions and hypotheses that will guide the investigation.

Complexity highly exists in the measurement and understanding of the concept regarding social welfare that may exist due to the presence of multidimensionality in it. The complexity may be reduced by introducing sets of indicators as an appropriate tool to handle and account for the interaction between society and the economy. To define welfare is a difficult task, however, simply we say that it is a condition of faring or doing well, especially for wellbeing or prosperity.

2.2 Classical and Neoclassical Perspectives on Social Welfare

2.2.1 Marshall's Definition of Social Welfare

In history, attempts were made to define welfare. Specifically, [Marshall \(1920\)](#) defines it as “man earns money to get material welfare” and authored a book in 1890. Later wealth along with humanity is a study matter and enlarges the scope of economics.

2.2.2 The Dual Criterion of Measuring Social Welfare by Edgeworth and Pigou

The leading Neoclassical economists in this regard were Francis Edgeworth and Arthur Cecil Pigou who gave concrete meaning to welfare and defined that social welfare is achieved after summing up all individual welfare in society; however, the sum of satisfaction achieved after the usage of goods and services is the individuals' welfare. [Pigou \(1920\)](#) had given the dual criterion of measuring and calculating the increase in the welfare of society.

The first one is that welfare increases with the increase in national income. Another aspect that matters in the maximization of welfare is the distribution of national income. It says that the increase in economic equality between rich and poor will maximize welfare.

2.2.3 Pareto's Social Welfare Function and Optimality Principles

The well-known criterion developed by Vilfredo Pareto related to the redistribution of income to make someone better off in society without worsening others is also an interrelated phenomenon to economic welfare. Earlier in 1913, the concept of social welfare function was developed by Pareto.

The Pareto optimality and compensation principles are the main axioms incorporated in the composition of welfare indices. But it lacks all possible social situations with the policy change as well as ignores the problem of distribution. The emphasis on the linkage between income inequality and social welfare has also been given by [Dalton \(1920\)](#).

It is highlighted in the study that the focus of the economic experts is primarily on the distribution of resources and economic welfare in total which is affected by the distribution of income. Therefore, setting aside the consideration of distribution in welfare calculus will not lead to the correct judgments.

Later Neo-Keynesian economist John R. Hicks contributed to welfare economics and endeavors to present the renowned compensation principle also known as Hicks efficiency. The compensation principle predominantly extends the criterion to analyze

costs and benefits through the comparison of losses of losers and gains of the gainers in the society which results due to changes in the economy or any economic policy (Hicks, 1939).

2.2.4 The Kaldor Criteria for Redistribution Policy, Scitovsky's Critique and the Double Criterion

The Kaldor (1939) criterion is also composed to imply that the redistribution policy in an economy does not lead to anyone worse off to make someone in the society better off. However, Scitovsky (1941) criticized the Hicks-Kaldor compensation criteria and stated that inconsistency may exist. These criteria lead to a contradiction, and it is difficult to get a unique equilibrium point according to the Scitovsky paradox (Scitovsky, 1941). Therefore, a double criterion was suggested by De-Scitovsky to determine improvement in the welfare level. One is the fulfillment of Hicks-Kaldor criteria and the second is the nonfulfillment of the reversal test, which exhibits that the losers are incapable of persuading the gainers to remain in the original situation.

The De-Scitovsky criterion along with Hicks Kaldor criteria was also criticized on the grounds of potential changes in welfare. These criteria enabled us to reach the necessary condition in the economics of welfare. This reaction was given by Little (2002) who considered it the unsatisfactory criteria to evaluate changes in social welfare due to changes in economic and non-economic policy. Furthermore, it is not correct to separate efficiency and distribution. The value judgments create vagueness, therefore, further suggesting that for the increase in welfare, the distribution of income is not worsened by the change of states. This critique was extended even to the work of Paul, A Samuelson (Samuelson, 1950), and Abram Bergson (Bergson, 1938).

They propounded that the ordinal preferences of the individuals and explicit value judgments for interpersonal comparisons are the basis for the evaluation of social welfare. The necessary and sufficient conditions for the determinacy of welfare by bestowing the concept of social welfare functions.

A social welfare function can be derived through value judgments rather than any unique point. Thus, it will incorporate the changes with the change in the value

judgments. The maximization of social welfare is derived through the Pareto optimality points regarding the allocation of resources as well as the equitable distribution of resources (Igersheim, 2019).

2.2.5 Arrows' Theorem and the Impossibility of Social Choice

The Bergson and Samuelson welfare function was part of constant debate in welfare economics and Arrows' work (1948, 1950, 1951a, 1963) regarding social choice theory has direct and devastating consequences over it. Though for half of a century, this argument prevails and Samuelson (1967, 1977, 1981, 1987, 2005) continues to defend the idea against the social choice theory.

According to Samuelson and Little, the theorem given by Arrow is not relevant to the function of social welfare, rather it is more relevant to the process of decision-making. The impossibility theorem regarding social choices was presented by Arrow (1963) and the concept was initially given in the doctoral thesis written by Kenneth Joseph Arrow in 1951.

2.2.6 The Axiomatic Approach to Collective Decision Making

Individual preferences are the main inputs in the collective decision-making process but the easier way to do this is through a dictatorship. Because majority rule will lead to contradictory outcomes and the procedure of choice becomes more complex. The axiomatic approach of Arrow's theorem leaves the devastating conclusion that even individuals' preferences in society are unanimous but still will not lead to an agreement of the welfare arrangement for a society. Arrow's theorem also prevails even under a certain class of incomplete preferences (Jain, 2015).

2.3 The Capability Approach in Welfare Economics: A Critical Analysis

The majority rule for social choice theory accepted the intensities of individual preferences and the cardinality of the relevant data regarding choices. Along with this criticism, Sen (2018) also turns the focus toward interpersonal comparisons which are missing in the theory. The main focus in welfare economics is the judgment of equity

and aggregate welfare but the absence of interpersonal comparison does not allow us to reach it rightly.

Hence, [Sen \(1985\)](#) criticized utilitarian's and articulated the idea of the capability approach in welfare economics and broadened its interpretation. Sen emphasized that the social evaluation may take place beyond the individual utilities and considers the inclusion of other dimensions like health, morbidity, and longevity ([Atkinson, 1999](#)).

2.3.1 The Concept of Valuable Functioning and Interpersonal Comparisons

Capability and functioning are the core concepts to measure the standard of living or quality of life. The access to the valuable functioning i.e., a valuable set of choices, whether an individual's capability to achieve effective freedom.

Firstly, mapping of valuable functioning, and then evaluating the performance of people in terms of capabilities is required. The notion of living standard is closely related to the capability to function that may generate utility for a particular individual.

2.3.2 Criticisms on Utilitarianism and Rawlsian Social Justice

The idea of [Rawls \(1972\)](#) was also rejected by Amartya Sen, based on the idea of the capability approach. Rawls's focus on welfare was mainly on the improvement of bottom-end position holders of the population. Sen argues that the enhancement of capabilities of a person is a more related phenomenon, but Rawls's exclusive focus was on the fair distribution of resources. The min-max approach to evaluate social welfare emphasizes the focus of policymakers, which should be on the most marginalized groups of society.

The maximax approach on the other hand prioritizes, maximizing the highest potential payoff associated with each alternative ([Von Neuman and Morgenstern, 1947](#)), regardless of the likelihood of achieving that outcome. It is an inappropriate instrument for practical decision-making in the social welfare field since it disregards the welfare of the large community. As a result, this approach is criticized on theoretical foundations in welfare economics because due to simplistic modeling, it does not capture the real-world complexity.

The capability approach on empirical grounds captures great interest in the area of welfare economics in the world. The dimensions chosen to compose HDI were majorly influenced by the concepts given by Sen ([Anand & Ravallion, 1983](#)). The contribution of Sen's work impetus towards the development of new literature regarding economic inequality in aggregative terms and welfare economics ([Sen & Foster, 1997](#)). It was also highlighted that the conditions of deprivation should improve among the poor. Information regarding poor class society is required to decrease poverty. Sen has devised poverty measures to capture the poor living conditions.

The criticism of the capability approach is that it is not important to assess the achievements of individuals; rather, it is important to provide equal opportunities and conditions to participate equally in society. It is required to judge the conceptions of individuals regarding goods. However, Sen defends the idea in this way that heterogeneity exists between individuals and how they convert the available resources into valuable function matters.

The fair allocation of resources implicitly assumes that individuals value all and live life with effective freedom. The approach of justice does not allow to get information regarding the relationship between a particular individual and resources. Martha Nussbaum was one of the major critics regarding the specification of capabilities ([Robeyns, 2017](#)). The argument against the capability approach is that objectivity is missing in identifying valuable capabilities.

This leaves us inconclusive regarding the identification of goals, achievements, and shortfalls of society. The Rawlsian social justice theorists put concerns related to the institutional structure of this approach. [Pogge \(2002\)](#) raises questions about the way of weighing the capabilities with each other like the setting of priorities according to needs, implication on interpersonal equality, and tackling of non-curative deprivations like physical handicapped, etc. How are all these aspects captured?

The list of capabilities not specified by Sen and accepted that this approach is for evaluation of effective freedom, and this is the only focal concern of it. The quality of

life is determined by different dimensions. However, subjectivity lies in this approach, but it is required to analyze social welfare and wellbeing.

The multidimensional measures based on poverty were composed and presented by Sen, in the nineteenth century and later literature developed in this area by Sabina Alkire and others (Duclos et al., 2006; Alkire & Foster, 2011). The desirable framework developed is multidimensional for the progress indicator of society.

2.4 Introduction to Subjective Wellbeing in Economics

The normative measures comprising indicators capturing the subjective wellbeing of individuals also remained in discussion. The idea of subjective wellbeing was introduced mainly by Easterlin in 1974 while measuring happiness. Larsen et al. (1983) evaluated the different scales used to measure the subjective wellbeing of young adults, which includes five single-item scales developed by (Gurin et al., 1960; Cantril, 1965; Andrew and Whitney, 1976; Fordyce, 1978). The multi-item scales were also analyzed to make comparisons which were created by (Bradburn & Caplovitz, 1965; Cambell et al., 1976; Tellegen, 1979; Underwood & Froming, 1980; Larsen, 1983).

Later the main concepts of subjective wellbeing captured through happiness are characterized by Frey and Stutzer (2002) and Blanchflower and Oswald (2004). However, the accuracy and reliability remain debatable because the analysis of subjective wellbeing is based on a survey reported by individuals.

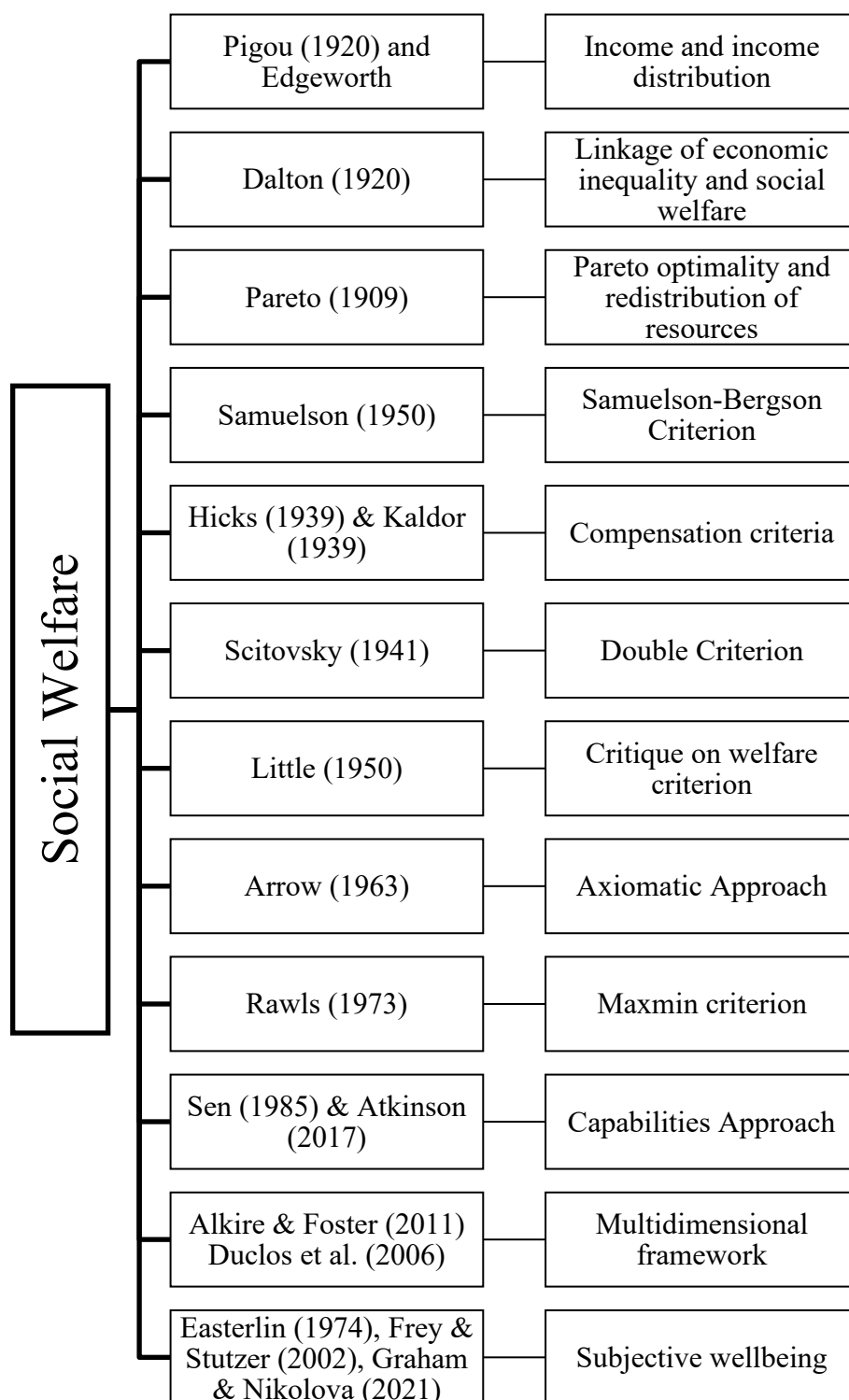
The concept of happiness is multidisciplinary and also applicable in economics. Because there is an innovative way to analyze the wellbeing of individuals which is provided through the economics of happiness both theoretically and empirically. The Easterlin paradox is an example of an empirical analysis of wellbeing through happiness (Easterlin, 1974).

Self-evaluation to make judgments is more relevant and also assists in the identification of biases in decision-making. The exploration through happiness research in economics reveals that the assessment of social welfare is based on the

aspects of judgments that arise from income, employment, social capital, health, security, etc. (Graham, 2005; Ramrattan & Szenberg, 2021).

The three dimensions are explained by Graham and Nikolova (2015) and Stone and Mackie (2013) which are Hedonic, evaluative, and eudaimonic. Nikolova and Graham (2021) have stated that these dimensions are related to each other and conclude by analyzing cross-sectional data that the hedonic evaluation shows that a log-linear relationship exists between happiness and income in the short run while the dimension of evaluative wellbeing shows that the stronger relationship exists between happiness and income. The overview of the various perspectives is presented in Figure 2.1.

Figure 2.1: Exploring the Concept and Approaches to Measuring Social Welfare



Source: Author's work based on literature review

2.5 Conclusion

Welfare is a condition of prosperity or wellbeing and its measurement and understanding are complex due to its multidimensionality. The complexity was reduced by the use of indicator sets. The earliest economists who contributed to the definition of welfare were Marshall, Edgeworth, and Pigou. They defined it as the sum of individuals' satisfaction achieved after the use of goods and services in a society and argued that the increase in national income and economic equality between rich and poor will maximize welfare. Later Neo-Keynesian economists like Hicks, Kaldor, and Scitovsky made further contributions to welfare economics by introducing compensation and double criteria to determine the improvement in the welfare level.

However, their work was criticized for its potential changes in welfare and vagueness in value judgments. Samuelson and Bergson proposed that the basis for evaluating social welfare is the ordinal preferences of individuals and the maximization of social welfare is achieved through Pareto optimality points. Arrow's theorem on social choice had a direct impact on the debate on the welfare function and was considered a devastating conclusion by Samuelson and Little.

In conclusion, the study of welfare economics is a complex and multi-disciplinary field with various contributions and criticisms from classical, neoclassical, and Keynesian economists. The concept of welfare is linked to the satisfaction of individuals' preferences and their use of goods and services in society, and its evaluation is based on the ordinal preferences of individuals and Pareto optimality. However, its measurement remains a challenge due to the potential changes in welfare and vagueness in value judgments. The next chapter focuses on the trends of social welfare in Pakistan. This chapter examines the current state of social welfare programs and policies in the country, analyzing key indicators such as education, healthcare, poverty rates, and access to basic services. This analysis will contribute to a deeper understanding of the effectiveness of existing programs and inform future policy recommendations to address the evolving needs of the population and promote equitable social welfare outcomes.

CHAPTER 3

TRENDS OF SOCIAL WELFARE IN PAKISTAN

3.1. Introduction

In the previous chapter on "The Evolution of Welfare Economics: A Historical Perspective," the study provided a comprehensive overview of the importance of social welfare in society and its impact on development and wellbeing. Building upon this understanding, the current chapter aims to address the disparities in the provision of social welfare services in Pakistan. Social welfare plays a crucial role in the development and wellbeing of society. The provision of social services such as education, healthcare, and poverty alleviation programs is essential for reducing inequality and promoting economic growth. The disparities in the provision of social welfare services in Pakistan are of great concern, as they have far-reaching consequences for the population, particularly the most vulnerable.

The measurement of social welfare is a highly debated topic among various schools of thought. Differences in the level of social welfare among different districts in Pakistan highlight the need for further investigation into the underlying causes. Accurate measurement of welfare is crucial as the policies formulated based on the welfare level have significant political implications. Thus, choosing the appropriate welfare indicators to accurately measure welfare is of utmost importance.

The differences in the level of economic welfare between provinces and districts in Pakistan can be attributed to various factors such as unequal distribution of resources, differences in economic development, and disparities in political representation. These disparities can lead to unequal access to basic services such as healthcare, education, and poverty alleviation programs, which in turn can exacerbate poverty and inequality.

This will help to provide a comprehensive understanding of the current state of social welfare in the country and inform future policy development to address the disparities. The findings of this study will be useful for policymakers, researchers, and practitioners working in the field of social welfare and development in Pakistan. It will also contribute to the existing body of literature on social welfare in developing countries, providing valuable insights into the challenges and opportunities for improving access to social services in Pakistan.

Pakistan is a developing country with a large population, but it faces numerous economic challenges such as poverty, low human development, and high levels of food insecurity. According to the latest data, 24% of the population lives below the poverty line and the country ranks 150th out of 189 countries in the Human Development Index (Blanchflower & Bryson, 2022). The poverty rate and food insecurity are particularly high in rural areas, and there are significant disparities in economic conditions between the regions of the country.

In this chapter, we evaluate the social welfare of households at the district level, taking into account their levels of income, income inequality, and poverty. We conduct a thorough empirical assessment of the state of social welfare to determine its magnitude. The calculation of welfare is a complex task and requires a detailed analysis.

3.2 Literature Review for Measuring Social Welfare

The literature highlights the points which remain in the debate regarding the measurement of welfare. Over time, it is realized that welfare is multidimensional, but a difference of opinion exists regarding the dimensions. The next question arises how to label those dimensions to measure the progress of society. Different analysts have different views on what constitutes welfare, therefore multiple indicators are inevitably used to measure welfare. In this section, a review of literature is presented related to the measurement of welfare.

The measurement of welfare is always highly focused among different schools of thought. The welfare levels are different in different regions, so it raises interest to explore the reasons lying behind them. The policies formed based on the level of

welfare have importance politically also. So, measuring welfare correctly is required and the choice of correct welfare indicators grabbed the importance to make appropriate measures.

This part elaborates on the literature review which makes the baseline for the research related selected research questions. The literature review is a crucial component of the thesis, as it provides a comprehensive overview of the existing research on social welfare in Pakistan. The methodology for the literature review will involve several steps to ensure a comprehensive and systematic analysis of the relevant literature.

The major step in conducting a literature review is to identify relevant keywords and search terms. This will involve identifying the key themes and concepts related to social welfare in Pakistan, such as poverty, inequality, healthcare, and education. The keywords will be used to search for relevant literature in academic databases.

The measurement of welfare is always highly focused among different schools of thought. The welfare levels are different in different regions, so it raises interest to explore the reasons lying behind them. The policies formed based on the level of welfare have importance politically also. So, measuring welfare correctly is required and the choice of correct welfare indicators grabbed the importance to make appropriate measures.

The antagonist's vision exists in defining and measuring welfare. First, the welfarist school of thought is also called the utilitarians ([Duclos & Arrar, 2006](#); [Bader, 2020](#)). Second is the non-welfarist school of thought, and it is based on functioning and capabilities. There are certain strengths and weaknesses of both schools of thought.

[Ducolus & Arrar \(2006\)](#) and [Woodard \(2019\)](#) wrote the book and a discussion on the welfarist and non-welfarist approaches is provided in detail. The differences occur in both defining economic conditions of the community like poverty and in the implication of policy to improve living standards. The view of the welfarist is related to the preferences of the individuals as according to them individuals maximize their utility and satisfaction by considering the given constraint and choosing according to the choices they want in their life.

Hence the actual state of welfare of the individuals who prevailed in their lives is reflected by these choices and also depicts their choices as well. According to this approach, a person would be considered poor in the consumption or income approach, as even the choice of the individual himself is to work less and consume little. So, a question arises from this perspective that the individual is contented with his condition, however might be possible for him to work more earn more, consume more, and improve the living conditions but is considered poor under this perspective.

Contrary to the welfarist view of the characterization of welfare, the non-welfarist perspective is that welfare comprises many factors, and compressing these dimensions into one which is utility does not attempt to depict all about welfare (Binder, 2021; Woodard, 2019). There are two basic sub-schools of non-welfarist the functioning and the capabilities school derived through Sen (1992) work on welfare.

However, criticism of non-welfarist is alike to that of welfarist i.e., it is difficult to capture the individuals' freedom of choice as like utility and happiness. Also, the concept given by non-welfarist of the existence of the multidimensions of welfare contrary to welfarist who restricted welfare to the sole metric dimension, is very difficult to judge and capture practically. Like the choice of multidimensions, assigning weights and basis to combine the multidimensions is also questionable.

The controversy related to the question of measuring individual welfare is the main objective to be explored in both visions. Measuring through income is, however, an easy way but is this sufficient? On the other side, problems exist with measurement and aggregation in the functioning approach given by non-welfarist. Thus, keeping in view this criticism, an innovative way introduced for theoretical and empirical analysis of individuals is wellbeing developed as Happiness Economics. The proxy used to measure individual welfare under happiness research of economics is subjective wellbeing. The subjective evaluation of wellbeing is reported by individuals and this reporting contains economic content (Frey & Stutzer, 2018; Nikolova, 2016).

Historically attempts have been made to provide a base to measure welfare. So that identification of the level of welfare would be possible. That is why several indicators have been identified in the literature by considering the different schools of thought. The welfare functions, poverty, and inequality indices are built by economists. The building of axiomatic welfare functions is contributed by [Atkinson \(1970\)](#). The work is mainly based on the aversion to income inequality. [Atkinson \(1987\)](#) also discussed the measurement of poverty as it also has a connection with social welfare.

Poverty also has a key importance in measuring social welfare. The living conditions help in defining the welfare of the individuals. Therefore, [Sen \(1973\)](#) incorporated the different elements in the composite measure of poverty to form the base for welfare comparisons. According to [Sen \(1973, 1976\)](#), major elements of poverty measure include the number of poor below the poverty line; more weightages should be given to the group of the poor whose income gaps are more from the poverty line. Below the poverty line, income inequality among the poor also is incorporated in the measure. Following Sen, a new measure to analyze welfare is proposed by [Alamgir \(1975\)](#). The index was generated by integrating the overall income inequality with the composite poverty index generated by [Sen \(1973, 1976\)](#). As Sen's composite index of poverty is more concentrated towards the individuals who live below the poverty line, the inclusion of the Gini Index (G) allows covering the entire population to some extent. Finally, the gross inequality index (GI) is formed by augmenting the quality index with the G and composite measure of poverty developed to capture social welfare.

The debate about measuring social welfare related to poverty and inequality remains alive yet. In economists' view, social welfare functions based only on any one of the phenomena like poverty or inequality do not depict the complete picture. Inequality, poverty, and welfare are interrelated with each other. [Kakwani \(1997\)](#) explored the interrelationship between these three. The conflict exists in the objective of social welfare and poverty measure given by [Sen \(1976\)](#) and [Kakwani \(1980\)](#). It is explained that conflict exists if the poverty and inequality measure does not fulfill the three axioms which are: if relative inequality remains unchanged and the economy grows at some positive rate then poverty strictly decreases. The second axiom implies that if mean income remains the same and there is a decrease in relative income inequality,

poverty must not increase. The third axiom is the weaker one, as the minimum value should be attained by the poverty index after the elimination of all income inequality. It is concluded that relying on any single measure of poverty for empirical analysis of welfare is not sufficient. There is no single measure of poverty that is perfect for the exploration of social welfare.

On the macro level, gross domestic product (GDP) is used to analyze living standards. Because numerical valuation of the goods and services is possible and if the economy grows then it results in the enhancement of economic wealth. This further enhances social welfare, as individuals fulfill their needs according to their preferences at personal expense. Thus, it provides the material base to depict living standards and has a strong linkage with quantitative economic growth.

But GDP (per capita) as a proxy for welfare receive criticism from well-known economists of the twentieth century initially by [Kuznet \(1941\)](#), [Mishan \(1967\)](#), [Nordhaus and Tobin \(1972\)](#), and [Sen \(1976\)](#). It is followed by many other economists, as their view is that GDP incurs the cost of the activities in the market rather than their benefits. It does not incorporate the whole cost as various social costs are missing in it. The empirical studies on most western (OECD)¹ countries based on happiness also show that the economy's GDP grows at a steady pace does not help in raising the welfare or in some case studies like in the USA negative time trends are seen. It indicates that the absolute level of income does not elucidate the whole story of measuring wellbeing. The valuations of environmental changes are also missing in GDP, so depreciation of natural capital and environmental degradation are also ignored ([Antal & Bergh, 2014](#)).

[Hulten and Nakamura \(2022\)](#) theoretically discussed the measurement of wellbeing by arguing that it goes beyond GDP. For this purpose, they presented the framework of expanded GDP (EGDP) which is composed of a monetary measure that shows a change in welfare and is added to GDP to get EGDP because sources of utility and disutility are not accounted for in the GDP. [Atkinson \(2019\)](#) has also of the view that in the present structure of the digital economy where information access exists, and the growth of the internet enables individuals to use their resources more effectively

¹ Organization for Economic Cooperation and Development

therefore measuring wellbeing considering these is more important than relying only on GDP.

Various empirical analyses were also held using different indicators of welfare. Income inequality and poverty measures are used to analyze welfare. The issue of the increase in inequality was highlighted by [Zhuang \(2008\)](#) and the focus region was developing Asia. It is explained that inequalities in access to education and health facilities emerge causing a rise in infant mortality rates. All this happens due to an increase in income inequalities. The gap is widened by the classes or standards, of living in rural and urban identified. It is also shown by using data from 1985 to 2004 that the per capita income of rural to urban ratio rose to 3.2% and the per capita income of coastal to western provinces ratio rose to 2%.

Mean income and income inequality are the main determinants in the traditional framework of social welfare functions. However, the concept of illfare functions along with welfare functions is introduced by [Aristondo et al. \(2013\)](#). According to them, the illfare functions are used to drive the disutility of unfavorable variables. A unified dual framework is proposed to investigate the welfare and illfare level the society. The properties of the welfare function defined as these functions are continuous, monotonic, and strictly S concave whereas the illfare function is continuous, monotonic, and strictly S convex. The strict S convexity implies that under progressive transfers, the illfare levels are going to decrease because strict S convexity is equivalent to symmetry.

The welfare multiplier is designed by [Sims and Wolff \(2017\)](#) to see the impact of per unit change in the government spending shock. The aggregate welfare changes with the per unit change in consumption and investment of the government or not. Whereas aggregate welfare is defined as the equally weighted sum of the present discounted value of flow utility across households and aggregate welfare is written in terms of aggregate variables.

The case study of South Africa is analyzed by [Biyase and Ziwane \(2018\)](#) to find out the main determinants of the welfare of the household. In this regard data from the National Income, Dynamic study is employed of the first four waves and fixed effect

and also random effect Probit estimation techniques used. It captures the unobserved heterogeneity and endogeneity of individuals in cross-sectional data. The significant determinants of welfare in South Africa are the employment status of the household head, gender of the household head, marital status of the household head, levels of education of the household head, race of the household head, some province dummies, and dependency ratio. Additionally, residents of the rural region are more stricken by poverty than those of the urban regions.

A multidimensional measure of welfare is introduced along with the assessment of economic growth. The growth rate of welfare depends upon the growth rate of output and the growth rate of the income distribution. The study aims to determine whether among channels, income distribution, and economic growth which factor most influences welfare. [Shafique and Ali \(2018\)](#) highlighted the aspects while assessing the state of welfare in Pakistan. The model incorporates social indicators which include the expenditure by the government on health and education, rate of unemployment, persons per doctor, teachers in universities, and university enrollment as well as economic indicators which include the rate of inflation, output gap, and debt level. It is concluded that on one side growth rate of output and income inequality affect social welfare positively but, on the other side, this effect is proportional too.

The welfare loss due to the presence of inequality is also examined in the case of China by [Wang et al. \(2019\)](#). For this purpose, the authors employed the panel data from 1996-2010 to analyze that social welfare was affected due to income inequality, which is proved by adopting the utilitarian approach. Their empirical analysis shows that income inequality is causing the rate of 8.08% welfare loss.

[Espinoza-Delgado and Silber \(2021\)](#) developed a Multidimensional deprivation index (MDI) which is based on [Shorrocks' \(1995\)](#) and an extension of the index which was composed by [Sen \(1976\)](#) whereas empirical analysis organized on the data of four Central American countries. The composition of MDI includes five main dimensions i.e., education, employment, water and sanitation, energy and electricity, and quality of dwelling for the empirical analysis. It is concluded that the population of four Central American countries is more deprived of education than all other dimensions.

The Chile case is analyzed by employing VMPI (Vulnerability to multidimensional poverty index) and [Gallardo \(2020\)](#) concluded that almost 20.7% are multidimensionally poor and 39% are vulnerable to multidimensional poverty (a risk of becoming poor).

[Ruggeri et al. \(2020\)](#) explored the wellbeing of 21 countries by employing the data from the European Social Survey (2006 to 2012) and a multidimensional measure of wellbeing. The measure of psychological wellbeing (MPWB) is composed through factor analysis to assess wellbeing. The authors also discussed the linkage of income, employment, and income distribution with wellbeing. They concluded that policymakers may be directed to crafting policies by the identification of areas where the potential for improvement exists.

[Baqae et al. \(2022\)](#) define the money metric functions and cost of living index which is used to measure cardinally to rank the budget sets and cost of maintaining a living standard. The algorithms developed and are applied to the long-run cross-sectional data of the UK, 1974-2017 for the 17 categories of goods and services by assuming that the households have the same stable preferences for these categories. The conclusion about the welfare of rich and poor households was drawn and highlighted that the money metric derived from the welfare-related inflation rate is understated than the official statistics of annual inflation rates because the 20% upward bias exists in the case of poor households. Cross-sectional data was also analyzed to measure welfare for homothetic preferences by [Jaravel and Lashkari \(2022\)](#). They have also developed a non-parametric approach for measuring welfare, but the preferences are homothetic instead of the same preferences.

3.3 Data

Data is a critical component in research as it provides the foundation for evidence-based decision-making and enables researchers to validate or reject hypotheses. The analysis of data helps researchers make informed decisions and gain a deeper understanding of the subject being studied. High-quality data that is free from personal bias leads to more accurate research findings, which is especially important in scientific research where accuracy is key.

The PSLM survey is a nationally representative survey of households in Pakistan. It collects data on various aspects of household wellbeing and socioeconomic status to assess social welfare levels, labor market characteristics, education, health, access to essential services, infrastructure, demographic, migration patterns, and gender equality. PSLM is based on seven rounds of data whilst, the author of this thesis has chosen the data from six rounds, providing valuable data on the social and living conditions of households in the country over time. The data collected in the PSLM survey includes information on household income, household size, and access to the services that address the population's welfare.

The data collected in the PSLM survey provide district-level population-based estimates of social indicators and their progress. It is divided into four regions, including Punjab, Sindh, Khyber Pakhtunkhwa (KP), Balochistan, and Islamabad.

From 2006-07 to 2010-11 PSLM surveyed 42.29-42.8% of households in Punjab, 25-25.7% of households from districts of Sindh, 16.3-16.9% from districts KP, 14.4-15.9% from the districts of Balochistan and 0.75-0.78% from Islamabad. Similarly, for PSLM rounds of 2012-13 to 2019-20, 41.8-48% of households from Punjab, 23.1-25.2% from districts Sindh, 16.5-17.7% from districts of KP, 14.3-15.3% from districts of Balochistan and 0.76-0.85% from Islamabad were surveyed. The percentages are derived from the data presented below from Table 3.1 of sample households.

Table 3.1: Households covered from provinces in PSLM surveys

Province	2006-07	2008-09	2010-11	2012-13	2014-15	2019-20
Punjab	31682	31940	32372	32372	36888	78100
Sindh	18532	19300	19728	19728	19024	37094
KP.	12525	12264	12552	12768	13680	28525
Balochistan	10654	11668	12236	11884	11772	15226
Islamabad	560	876	600	600	628	1364

Source: The author's work is based on various issues of the PSLM survey.

The PSLM survey collects valuable data for research and policy analysis, offering insight into the household income of each district, household size of each district, and age by income in various regions of Pakistan. The data is essential for understanding the social and economic conditions in the country and informing policy decisions for improving household welfare.

3.3.1 Issues and Limitations of the PSLM Survey Data

The PSLM survey, like all other data sources, has limitations and issues that need to be taken into account. The most common limitations include sampling bias, non-response bias, data quality, and data availability. Sampling bias occurs when the sample of households selected for the survey does not accurately represent the entire population, leading to potential inaccuracies in the results. Non-response bias occurs when some households do not participate in the survey, leading to a lack of information about certain segments of the population.

The quality of data collected from the survey depends on the accuracy and completeness of the information provided by the respondents, which can be influenced by factors such as social desirability bias, recall bias, and interviewee errors. Additionally, some information may not be available for all households, such as detailed information about income and expenditure, which can limit the scope of analysis. There are several other issues related to the PSLM survey data that need to be considered.

One issue with the PSLM survey data is the measurement of household income. Self-reported income data can be subject to under-reporting, over-reporting, and inaccuracies, as respondents may not remember or disclose their true income levels. Additionally, income levels can be influenced by factors such as seasonality, irregular payments, and changes in household composition, which can make it difficult to accurately capture the household's true income.

Another issue is under-coverage, which occurs when certain segments of the population are not included in the survey, leading to a lack of information about these groups. Furthermore, the PSLM survey relies on self-reported data, which can be

subject to social desirability bias and recall bias. Additionally, the PSLM survey may not be able to capture the complexities of households' income and expenditures, leading to limitations in the data's ability to accurately measure living standards.

Despite these limitations, the PSLM survey provides valuable information about households in Pakistan. To mitigate these issues, it is crucial to use robust and rigorous data analysis techniques and to triangulate data whenever possible. When interpreting the results of the PSLM survey, it is important to keep these limitations and potential biases in mind and to approach the data with caution.

3.3.2 Extraction of Relevant Data

For our analysis, we extracted the relevant information from various sections², like household roster, and employment of PSLM survey data. It includes income earned through employment or received through other sources i.e., transfer payments like in-kind transfers, pensions, or remittances, etc. The total household income is calculated by summing up the income received from all sources.

3.3.2.1 Subnational Administrative Units Division in Pakistan

The Pakistan Bureau of Statistics is the primary source of data collection and dissemination of statistical information in Pakistan. The data collected through the PSLM survey is valuable for research and policy analysis aimed at improving household welfare across the country.

The PSLM survey focuses on collecting data for households at the district level across the four provinces of Balochistan, KP, Punjab, and Sindh. These provinces are divided into districts, tehsils, and union councils and the total number of districts in these four provinces is 115 as shown in the below mentioned figure 3.1.

3.3.2.2 Province and District wise spread of Pakistan

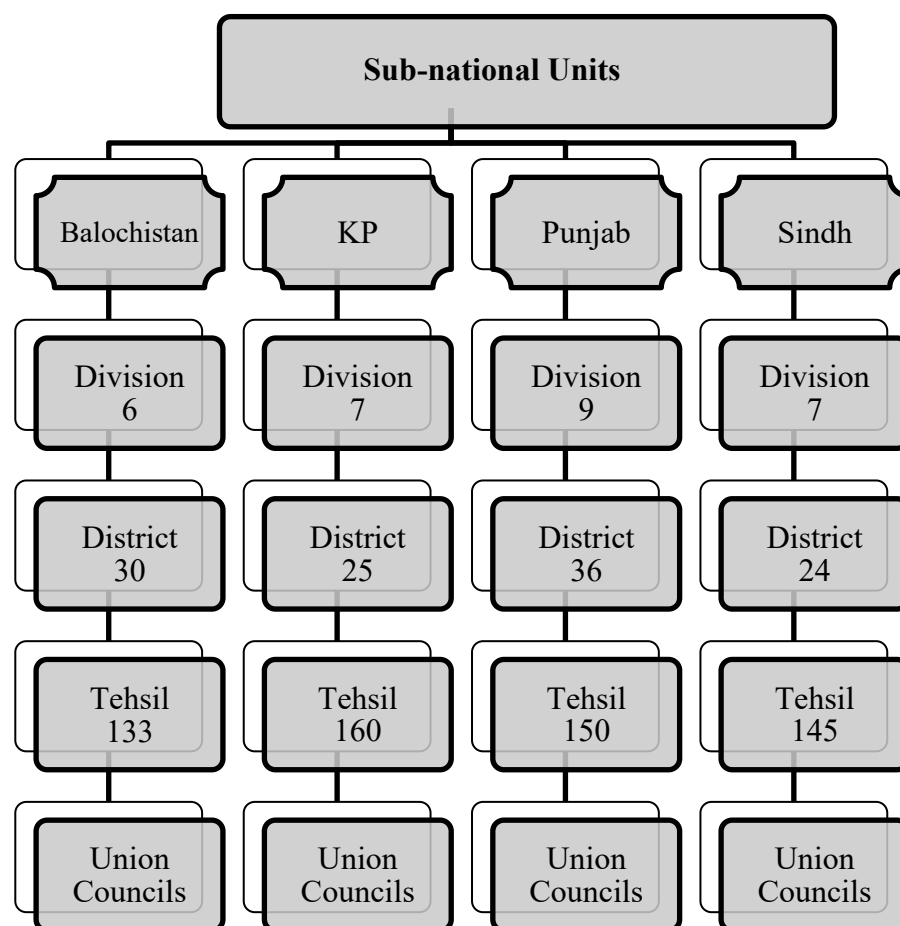
Pakistan is divided into four provinces and one federal territory. The four provinces are Punjab, Sindh, KP, and Balochistan, and the federal territory is Islamabad Capital Territory. Punjab is the largest province in terms of population and is located in the

² Questionnaire is accessible online at <http://www.pbs.gov.pk/content/questionnaire>

northeastern part of Pakistan. It is bordered by the province of Sindh to the south and KP to the northwest.

The province of Punjab is further divided into 36 districts. Sindh is located in the southeastern part of Pakistan and is bordered by the province of Punjab to the north and the Arabian Sea to the south. The province of Sindh is divided into 24 districts. Khyber Pakhtunkhwa (KP) is located in the northwestern part of Pakistan and is bordered by Afghanistan to the west and the province of Punjab to the east.

Figure 3.1: Subnational Administrative Units of Pakistan

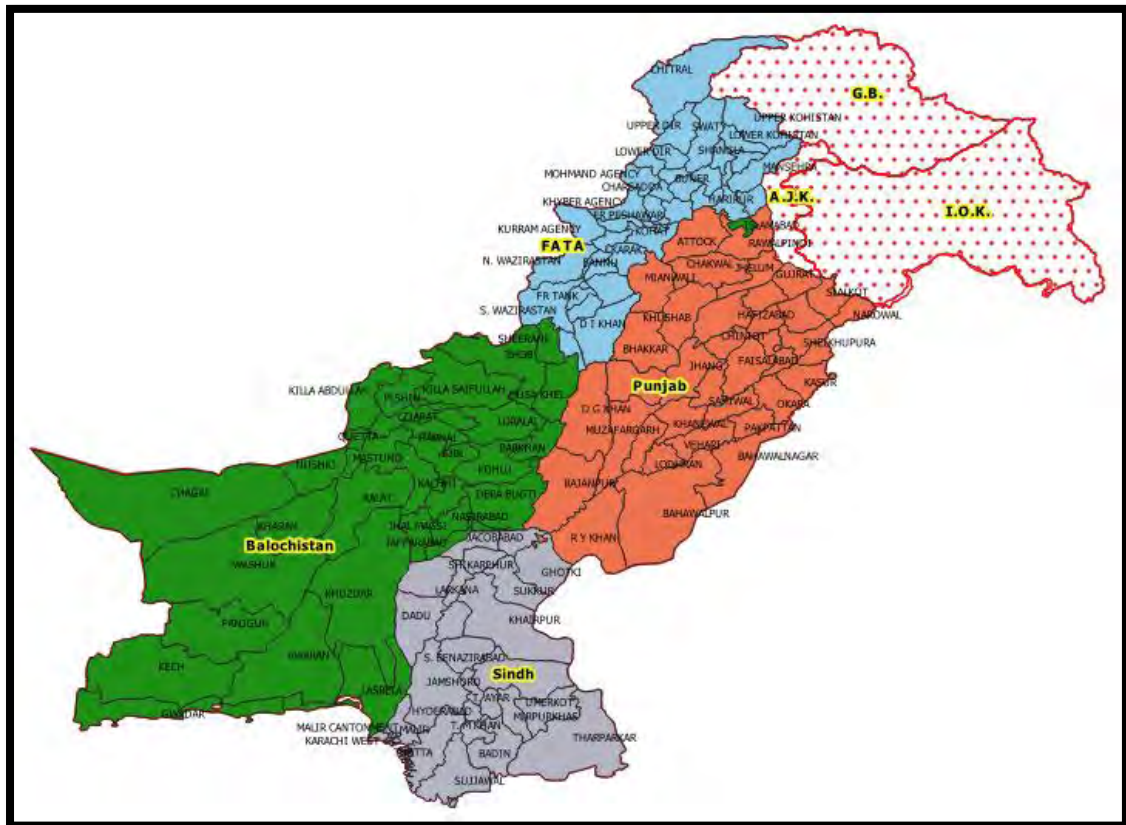


Source: Author's work

The province of KP is divided into 25 districts. Balochistan is the largest province in terms of area and is located in the southwestern part of Pakistan. It is bordered by Iran to the west and Afghanistan to the northwest. The province of Balochistan is divided into 32 districts. Islamabad Capital Territory is a federal territory located in the central part of Pakistan and serves as the capital of the country. It is a relatively small

territory with only one district. The spread of the districts across Pakistan is presented in Figure 3.2.

Figure 3.2: Province and District wise spread of Pakistan



Source: Author's work

3.3.3 Data for Household Income

The PSLM is conducted by the Pakistan Bureau of Statistics and collects data on household income by asking several questions related to the sources of household income. The survey follows international best practices and guidelines for collecting data on household income. Some of the key questions included in the PSLM survey to collect data on household income are discussed in this section.

Respondents are asked to report their income on a monthly or annual basis. This helps in calculating the average household income and understanding the distribution of income across different households. The survey asks if the respondent has done any other work or job for pay, profit, or family gain during the last year. This provides a comprehensive view of the employment status of household members and the sources of household income.

The survey asks if the respondent has received any income from wages and salaries during the last year. This provides information on the wage-earning population and their contribution to household income. The survey asks if the respondent received any pensions or other benefits during the last year. This provides information on the proportion of the population receiving pensions or benefits and the impact on household income.

The survey asks about remittances received (in cash) from within Pakistan and from outside Pakistan. This provides information on the importance of remittances as a source of household income. The survey asks if any of the household property was rented out. This provides information on the proportion of households earning income from renting out property and the impact on household income.

All these questions provide a comprehensive picture of household income and help inform research and policy analysis aimed at improving household welfare across the country. The data collected through the PSLM survey is valuable for understanding the social and economic conditions in Pakistan and can inform policy decisions aimed at improving the social welfare of households.

3.3.3.1 Real Household Income (R_INC)

The PSLM questionnaire asks about various sources of household income, including wages and salaries, pensions, remittances, rental income, etc. The collected data on household income (HHINC) is adjusted for inflation using the sensitive price index provided by the State Bank of Pakistan (SBP). The base year for the sensitive price index was 2014-15 and was later revised to 2015-16 with new income group divisions. The information obtained from the PSLM questionnaire is used to construct the variable of per capita Real Income (R_INC) of the households in each district in this research.

3.3.3.2 Data for price level

The data on household income used in PSLM is collected through a questionnaire that asks about different sources of income, including wages and salaries, pensions, remittances, and rental income. The Pakistan Bureau of Statistics publishes a Monthly

Bulletin of Statistics which includes the Sensitive Price Index for different income groups in the country. The income groups are divided into five quintiles, with the lowest income group being up to Rs. 8000. The Sensitive Price Index measures the changes in the prices of a basket of essential goods and services that are considered to be most sensitive to the changes in income and expenditure patterns of households.

An index is an important tool for understanding the changes in the cost of living for different income groups in the country. In the year 2020, the base year for the Sensitive Price Index was revised from 2008-09 to 2015-16. This revised base year provides a more accurate reflection of the changes in the prices of essential goods and services for different income groups in the country. The Sensitive Price Index is an important tool for policymakers as it helps them to understand the impact of inflation on different income groups and to design policies that are better suited to the needs of these groups. By converting the base year to 2014-15 from 2007-08 in this thesis, the Sensitive Price Index provides a more accurate representation of the changes in the cost of living for different income groups in the country. All the data is given in the mentioned in Table 3.2.

Table 3.2: Sensitive Price Index (SPI) for six rounds according to consumer income groups

Income Groups	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
All Income Groups	133.06	100	88.08	73.9	59.06	45.06
Up to Rs. 8000	128.07	100	88.64	74.67	59.09	43.85
Rs. 8000-12000	129.59	100	88.76	73.86	58.55	43.57
Rs. 12001-18000	129.42	100	87.83	73.31	58.66	43.78
Rs. 18001-35000	132.65	100	87.79	74.16	58.57	44.15
Above Rs. 35000	136.19	100	88.11	74.24	59.68	46.14

Source: Author's work compiled from various issues of Monthly Statistical Bulletin published by PBS

3.3.3.3 Average Household Size (HS) based on the combination of four provinces

Household size is used to calculate the per capita income of households in the PSLM survey. The PSLM survey collects data on household size in each of the four provinces in Pakistan in various rounds from 2006-07 to 2019-20. Table 3.3 shows the number of households and the average household size in each round. The average household size has decreased over time, with the largest decrease occurring between

2014-15 and 2019-20, where the average household size decreased from 6.54 to 5.45. This information is used to calculate per capita income by dividing the total household income by the number of individuals in the household and it is mentioned in below Table 3.3.

Table 3.3: Household size in the districts of Pakistan

PSLM Rounds	No. of Households	Average Household Size
2006-07	73953	6.70
2008-09	75188	6.65
2010-11	76546	6.52
2012-13	75516	6.52
2014-15	78635	6.54
2019-20	160444	5.45

Source: Author's work based on different waves of the PSLM

3.3.3.4 Age (A)

The age of the individual is used to calculate the adult equivalence in the household. This helps in determining the per capita income of the household more accurately by taking into account the number of adults and children in the household. An adult (18 years or above) is given a scale of 1 and a child (below 18 years) is given a scale of 0.5. This means that the income of a household with one adult and one child would be divided by 1.5 to determine the per capita income.

3.3.4 Multidimensional Poverty Index (MPI)

The Multidimensional Poverty Index (MPI) is calculated using data from the Pakistan Socio-Economic Household Survey (PSLM). The PSLM data is collected and analyzed by the Federal Bureau of Statistics in Pakistan and provides information on various wellbeing, such as household income, consumption, education, and health. The MPI combines this information into a single composite measure that captures the multiple dimensions of poverty, such as the lack of basic human needs, limited access to education and health services, and poor living standards. The MPI helps policymakers and practitioners to understand the multiple and interrelated aspects of social wellbeing and design more effective reduction strategies.

3.3.5 Human Development Index (HDI)

The data collected through PSLM can be used to calculate the HDI for Pakistan and compare it across different districts in the country. The HDI is a composite index that measures the average achievements in three dimensions of human development: health, education, and standard of living. The data collected through PSLM on health (such as life expectancy), education (such as years of schooling), and income (such as household income) can be used to calculate the HDI. By comparing the HDI across different districts, it is possible to identify disparities in human development and target interventions to improve human development outcomes in those areas.

Table 3.4: Descriptive of the variables

Variable	Observations	Mean	Std. dev.	Min	Max
SW¹					
2019-20	117	53020	19295	16539	93426
2014-15	114	29860	8995	13954	58898
2012-13	115	29948	9874	17021	82610
2010-11	114	25532	8782	9891	52379
2008-09	111	24346	9031	7954	54200
2006-07	103	14112	11579	1525	55717
SW²					
2014-15	114	34963	16033	14876	95299
2012-13	115	35041	17824	15101	129037
2010-11	114	28865	13891	9627	75914
2008-09	111	27040	14925	8794	85005
2006-07	103	18118	16931	2193	90443
SW³					
2014-15	114	34082	17951	12707	102451
2012-13	115	34251	20213	12210	139474
2010-11	114	27370	15589	6594	79956
2008-09	111	22260	11287	8323	90971
2006-07	103	16238	11683	3621	63640

Source: Author's work based on different waves of the PSLM

* SW¹, SW², and SW³ are the social welfare functions³

3.3.6 Summary

The data collected through the PSLM survey in this thesis provides a comprehensive picture of the social welfare of households in Pakistan. The information on household

³ The definitions of SW¹, SW², and SW³ are given in section 3.4.5

size, income, and sources of income allows for a thorough analysis of the economic status of households. The inflation-adjusted sensitive price index provided by SBP helps to accurately reflect the changes in household purchasing power over time.

Additionally, the MPI provides a multidimensional view of poverty that goes beyond just income and considers factors such as health and education. The HDI calculation using the PSLM data gives a holistic view of the human development of households in Pakistan, including their standard of living and access to education and healthcare. By linking these variables, the PSLM data provides a robust picture of the social welfare of households in Pakistan, allowing for more informed policymaking and program implementation.

3.4 Methodology

Social welfare is a multidimensional concept that goes beyond traditional economic measures of prosperity. To gain a more holistic understanding of social welfare, researchers and policymakers have adopted approaches that incorporate both monetary and non-monetary indicators. One such approach is the Sen approach, which takes into account both income and income inequality to measure social welfare.

In this context, this report aims to assess the social welfare of districts in Pakistan by employing a multidimensional approach. Firstly, we calculate the Gini Index for each district in Pakistan to assess income inequality, using household income data. The Sen Index is then employed to measure social welfare, which considers not only income but also income inequality in its theoretical framework.

In addition to income and income inequality, non-monetary indicators such as the Multidimensional Poverty Index (MPI) are also employed in this study. The MPI is a multidimensional measure of poverty that takes into account several dimensions of poverty, such as education, health, and living standards. By analyzing the MPI data for each district in Pakistan, we can gain a deeper understanding of the socioeconomic status of each region.

In addition to the Gini Index and MPI, the Human Development Index (HDI) is also utilized in this report to assess social welfare in Pakistan. HDI is a composite index that takes into account three key dimensions of human development: education, health, and income. By considering these three dimensions, the HDI provides a more comprehensive assessment of human wellbeing than traditional measures of economic growth.

Overall, this report provides a comprehensive assessment of social welfare in Pakistan, utilizing both monetary and non-monetary indicators to gain a multidimensional understanding of the concept. By employing such an approach, policymakers and researchers can better understand the factors that contribute to social welfare and make informed decisions to improve the wellbeing of the population.

3.4.1. Theoretical Framework for Measurement of Social Welfare

Gross Domestic Product (GDP) has long been used as the primary indicator of a country's economic activity and progress. However, it has become increasingly clear that GDP is not an accurate reflection of a country's overall socioeconomic progress. While GDP measures the total value of goods and services produced within a country's borders, it does not take into account important factors such as income inequality, environmental sustainability, and quality of life.

For instance, a country with a high GDP may still have significant income inequality, which can result in negative social and economic consequences such as poverty, social unrest, and political instability. Similarly, a country with high levels of pollution and environmental degradation may have a high GDP but a low quality of life for its citizens.

As such, it is important to adopt a more holistic approach to measuring socioeconomic progress that takes into account a range of indicators, both monetary and non-monetary.

By incorporating measures of income inequality, environmental sustainability, and quality of life, we can gain a more comprehensive understanding of a country's progress and identify areas that require attention and improvement. However healthy

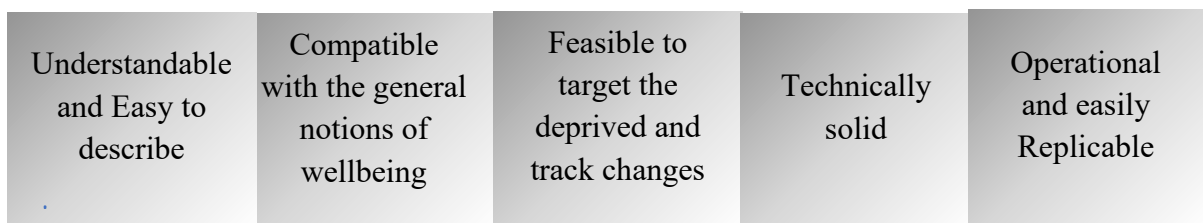
criticism and debate in the literature exist to use only GDP as a welfare indicator due to certain limitations.

The two major weaknesses highlighted in the literature are distributional issues, which are neglected as well as the market valuation of elements related to the wellbeing of human activity does not exist (Kramp, 2010). However, one of the crucial determinants of welfare is the distribution of resources and inequality (Schwartz & Winship, 1980). Because inequality results in loss of welfare. Secondly, the evolution in the stock of wealth in an economy is determined not only by the flow of income but other factors also influence it. This includes revaluation of assets, consumption of fixed capital and volume changes not because of economic transactions but other factors like discoveries of natural assets, natural disasters or war and terrorism damaged the stocks, etc. In GDP the impact of productive activities on stocks, including stocks of natural resources, has been ignored because it includes the measurement of productive flows. However, welfare depends upon income, but it is inappropriate to consider it the sole attribute of welfare. That is why including measures of poverty and income inequality will fill the gap.

3.4.2 Core Properties for a Measuring Tool of Wellbeing

The capability approach by Amartya Sen provides a base for developing indices with multiple dimensions. An adequate measure of welfare for public policy can be developed with the core properties proposed in the approach of capabilities and functioning. The welfare measure is comprised of a few characteristics as mentioned in Figure 3.3.

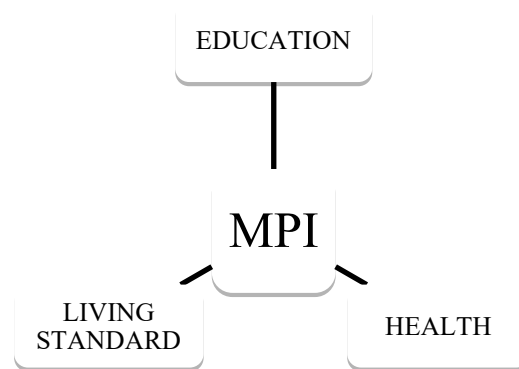
Figure 3.3: Core properties of a measure of welfare



Source: Author's work

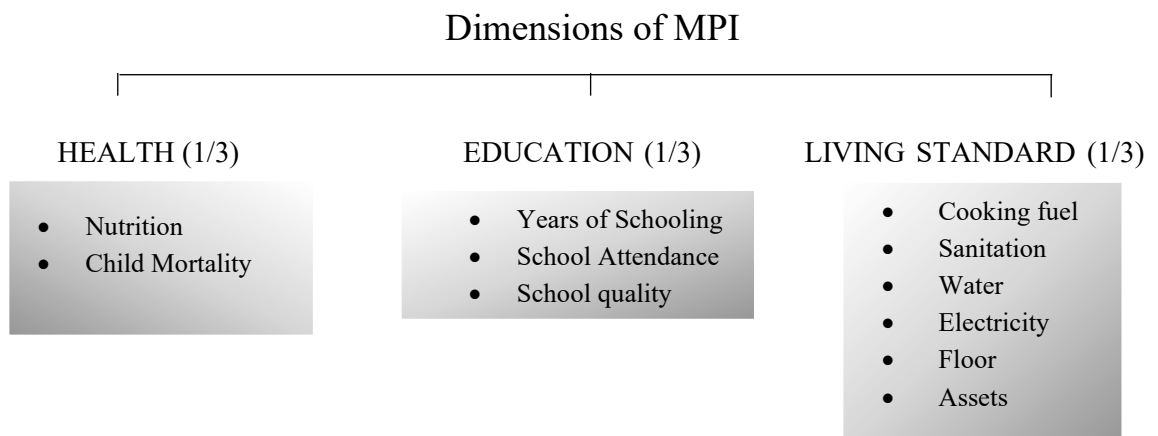
The addition of achieved functioning in a welfare measure must have some intuition. The addition of achieved functioning in a welfare measure must have some intuition and a good reason for its inclusion. Therefore, [Alkire and Foster \(2011\)](#) developed a measure incorporating different dimensions indicating the standard of life. The three equally weighted dimensions are chosen to compose MPI (Multidimensional Poverty Index). Further, the aggregation of three dimensions is based on ten different indicators. The underlying theoretical framework of the composition of MPI is presented in Figure 3.4. There are mainly three dimensions combined to form MPI. Equal weights are assigned to these three. Each dimension is pertinent to a range of indicators, Figure 3.5 describes ten indicators. The weights are assigned to each dimension.

Figure 3.4: Composition of Multidimensional Poverty Index (MPI)



Source: Author's work based on the study by Alkire & Foster (2011)

Figure 3.5: Dimension, weights, and indicators (MPI)



Source: Author's work based on literature.

A substantial difference occurs in MPI from the traditional measurement of material deprivation because MPI includes deprivation in functioning. The computation of MPI is based on the information regarding the incidence of poverty in the population and secondly on the intensity of their deprivation. The multidimensional headcount ratio (H) is the first component, exhibiting the proportion of people experiencing multiple deprivations in each population (equation 3.1). Formally H is computed as:

$$H = q/n \quad (3.1)$$

Where the number of multidimensional poor is denoted by q and n is the total population under consideration. The depth of poverty is calculated through the weighted sum of deprivation through which the multidimensionally poor encompasses (equation 3.2). Therefore, the intensity of poverty is calculated as:

$$A = \frac{C_j(K)}{q} \quad (3.2)$$

The $C_j(K)$ denotes the score of censored deprivation of the district j and q are the number of multidimensionally poor as mentioned above. Mathematically, the product of both will establish MPI (equation 3.3).

$$MPI = H * A \quad (3.3)$$

In the case of Pakistan, the threshold is 33.3%, and the individuals or households are identified through a weighted deprivation score. If the score is greater than 33.3%, considered poor in multidimensions.

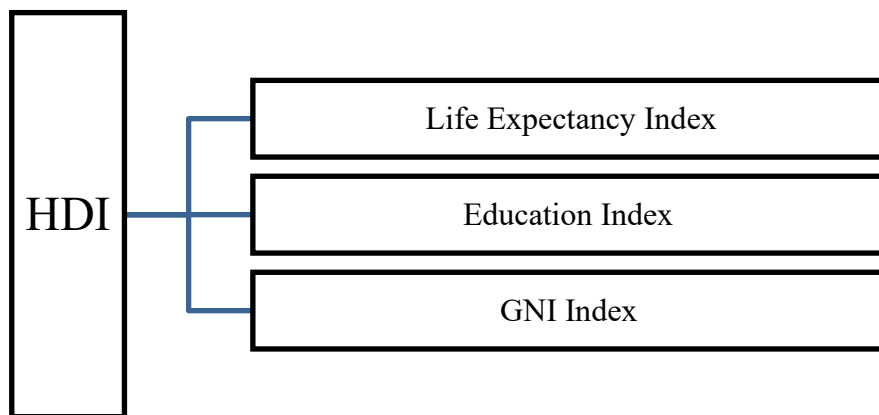
3.4.3 Human Development Index (HDI)

The conceptual base for the construction of HDI is derived through the capabilities and functions. The core of human development is to enhance capabilities in functioning to measure wellbeing in terms of development activity. The composition of HDI is presented in Figure 3.6. The essential capabilities are derived through three main dimensions to develop the analysis of human development. These three dimensions include:

- i) Longevity
- ii) The attainment of education
- iii) Acquiring a decent standard of living

Therefore, four indicators Life expectancy at birth, Expected years of schooling, Mean years of schooling, and GNI per capita hired for developing indices to represent each dimension.

Figure 3.6: Composition of HDI



Source: Author's work

The first computation of these indices takes place for the construction of HDI. Because the underpinnings of human development are based on these three indices representing each dimension.

3.4.4 Income Distribution

The per capita real Income (R_INC) is the income of the individuals in the selected household living in the district, adjusted for inflation by utilizing a sensitive price index. The household size (HH size) is utilized to calculate the total number of individuals. The per capita real income (R_INC) is calculated by dividing real income by the total number of individuals of all households in the sample for further analysis.

In this study, we employ the Gini coefficient to measure income inequality at the district level in Pakistan. The Gini coefficient is a widely used measure of income inequality that calculates the extent to which the distribution of income deviates from perfect equality. The coefficient ranges from 0 to 1, with 0 indicating perfect equality

(i.e., every person has the same income) and 1 indicating perfect inequality (i.e., one person has all the income). The rationale for using the Gini coefficient in this study is its simplicity and widespread use as a standard measure of income inequality. Moreover, it allows for easy comparison between different regions and has been shown to be a reliable predictor of various social and economic outcomes such as poverty, health, and social mobility. By employing the Gini coefficient, we can gain a better understanding of the level of income inequality in each district of Pakistan and its potential impact on social welfare. The framework for the income distribution for the n -vector of household's income in each district is taken here as follows in equation (3.4):

$$d_INC_j = \sum_{i=1}^n R_INC_{ij} \quad (3.4)$$

d_INC_j is the district j aggregate income where i varies from 1 to n is the number of households in a district j , and R_INC_{ij} is the per capita real income of household i in district j .

Further, the mean income of the households in district j is written as in equation (3.5):

$$\mu_j = \frac{1}{n} \sum_{i=1}^n R_INC_{ij} \quad (3.5)$$

Equation (3.4) shows the sum of the real per capita income in a district and equation (3.5) shows the mean income (AINC) of district j and n is the total number of households. Another vector $\mathbf{1}$ is used here and is denoted as $(1, 1, \dots, 1)$, & $\mu(\mathbf{1}) = \mu$ owing perfectly equal distribution with mean μ . The inequality function to assess income distribution ' R_INC_i ' per capita real income in district j can be expressed in equation (3.6):

$$I(R_INC_i) = I(R_INC_{1j}, R_INC_{2j}, \dots, R_INC_{nj}) \quad (3.6)$$

The axiomatic approach takes towards the characterization of the inequality measure. The core axioms set to develop the inequality index are four:

Axiom 1: Anonymity implies that, in the distribution, relabeling a person will not affect inequality.

Axiom 2: The population principle implies that ceteris paribus the population change will leave inequality unchanged. So, replication of a population will not affect inequality.

Axiom 3: The transfer principle implies that redistribution of income in a way that someone receives income who is richer than any poor a regressive transfer will contribute to rising inequality and vice versa (Pigou-Dalton Principle).

Axiom 4: The scale invariant rule implies that if incomes of all individuals in the distribution are scaled up or scaled down with the same scalar say λ then inequality remains the same.

The Gini coefficient is used to measure income inequality and a measure that satisfies the above axioms. It was first introduced by Corrado Gini in 1912 to analyze the degree of concentration of income across the region. Though it is not possible to decompose the Gini coefficient across the groups or subgroups but enables highlighting the distribution of resources like income across the society. It is a statistical tool that assists in making comparisons of the income distribution within a region. According to Cowell (2016), Gini Index is written as in equation (3.7):

$$I_{Gini} \mu(R_INC) = \frac{1}{2n^2 \mu(x)} \sum_{i=1}^n \sum_{j=1}^n |x_i - x_j| \quad (3.7)$$

Therefore, the Gini index is half of the relative mean absolute difference as depicted in the formula of equation (3.7). The value of the index lies between zero and 1, where zero implies perfect equality and unity implies maximum dispersion of the data under consideration. The graphical presentation of the Gini is usually done through the Lorenz curve. It gives the scenario of the concentration of income among the population across the region. The proportion of the cumulative total income of the population to the population percentile by income is plotted to check the dispersion from perfect equality. Therefore, the following formula in equation (3.8) is used to calculate each district's Gini Index, the income inequality among the households (real income).

$$I_{Gini}\mu(R_INC) = \frac{1}{2n^2 \mu(AINC)} \sum_{i=1}^n \sum_{j=1}^n |R_INC_i - R_INC_j| \quad (3.8)$$

3.4.5 Social Welfare Functions

The social welfare function is defined to represent the empirical income with ‘n’ arguments.

The social welfare of the households in district j is $SW(dis_j)$ and if say Z_1 to Z_q are the indicators that determine the social welfare.

Certain axioms must obey this normative function. It allows drawing comparisons between individuals or households and also represents social preferences over income distribution. The main axioms among all are the Pareto Axiom, Symmetry Axiom/Anonymity, and Principle of Transfers also called the Pigou Dalton principle. The welfare function follows such axioms and expresses the aversion to inequality by society.

Let us suppose that the social welfare function taken here is homogeneous of degree 1. Factorizing means income μ by using this property by normalizing, $SW(1, 1, \dots, 1)$. The normalized function reaches its maximum at 1 because there is an inequality aversion and thus total welfare cannot be greater than μ . Hence the relationship between social welfare function and inequality is presented also by Atkinson (1970) and can be rewritten as in equation (3.9):

$$SW_j^1(dis) = \mu_j(1 - I) \quad (3.9)$$

Equation (3.11) I is interpreted as an inequality measure and the cost of inequality is represented by where the inequality measure I cannot be greater than 1.

Another way to measure social welfare is by employing a measure that incorporates the aspect of poverty along with inequality. According to [Kakwani \(1997\)](#) inequality, welfare, and poverty are interrelated phenomena. The decomposition of the inequality measure can be done by separating the poor from other groups of the population. The

idea is discussed by [Lubrano \(2017\)](#). Thus, including the cost of poverty with inequality the welfare function can be shown in equations (3.10) and (3.11):

$$SW_j^2(dis) = \mu_j - \frac{1}{2}\mu_j P_j - \frac{1}{2}\mu_j I_j \quad (3.10)$$

$$SW_j^2(dis) = \mu_j(1 - 1/2(P_j + I_j)) \quad (3.11)$$

Where P is the poverty index and μP is the cost of poverty. Here there is a tradeoff between inequality and poverty.

According to Sen (1989), the measurement of wellbeing is not uni-dimensional, so multidimensional aspects should be included. A measure of welfare should cater to the cost of poverty, cost of inequality and includes living standards. So, a measurement of welfare based on inequality, poverty, and living standards can be done by using the welfare function which is given in equation (3.12):

$$SW_j^3(dis) = \mu_j[1 - 1/3(P_j + I_j + IHDI_j)] \quad (3.12)$$

The welfare measure SW^3 caters to the three aspects of welfare which are poverty, inequality, and living standards. The multidimensionality of welfare covers by employing the composite measure of poverty (MPI), and inequality (Gini Index) and represents living conditions human development index (HDI), so to cover the cost of low living standard, the inverse of HDI (IHDI) is utilized. As [Anand and Sen \(2000\)](#) discussed in their paper about the importance of the income component in the human development index but not enough to judge the quality of life of human beings.

3.5 Results and Discussion

This section of our study indicates that the level of social welfare in Pakistan varies greatly across provinces and districts. In this section, we will present and analyze the findings of our analysis to gain a deeper understanding of the social welfare conditions in the country. The capital district of Pakistan i.e., Islamabad has seen a rise in the level of welfare due to an increase in the real average income of households. Despite the existence of inequality, which is measured at 0.56 in 2019-20, the welfare level of the area has increased as a result of a rise in the average real

income of households. It can be concluded that the improvement in the welfare level of the capital district and major districts of the provinces is a reflection of the general trend of improvement in the country's economic status during this period.

The social welfare level in Balochistan has been observed to be deteriorating in the districts of Awaran, Chaghi, Panjgur, and Washuk. The data collected in the three rounds of 2019-20, 2014-15, and 2006-07 reflects the lowest level of welfare in these areas, which is evident from the dark red shading in the figure. However, there has been an improvement in the welfare level in other districts of Balochistan province during the period of 2014-15 as compared to 2006-07.

However, the trend reversed in the year 2019-20, and the welfare level worsened in these areas. On the other hand, the district of Khyber Pakhtunkhwa is expected to show an improvement in the welfare level in the year 2019-20 compared to the previous two rounds. In part 1 of Figure 3.5, it can be observed that the districts near the Central Punjab region have the highest level of social welfare in the year 2019-20. However, the districts located in South and North Punjab have a lower level of social welfare.

The same trend can be seen in the districts near the districts where the capital cities Karachi and Peshawar of Sindh and KP respectively are located, the level of social welfare is higher in those districts near the capital city compared to the far-off districts. A comparison between the years 2006-07 and 2019-20 shows that the level of welfare has deteriorated in the districts of Sindh and KP. On the other hand, Balochistan is the most disadvantaged region in terms of social welfare.

3.5.1 Social Welfare Across Districts of Pakistan Based on Income and Income Inequality

Spatial mapping is a superior method for illustrating connections and flows between different regions in comparison to tabulated datasets and other graphical forms of data visualization. The evaluation of social welfare issues based on income and income inequality is made easier through spatial mapping compared to any other technique. Hence, it plays a crucial role in recognizing disparities in social welfare across different districts in Pakistan.

The social welfare of different districts in Pakistan is depicted in Figure 3.5, which is a spatial mapping that showcases the levels of social welfare across different regions. The correlation between social welfare and income inequality is depicted in this figure.

The levels of social welfare are represented by different colors, with the minimum value represented by red, the maximum represented by dark blue, and the medium level represented by white and brown colors. The correlation between social welfare and income, as well as income inequality, can be seen from the map. The indicator used to represent social welfare in each district is " SW_j^1 " in Figure 3.5. The figure is divided into two parts, with part 1 showing the mapping of social welfare across districts for the years 2006-07, 2008-09, and 2010-11, while part 2, mapping of the years 2012-13, 2014-15, and 2019-20 are presented.

3.5.2 Level of Inequality Across Districts

Despite global efforts to reduce income inequality, developing countries are still grappling with significant disparities, especially since the 2008 global crisis. As a result, reducing income inequality has become a critical issue for researchers and policymakers in these countries. In this context, the Gini coefficient emerges as a valuable measure of inequality. It is a simple and widely used tool that helps compare income distribution between countries or regions. Unlike other measures, it considers the entire income distribution rather than just the average or a specific portion of it. Moreover, it can be decomposed to assess the contributions of different income sources to overall inequality. Also, it can be used to track trends and evaluate the effectiveness of policies aimed at reducing inequality.

The Gini coefficient is crucial in evaluating the economic wellbeing of society, and it has been used to map the income inequality levels across different districts in Pakistan. The data reveals that the level of income inequality in Pakistan has increased between 2006-07 and 2019-20. The district of Shikarpur recorded the highest Gini coefficient of 0.61 in 2019-20, followed by Islamabad, Lahore, Quetta, Peshawar, and Karachi. There was a significant rise in income inequality in Punjab, with districts like Sahiwal, Lahore, Bahawalnagar, and Jhang exhibiting high levels of

inequality. Similarly, 15 out of 24 districts in Sindh showed high levels of income inequality. The causes of income inequality in Punjab are multifaceted, ranging from unequal distribution of resources like land, capital, and infrastructure to differential access to these resources.

Balochistan showed no improvement in reducing income inequality, and its districts remained unchanged from 2006 to 2020. Although income inequality in Balochistan is not as high as in some other regions of Pakistan, it is still a significant issue that needs to be addressed. On the other hand, the districts in KP showed improvement in terms of income inequality, with Chitral having the lowest Gini coefficient value of 0.36. However, districts with a higher concentration of industries and commercial activities tend to have higher levels of income inequality. In contrast, rural districts tend to have lower levels of income inequality. For instance, Kohistan, Torghar, and Shangla have relatively low levels of income inequality compared to other districts in KP.

The level of income inequality varies among the districts of Sindh, with urban regions like Karachi exhibiting higher levels of inequality compared to rural areas. Karachi, being the largest city and the economic and financial hub of the country, has experienced significant economic growth. However, the benefits of this growth have not been equally distributed, resulting in a significant income gap between the rich and the poor. Overall, the Gini coefficient highlights the varying levels of income inequality among the regions of Punjab, Sindh, Balochistan, and KP, with some regions (mainly urban regions) experiencing progress while others remain stagnant.

The data presented in the article highlights the issue of income inequality in Pakistan and the disparities that exist within the country. The Gini coefficient, which is a widely used measure of inequality, shows that income inequality has increased in Pakistan between 2006-07 and 2019-20. The highest levels of inequality are observed in the districts of Shikarpur, Islamabad, Lahore, Quetta, and Peshawar, while the lowest levels are observed in Chitral, Kohistan, Torghar, and Shangla.

The above data also highlights the complex and multifaceted nature of the causes of income inequality. Unequal distribution of resources such as land, capital, and

infrastructure can contribute to income inequality. Wealthier individuals or groups may have greater access to these resources, allowing them to generate more income and widening the income gap with those who have less access to resources. Additionally, some regions with a higher concentration of industries and commercial activities tend to have higher levels of income inequality, while districts with a predominantly rural economy tend to have lower levels of income inequality.

3.5.3 Multidimensional Poverty Index (MPI) Across Districts of Pakistan

The Multidimensional Poverty Index (MPI) is a comprehensive measure of poverty that takes into account various dimensions of deprivation, such as health, education, and living standards. It not only measures income level but also captures the extent and intensity of poverty in a region. The MPI provides a more nuanced picture of poverty in a region than a single-dimensional measure.

Figure 3.7 shows that the most impoverished districts in Pakistan are located in Balochistan and KP. In Balochistan, the scarcity of water is a major issue, which limits agricultural productivity and access to safe drinking water. Ethnic and political conflicts in the region have also created a challenging business environment, making it difficult to attract investment and promote economic growth. Similarly, some districts in KP, such as Upper Dir and Kohistan, have limited access to basic services like healthcare, education, and safe drinking water, which contributes to high MPI in the region. Furthermore, natural disasters such as floods and earthquakes have a severe impact on the economic well-being of affected families.

On the other hand, poverty levels in many districts of Punjab are relatively low. However, districts in southern Punjab have a high MPI due to limited access to basic services and challenges in the agricultural sector. Natural disasters like floods and droughts are common in Southern Sindh, which can destroy crops, homes, and infrastructure, and have a significant impact on the livelihoods of the poor. The MPI data reveals that 13 out of the 20 poorest districts are located in Balochistan in both 2014-15 and 2019-20. In contrast, many districts in Punjab and KP have better living conditions. The proximity to the capital also plays a role in poverty levels, with districts near the capital having better living conditions than those far from it. Overall, the MPI provides a more comprehensive and detailed view of poverty in Pakistan than

a single-dimensional measure and helps policymakers to identify areas that need more attention and investment to reduce poverty levels.

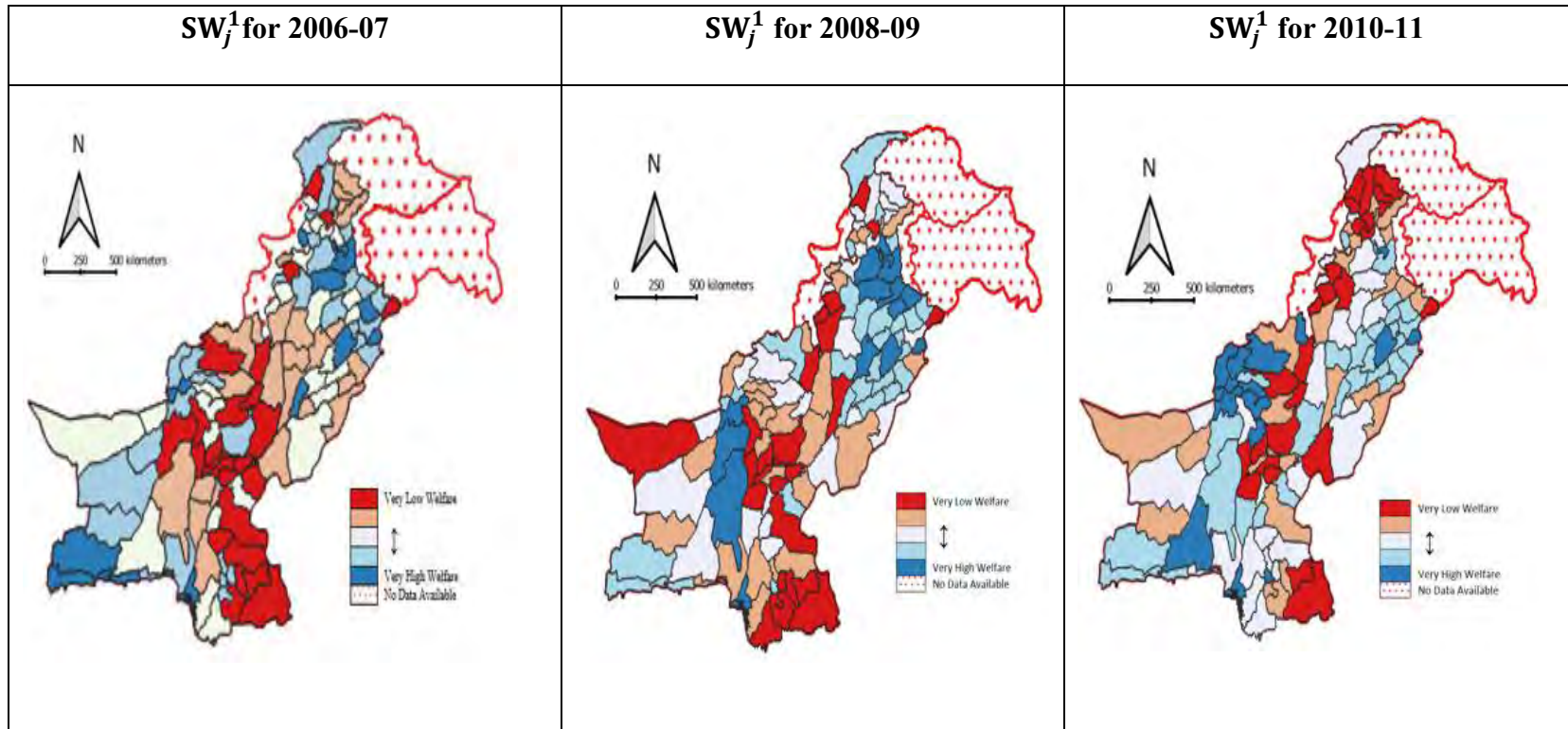
3.5.4 Human Development Index (HDI) Across Districts of Pakistan

The following section presents the data on the social welfare of different districts in Pakistan. The data provides an overview of the level of social welfare in the country and the disparities between districts. Figure 3.1 provides insights into the standard of living in various districts across Pakistan. This index is a comprehensive measure of human well-being that encompasses aspects such as education, health, and income. The figure presents information on the HDI of districts separated by province and serves as a representation of the socio-economic status of the different regions.

In Balochistan, 20 out of 30 districts are in a state of low HDI, demonstrating a lower standard of living. While some districts, such as Kech, Khuzdar, Noshki, and Pishin, showed progress in 2014-15 as compared to 2006-07, other districts, including Awaran, Jhal Magsi, Harnai, Washuk, and Chaghi, still have a below-average HDI. Additionally, in Mastung, Killa Saifullah, and Khuzdar, the quality of life has worsened over time. In Khyber Pakhtunkhwa (KP), the conditions are varied. Kohistan, Torghar, and Upper Dir are some of the worst-off districts, with HDIs of 0.23, 0.24, and 0.38, respectively. On the other hand, some districts have a moderate HDI, including Hangu, Lower Dir, and Shangla, with HDIs between 0.40 and 0.60. Lastly, some districts have a relatively high HDI, with the highest value of 0.76 in Peshawar.

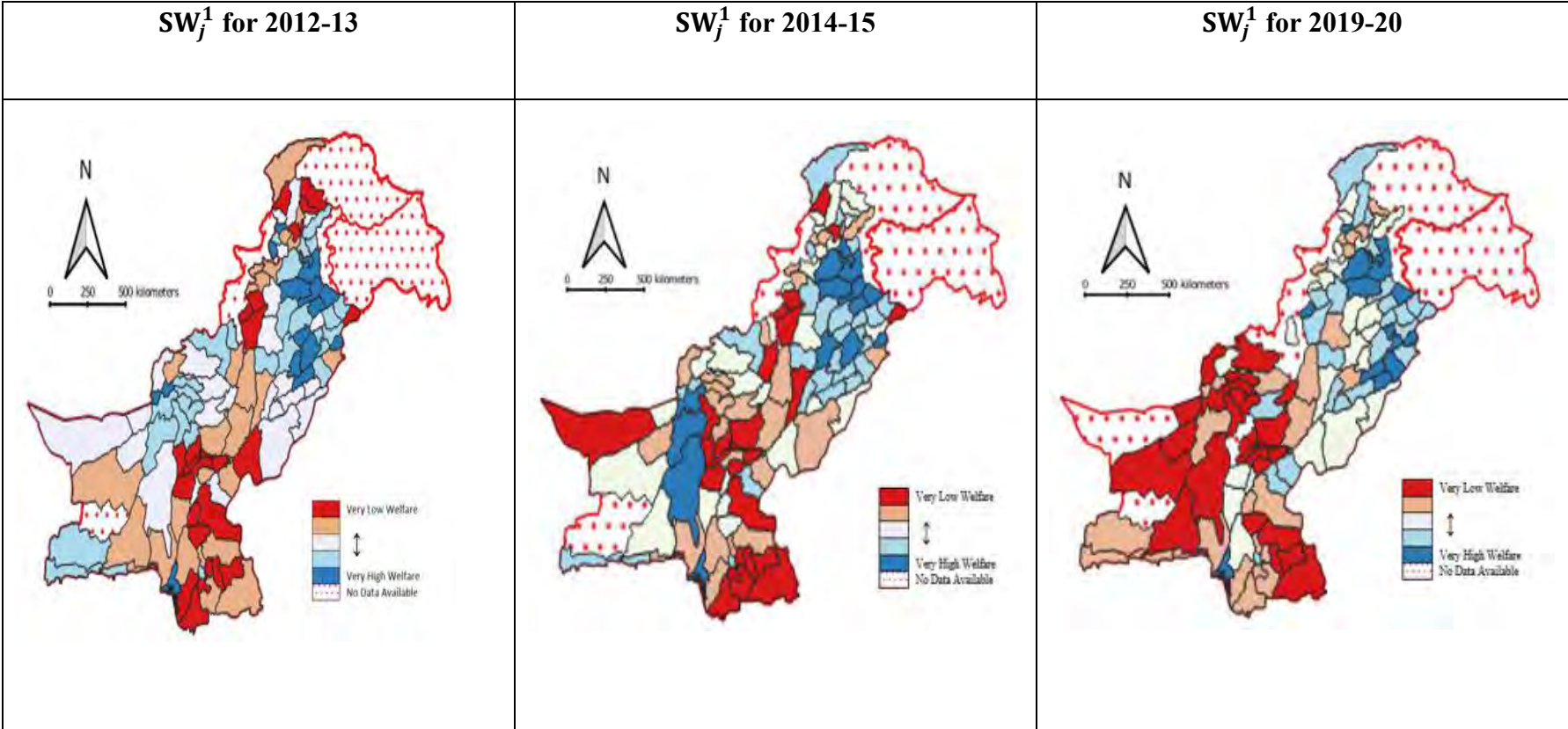
In Sindh, the HDI remains low in Tharparker, Sujjawal, Tando Mohammad Khan, and Thatta, with values of 0.32, 0.33, and 0.38, respectively. On the one hand, districts like Jamshoro, Shaheed Benazirabad, and Dadu have shown improvement, while on the other hand, Shahdadt and Sukker have shown deterioration in 2014-15. Lastly, in Punjab, there is only one district in the bottom 50, Rajanpur, with an HDI of 0.51. Although the conditions in the districts of Punjab are better compared to other provinces, it is also noteworthy that the lower Punjab districts seem to be deprived compared to the upper Punjab districts.

Figure 3.7: Social Welfare across Districts of Pakistan Based on Income and Income Inequality



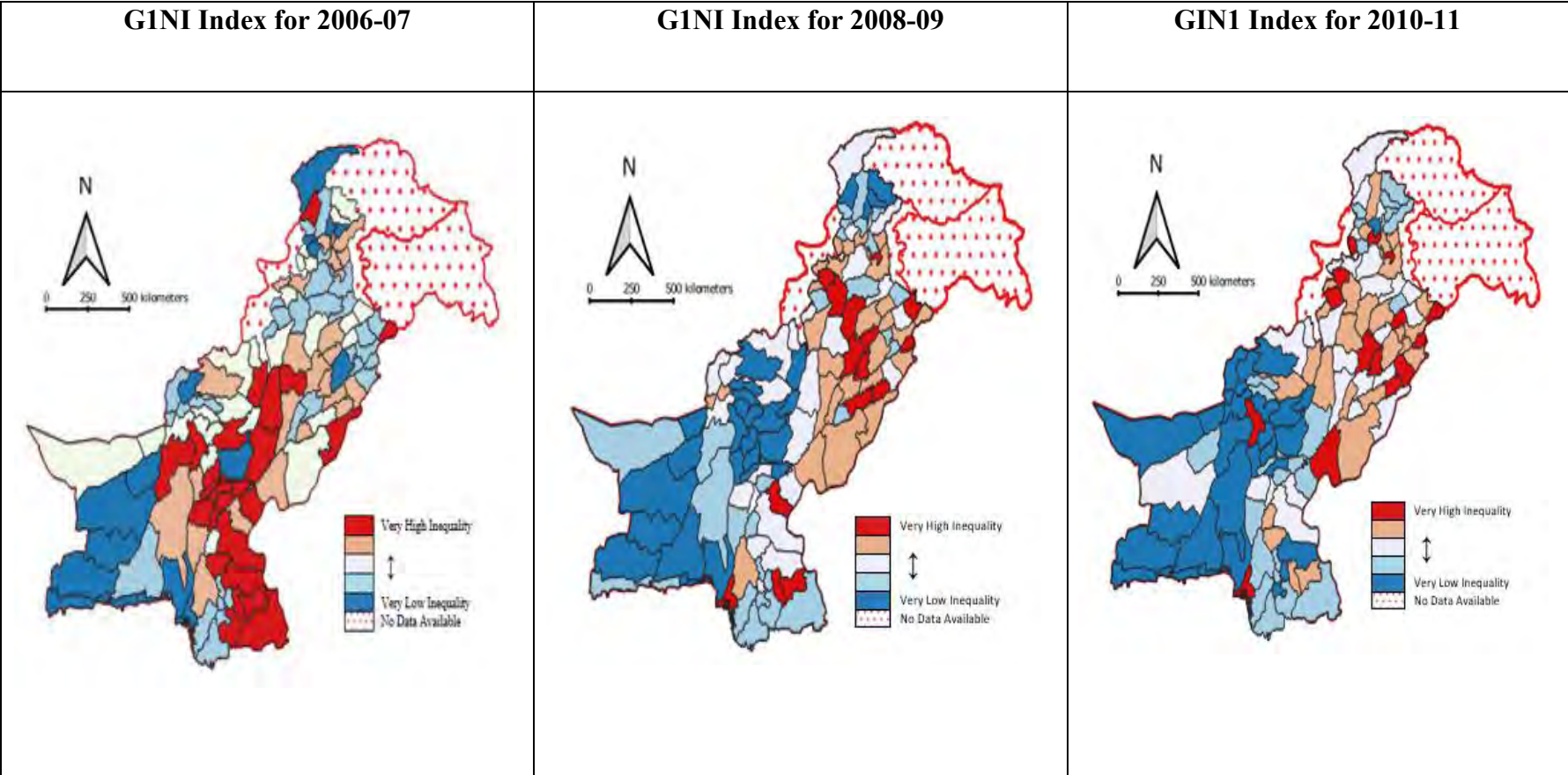
Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare.

Continue Figure 3.7 ...



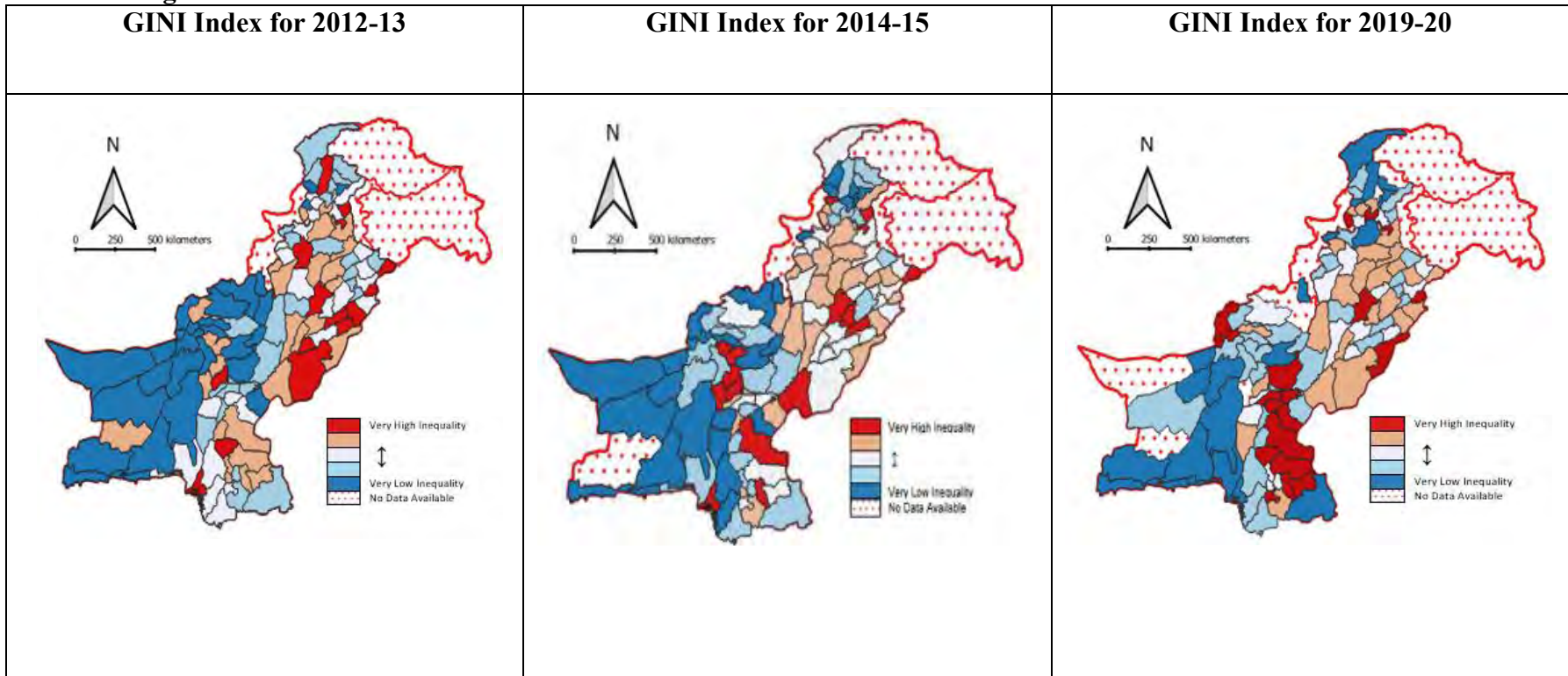
Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare

Figure 3.8: Level of Inequality Across Districts



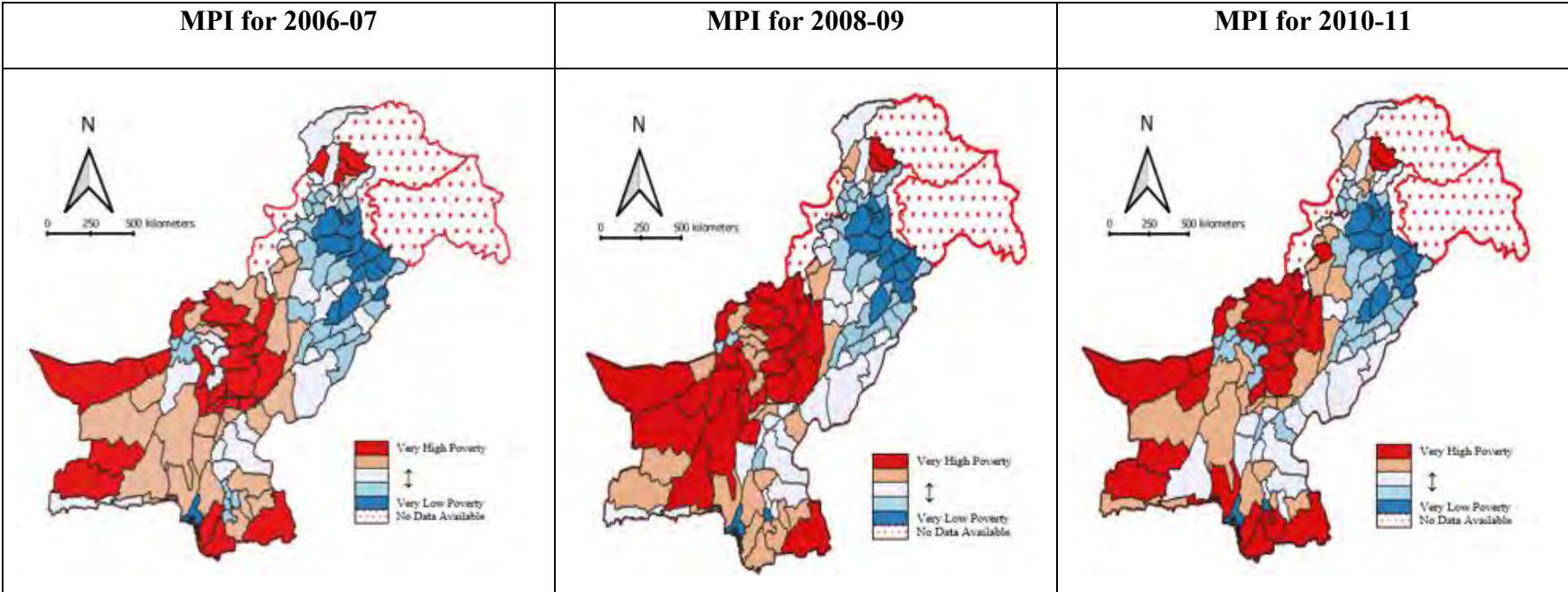
Authors' work. The lower quantile indicates low-income inequality whereas the upper quantile indicates high-income inequality.

Continue Figure 3.8 ...



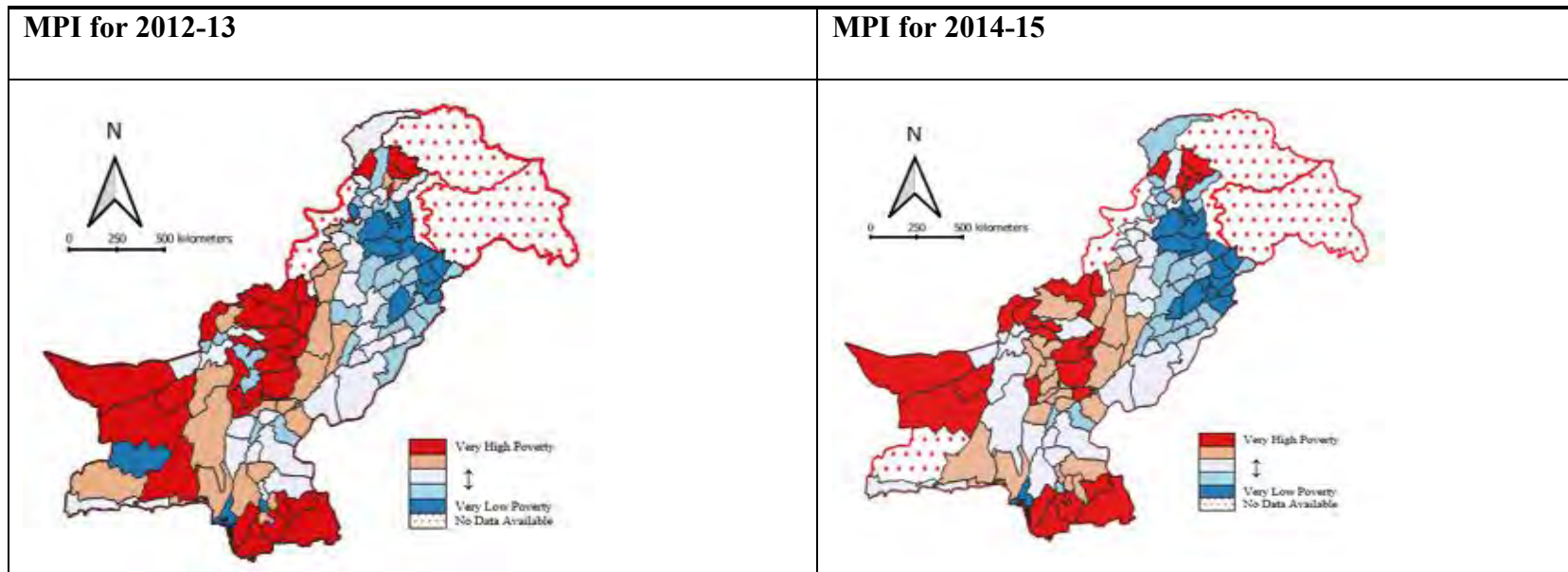
Authors' work. The lower quantile indicates low-income inequality whereas the upper quantile indicates high-income inequality

Figure 3.9: Multidimensional Poverty across Districts



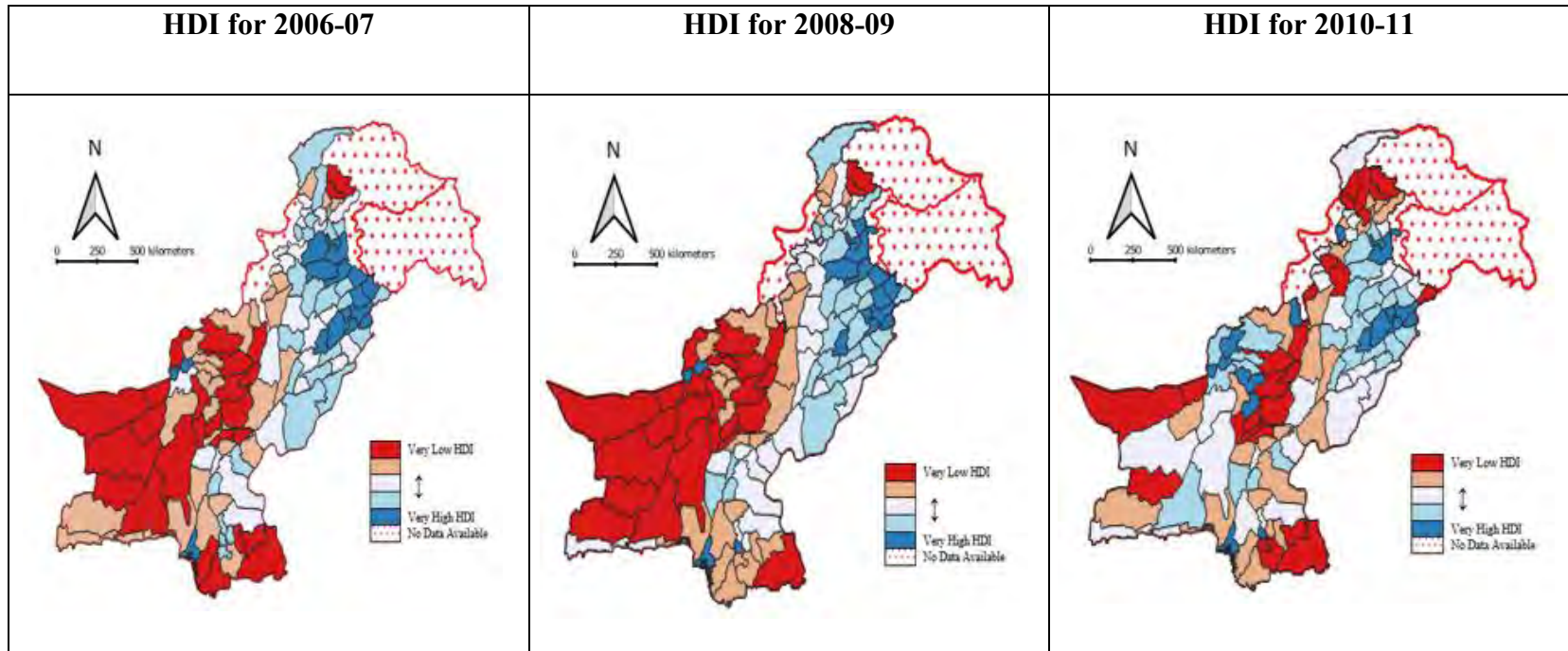
Authors' work. The lower quantile shows less poverty whereas the upper quantile depicts a high poverty

Continue Figure 3.9 ...



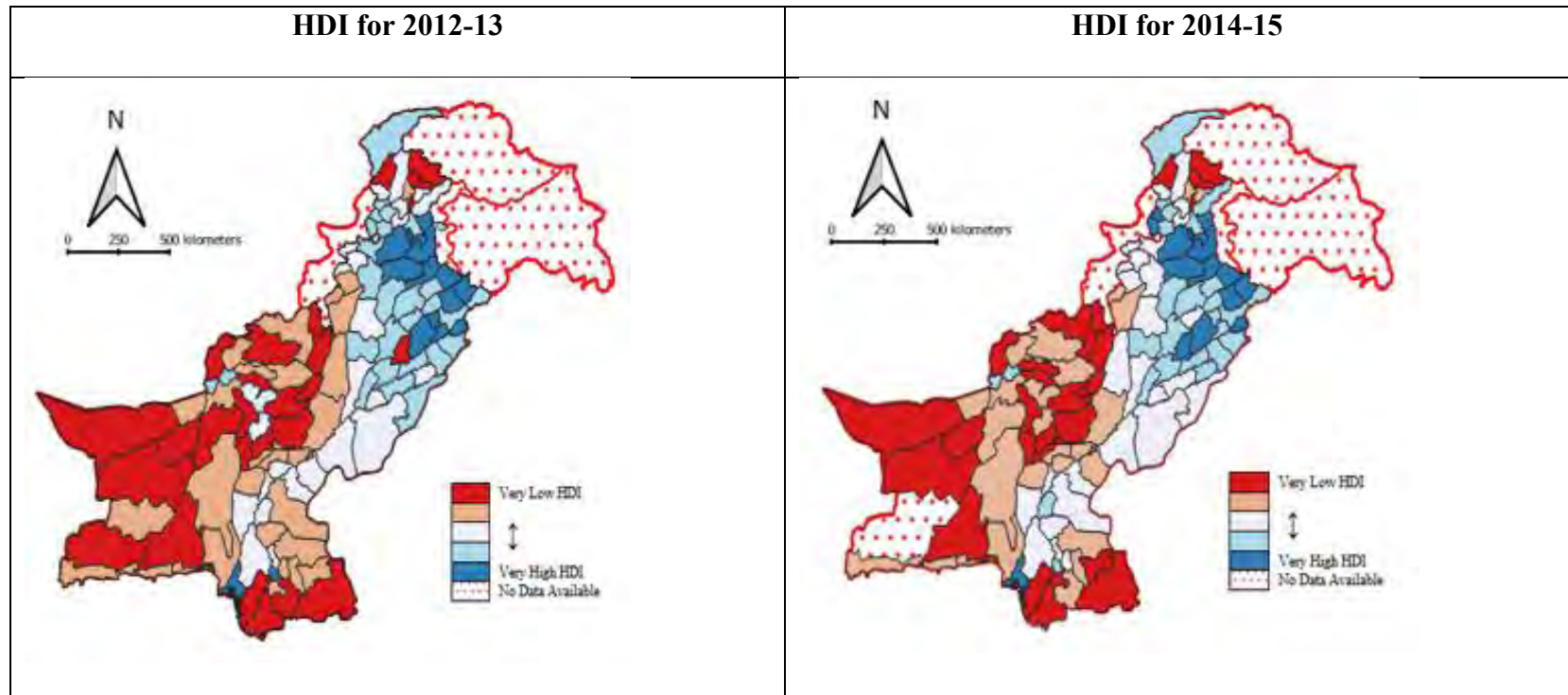
Authors' work and data source. The lower quantile shows less poverty whereas the upper quantile depicts a high poverty

Figure 3.10: HDI across Districts of Pakistan



Author's work. A high quantile indicates a higher rank of human development in a region whereas a lower quantile indicates a lower rank of human development in a region.

Continue Figure 3.10 ...



Author's work. A high quantile indicates a higher rank of human development in a region whereas a lower quantile indicates a lower rank of human development in a region.

3.5.5 Social Welfare Across Districts of Pakistan: Multidimensional Indicators

The social welfare indices are based on multidimensions i.e., health, education, and living standard. Therefore, SW_j^2 and SW_j^3 are employed to assess the social welfare of the households in the districts.

3.5.5.1 Social Welfare: Multidimensional Indicators (SW_j^2)

The data presented in Table 3.9 provides an overview of the districts in Pakistan in terms of their social welfare and economic indicators. The welfare index SW^2 is used to rank the districts, taking into account the MPI and Gini Index. The districts that rank better than other districts in the MPI also tend to rank better in terms of social welfare SW^2 . Figure 3.9 provides an in-depth analysis of the social welfare levels across different districts in Pakistan, highlighting the disparities and improvements over time.

However, it is important to note that none of the districts in Khyber Pakhtunkhwa (KP) and Balochistan are found in the top ranking list according to this welfare index. Despite having low income inequality in these districts, the MPI and per capita Average Real Income (AINC) are relatively high, that contributes to lower welfare levels in these areas. The districts of Mastung, Kalat, and Quetta in Balochistan are exceptions, as they have low MPI and low-income inequality, contributing to higher welfare levels in these areas. The same trend is observed in Haripur, Peshawar, Chitral, and Abbottabad districts in KP, which have low MPI and low-income inequality.

Islamabad district ranks first in terms of social welfare, with a high level of average per capita income (AINC). Despite this, the district also experiences a high level of income inequality, as indicated by its high Gini Index. This highlights the importance of considering multiple indicators when evaluating the welfare levels of different districts.

The district of Khuzdar ranks first in terms of the Gini Index, but due to a low per capita income, it ranks 117th in terms of SW^1 . This demonstrates the importance of considering

both income inequality and average household income when evaluating the welfare levels of different districts.

3.5.5.2 Social Welfare: Multidimensional Indicators (SW_j^3)

A comprehensive assessment of social welfare has been conducted for all districts in Pakistan using various indicators such as the AINC (per capita real average income), Gini coefficient, MPI, and HDI. This multidimensional approach allows for an evaluation of the ability of districts to access goods and services, with a particular focus on health, education, water accessibility, and per capita income.

The AINC indicator measures the average real income of households, providing insight into their financial well-being. The Gini coefficient assesses income inequality within a district, indicating how wealth is distributed among the population. The MPI (Multidimensional Poverty Index) examines poverty across multiple dimensions, such as education, health, and living standards. Finally, the HDI (Human Development Index) provides a more holistic measure of human development by taking into account factors such as life expectancy, education, and income.

The social welfare in various districts of Pakistan is measured through a multidimensional approach that considers factors such as the AINC, Gini coefficient, MPI, and HDI. The AINC measures per capita real income, while the Gini coefficient measures income inequality. The MPI measures the deprivation levels in health, education, and accessibility of water, and the HDI measures the overall well-being of the people.

According to the latest rankings, the top 5 districts in terms of social welfare are Islamabad, Karachi, Rawalpindi, Jhelum, and Lahore. These districts have a higher HDI and lower MPI than other districts, indicating better capabilities to acquire goods and services. On the other hand, the bottom 5 districts have a high MPI and low HDI, despite having a Gini coefficient that is the same or even lower than the top 5 districts.

In Balochistan, 14 districts, including Nasirabad, Dera Bugti, and Kachhi, are among the bottom 50 districts in terms of social welfare. These districts have a low HDI and a high MPI, while the Gini coefficient is low. In KP, 12 districts, including Upper Dir and Buner, are also in the bottom 50 districts due to low scores in HDI and AINC.

In Sindh, 18 districts, including Khairpur and Mirpur Khas, have a low AINC, high-income inequality, and high MPI. Similarly, in Punjab, 6 districts, including Muzaffargarh and DG Khan, have a low AINC and a high Gini coefficient, resulting in low social welfare.

In terms of changes in social welfare rankings, districts such as Sherani, Harnai, and Pishin in Balochistan, and Hangu and Karak in KP, have shown improvement in recent years. Meanwhile, districts like Kohistan, Upper Dir, and Shikarpur have seen a decline in their social welfare rankings.

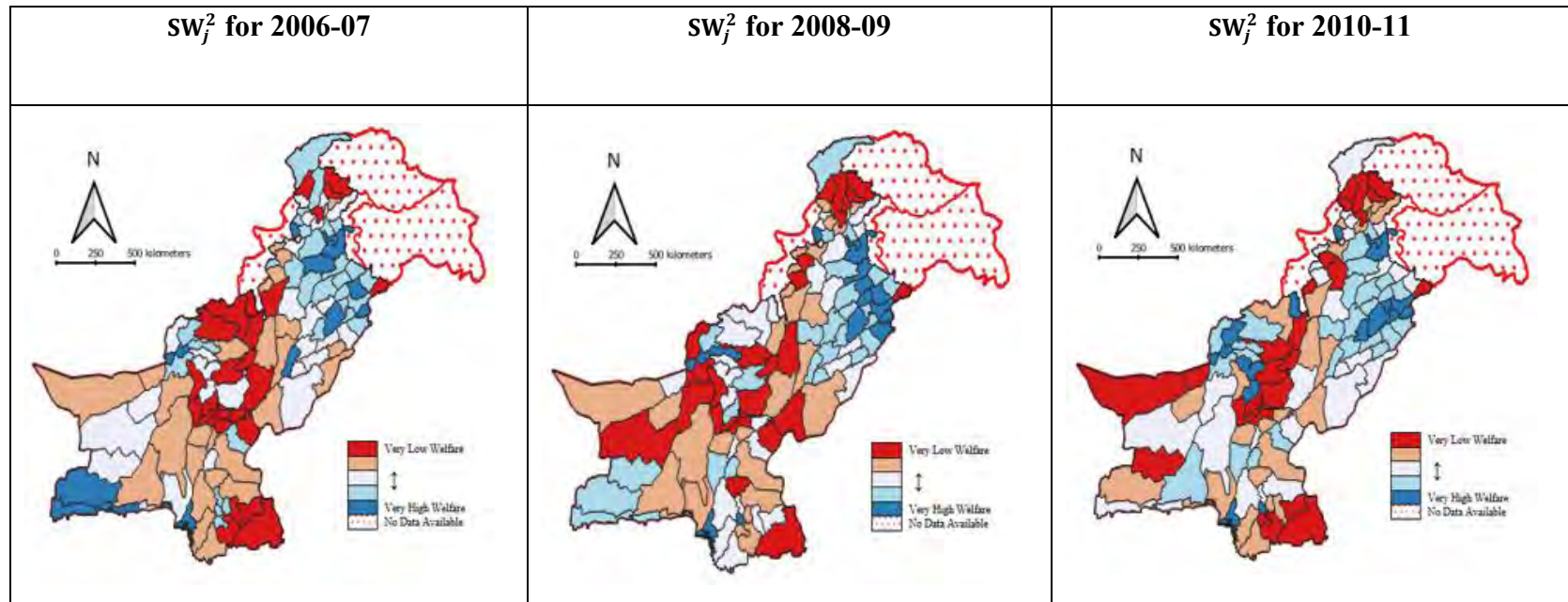
The data presented provides insights into the social welfare of different districts in Pakistan. The use of multiple indices like AINC, Gini Coefficient, MPI, and HDI provides a multidimensional measure to assess the capabilities of the districts over goods and services, mainly in terms of health, education, accessibility of water, and per capita real income.

The results show that the top five districts, including Islamabad, Karachi, Rawalpindi, Jhelum, and Lahore, have better capabilities to acquire command over goods and services than other districts. These districts have a higher HDI and lower MPI, indicating better health, education, and income levels. On the other hand, the bottom five districts have a higher MPI and lower HDI, indicating poor outcomes in health, education, and income levels despite a low Gini coefficient.

Interestingly, the data reveals that some districts have seen improvements in their social welfare levels over time, while others have experienced a decline. For instance, the social welfare level in Narowal district has shown improvement, moving from the bottom fifty districts in 2010-11 to a higher rank in 2014-15. On the other hand, some districts like

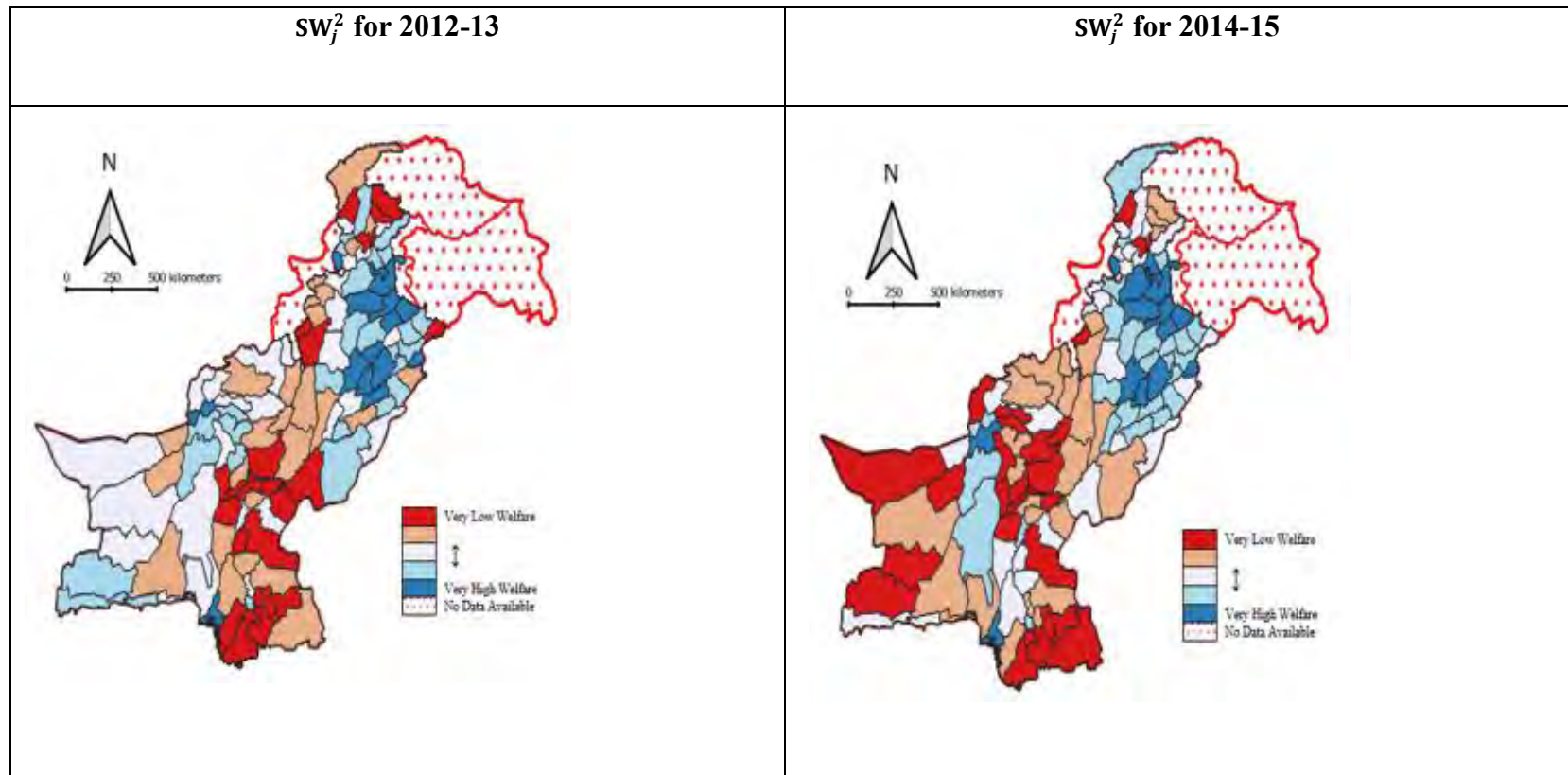
Sherani, Harnai, Pishin, Sibi, Awaran, Killa Saifullah, Killa Abdullah, Mastung, and Ziarat have experienced a decline in their social welfare levels since 2012-13, which coincides with the period when terrorist violence was high in these areas.

Figure 3.11: Social Welfare Across Districts SW_j^2 of Pakistan based on Income, Income Inequality and MPI



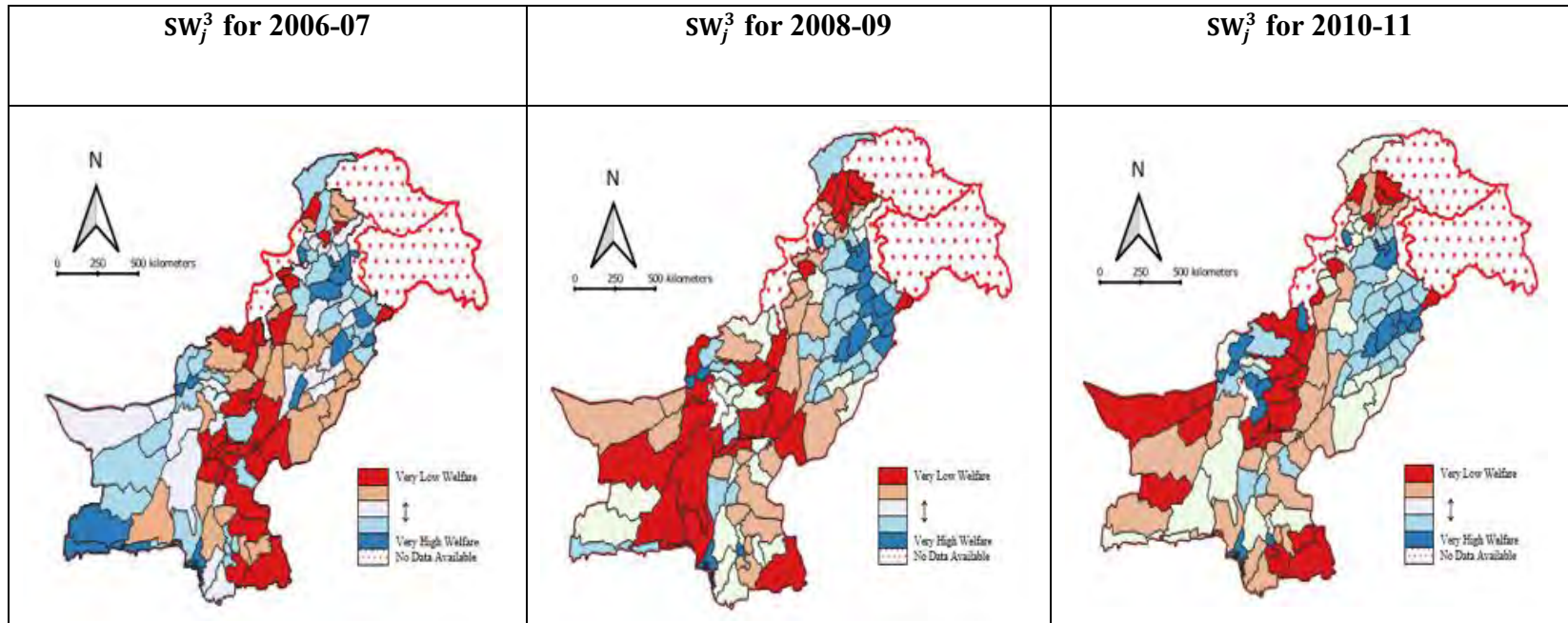
Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare.

Continue Figure 3.11...



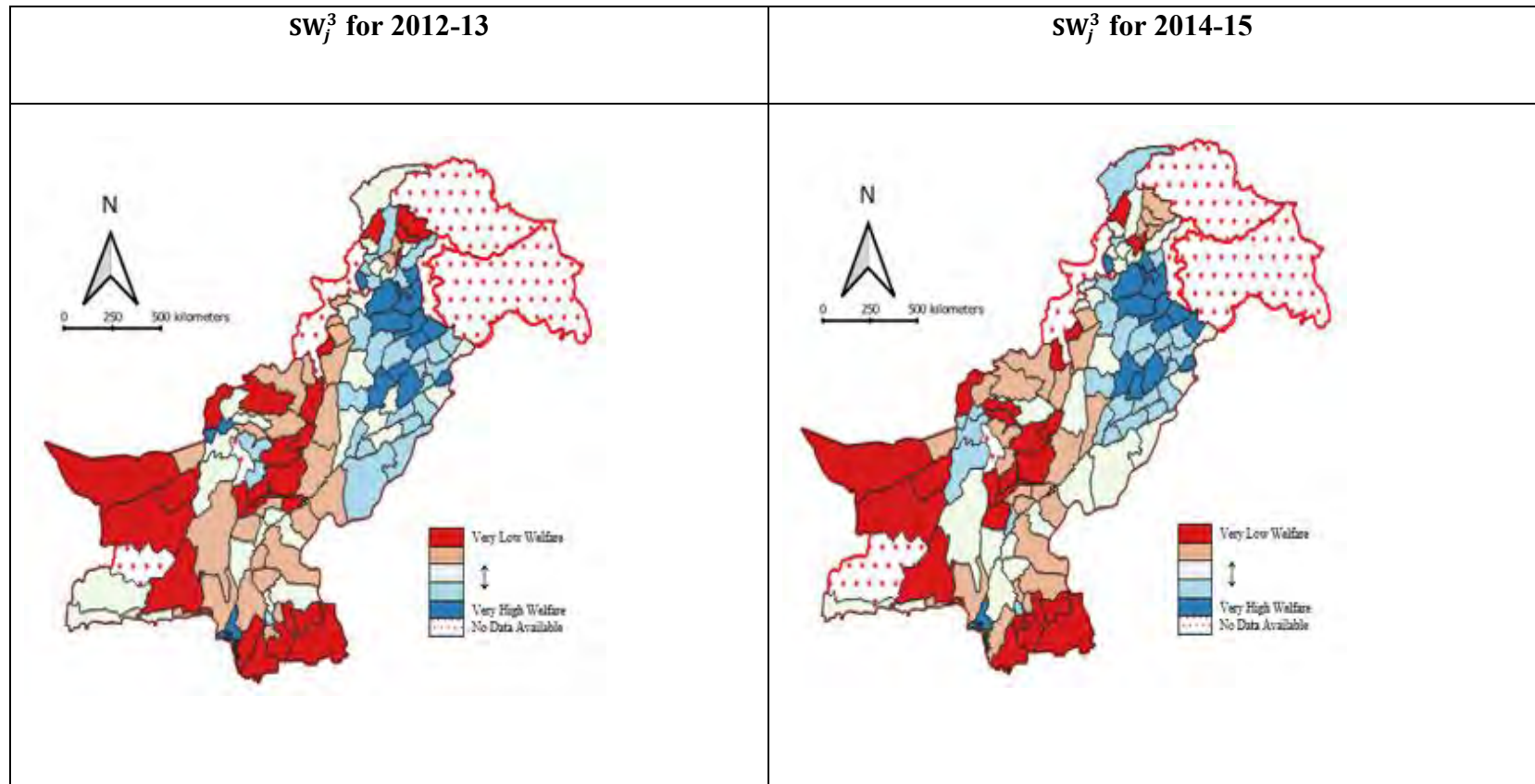
Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare

Figure 3.12: Social Welfare Across Districts of Pakistan based on Income, Income Inequality, MPI and HDI SW_j^3



Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare

Continue Figure 3.12 ...



Authors' work: The upper quantile indicates the highest level of social welfare whereas the lower quantile indicates a low level of social welfare

3.5.6 Top 10 Districts with High Social Welfare in Pakistan: An Analysis of SW^1 and SW^2 Indices

The study of social welfare is crucial in understanding the level of welfare and standard of living in different regions of a country. The Social Welfare Indices (SW_j^1 and SW_j^2) provide a comprehensive evaluation of the poverty, health, education, and living standards in different districts of Pakistan and enables ranking of them. The top ten districts with high social welfare, as shown in Table 3.5, provide a clear picture of which regions have the highest standards of living and quality of life.

The district of Islamabad has consistently ranked first in terms of social welfare. Although it has a high level of income inequality, the Average Household per capita Income (AINC) in this district remains high, making it an attractive destination for individuals seeking higher standards of living. On the other hand, the district of Khuzdar has ranked first in the Gini Index, but due to low AINC, it is ranked lower in terms of the SW^1 index.

It is noteworthy that some districts even with a low AINC can still rank high in social welfare if they have low income inequality. This is a crucial factor to consider when evaluating the standard of living in different regions. One example of this phenomenon is the district of Hangu, whose AINC may be lower than that of Lahore and Rawalpindi, but it still ranks higher than these two districts due to a lower level of income inequality.

The ranking of districts remains relatively consistent over time, with some variations in their positions. However, the districts of Mastung, Kalat, and Quetta in Balochistan, Haripur, Peshawar, Chitral, Abbottabad, and other districts in KP with low-income inequality contribute to better welfare levels than other districts in these provinces.

In conclusion, the Social Welfare Indices (and SW_j^2) are essential tools for evaluating the standard of living and quality of life in different regions of Pakistan. The study of the top ten districts with high social welfare provides insight into the regions that have the

highest standards of living, and it highlights the significance of considering income inequality when evaluating the standard of living.

3.5.7 Top Ten Districts of High Social Welfare in Pakistan

The ranking of districts according to the SW^2 index provides insight into which regions have the highest level of welfare. Table 3.6 presents the ranking of districts in Pakistan based on the SW^2 index.

It can be observed from the table that the districts achieving high levels of success in the Multidimensional Poverty Index (MPI) are also ranked high in terms of the SW^2 index. Unfortunately, none of the districts from the KP and Balochistan regions are among the top-ranked in terms of social welfare based on the SW^2 index assessment. The high MPI and low AINC in these districts lead to a lower level of social welfare, despite the low levels of income inequality.

Table 3.5: Top Ten Districts of High Social Welfare in Pakistan (SW_j^1)

Rounds	2019-20	2014-15	2006-07	2019-20	2014-15	2006-07
Rank	SW¹	SW¹	SW¹	GINI	GINI	GINI
1	Islamabad	Islamabad	Islamabad	Khuzdar	Awaran	Gwadar
2	Karachi	Rawalpindi	Karachi	Awaran	Zhob	Kech
3	Kohlu	Karachi	Lahore	Sherani	Washuk	Panjgur
4	Lahore	Jhelum	Quetta	Kech	Gwadar	Dera Bugti
5	Rawalpindi	Lahore	Gwadar	Kohlu	Kharan	Shangla
6	Attock	Mastung	Rawalpindi	Lasbela	Tor Ghar	Malakand
7	Tank	Kalat	Kech	Gwadar	Sukkur	Kharan
8	Sherani	Chakwal	Chakwal	Kohistan	Khuzdar	Pishin
9	Chakwal	Attock	Peshawar	Chitral	Harnai	Battagram
10	Gujrat	Gujrat	Faisalabad	Kharan	Thatta	Mardan

Source: Author's work

Table 3.6: Top Ten Districts of High Social Welfare in Pakistan (SW_j^2)

Rounds	2014-15	2012-13	2006-07	2014-15	2012-13	2006-07
Rank	SW²	SW²	SW²	MPI	MPI	MPI
1	Islamabad	Islamabad	Islamabad	Islamabad	Islamabad	Islamabad
2	Karachi	Karachi	Karachi	Lahore	Karachi	Lahore
3	Rawalpindi	Rawalpindi	Lahore	Karachi	Lahore	Karachi
4	Lahore	Lahore	Quetta	Rawalpindi	Rawalpindi	Rawalpindi
5	Jhelum	Faisalabad	Rawalpindi	Jhelum	Jhelum	Gujrat
6	Chakwal	Jhelum	Chakwal	Attock	Chakwal	Jhelum
7	Attock	Chakwal	Peshawar	Chakwal	Attock	Gujranwala
8	Gujrat	Mandi Bahauddin	Faisalabad	Sialkot	Gujranwala	Attock
9	Toba T. Singh	Chiniot	Gujranwala	Gujranwala	Gujrat	Chakwal
10	Faisalabad	Gujrat	Gwadar	Gujrat	Faisalabad	Faisalabad

Source: Author's work

3.5.8 Top Five and Bottom Five Districts of High/Low Social Welfare in Balochistan

The top five and bottom five districts of high and low social welfare in Balochistan were analyzed in this section. It was found that the districts which were ranked high in terms of social welfare also experienced a decline in their rankings over the years from 2006 to 2020. The disparity in the level of social welfare between the top and bottom districts was substantial, with the bottom districts experiencing 50% lower levels of welfare compared to the topmost district. Figure 3.7 depicts a clear picture to make a comparison of the top five and bottom five districts of Pakistan.

The per capita Average Real Income (AINC) of the lowest-ranked district was found to be less than 50% of the AINC of the topmost district. The bottom district, Khuzdar, had an AINC that was about 85% less than the top-ranked district of Pakistan (Islamabad) and 70% lower than the top-ranked district of Balochistan (Kohlu). The other districts in the

bottom five also had significantly lower AINC levels compared to Kohlu, with the district of Killa Abdullah having a high level of income inequality within the district.

The results highlight the significant disparities in social welfare and income inequality between the top and bottom districts in Balochistan. The top districts have higher levels of AINC and social welfare, while the bottom districts have lower levels of AINC and social welfare, accompanied by high levels of income inequality.

Table 3.7: Top Five and Bottom Five Districts of High/low Social Welfare in Balochistan (SW_j^1)

Rounds	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
Rank						
Top Five Districts						
1	Kohlu	Mastung	Quetta	Sherani	Ziarat	Quetta
2	Sherani	Kalat	Gwadar	Quetta	Nasirabad	Gwadar
3	Pishin	Khuzdar	Sibi	Harnai	Kohlu	Kech
4	Lasbela	Quetta	Kalat	Pishin	Quetta	Pishin
5	Gawadar	Zhob	Kech	Killa Saifullah	Panjgur	Panjgur
Bottom Five Districts						
6	Killa Abdullah	Dera Bugti	Dera Bugti	Dera Bugti	Sohbatpur	Kalat
7	Bolan	Bolan	Nasirabad	Loralai	Barkhan	Bolan
8	Nasirabad	Jaffarabad	Jaffarabad	Nasirabad	Mastung	Jhal Magsi
9	Awaran	Jhal Magsi	Sohbatpur ⁴	Jhal Magsi	Loralai	Kohlu
10	Khuzdar	Nasirabad	Jhal Magsi	Musakhel	Killa Abdullah	Jaffarabad

Source: Author's work

3.5.9 Top Five and Bottom Five Districts of High/Low Social Welfare in KP

In this section, the analysis of the social welfare in the province of Khyber Pakhtunkhwa (KP), Pakistan, and its district ranking is presented. The findings indicate a fluctuation in the top-ranked district in the social welfare index, SW_j^1 , over the three rounds of 2006-07, 2014-15, and 2019-20. In 2006-07, Peshawar held the top rank, however, it failed to maintain its position in 2019-20 and was instead among the top 10 districts.

⁴ It was a tehsil of Jaffarabad and became a district after 2012

The data reveals a significant gap in the social welfare index between the highest and lowest-ranked districts, with a difference of 50% in 2019-20. This disparity, however, has decreased over the years, with the gap reducing from 88% in 2006-07 to 50% in 2019-20. The gap in income levels, with the lowest district having 46% less income than the topmost district, is a further indication of the disparity in social welfare and economic development between districts in KP.

It is imperative to address these disparities through policies and initiatives that promote social welfare and economic development in all districts, particularly the lower-ranked ones, to improve the overall standard of living in the province, as highlighted in Table 3.8.

Table 3.8: Top Five and Bottom Five Districts of High/low Social Welfare in KP (SW_j¹)

Rounds Rank	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
Top Five Districts						
1	Tank	Haripur	Peshawar	Peshawar	Peshawar	Peshawar
2	Abbottabad	Peshawar	Malakand	Malakand	Chitral	Abbottabad
3	Malakand	Chitral	Charsadda	Bannu	Noshera	Noshera
4	Chitral	Abbottabad	Abbottabad	Haripur	Haripur	Chitral
5	Haripur	Shangla	Mansehra	Chitral	Mansehra	Shangla
Bottom Five Districts						
1	Hangu	Lakki Marwat	Upper Dir	Lower Dir	Hangu	Hangu
2	Charsadda	D. I. Khan	Buner	Lakki Marwat	Swabi	D. I. Khan
3	Buner	Buner	Kohistan	Swat	Kohat	Karak
4	Mardan	Tank	Tank	Buner	Buner	Buner
5	Noshera	Upper Dir	Tor Ghar	Karak	Karak	Upper Dir

Source: Author's work

3.5.10 Top Five and Bottom Five Districts of High/Low Social Welfare in Punjab

Income inequality, as an economic concept, refers to the uneven distribution of income among individuals within a society or population. The Gini coefficient is a commonly used measure of income inequality, where a higher Gini coefficient signifies greater income inequality. High levels of income inequality are associated with various economic and social costs, such as decreased economic growth, increased poverty rates, and limited opportunities for social mobility.

These sections shed light on the issue of income inequality and low per capita Average Real Income (AINC) levels in the lower-ranked districts of Punjab and Sindh, which indicates significant variations in household livelihoods across these regions. This phenomenon can potentially lead to adverse economic and social outcomes, such as reduced economic growth, increased poverty, and limited social mobility.

The districts of Southern Punjab mainly are deprived of accessing the services required to fulfill the basic needs of life. Along with districts of southern Punjab, Mianwali and Bhakkar from the northwest, Kasur, Narowal, and Khanewal from the eastern part of Punjab experience low levels of social welfare.

Addressing these underlying factors through policies that aim to improve access to education and training, promote job creation, and implement targeted social welfare programs could help to alleviate income inequality and improve household livelihoods in these regions. Table 3.9 is the depiction, and it represents the top five and bottom five districts based on high and low social welfare in Punjab.

3.5.11 Top Five and Bottom Five Districts of High/Low Social Welfare in Sindh

The districts of Sindh are vulnerable in the provision of services and due to lack of availability of resources experiencing difficulty in achieving better livelihood except for a few districts which are hubs of economic activities i.e., Karachi whose rank remained at

the top across Pakistan in all the 5 rounds, but the resources are not distributed equally causing disparities within and across the other districts of Sindh. The AINC of the households in a few of the districts is at the subsistence level. Therefore, their rank in terms of social welfare (SW¹) is quite low. The top five and bottom five districts of Punjab are presented in Table 3.9.

The AINC metric is a crucial indicator of household income levels, which is determined by dividing the total income of a geographic area by the total number of households in the same area. Low AINC values imply that households in the area are likely experiencing financial difficulties and may be struggling to meet their basic needs. The high-income inequality and low AINC levels in the lower-ranked districts of Punjab and Sindh could stem from several factors, including inadequate access to education and training opportunities, limited job prospects, and insufficient social safety nets.

The most vulnerable district in social welfare of Sindh is Therparker, and other districts include Umerkot, Kashmore, Mirpurkhas, and Sikarpur where AINC is quite low and as stated in the above section income inequality is highest in the district Shikarpur. The top five and bottom five districts in the Sindh province are reported in Table 3.10.

Table 3.9: Top Five/Bottom Five Districts of High/Low Social Welfare SW_j^1 in Punjab

Rounds Rank	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
Top Five Districts						
1	Lahore	Rawalpindi	Rawalpindi	Lahore	Lahore	Lahore
2	Rawalpindi	Jhelum	Lahore	Faisalabad	Rawalpindi	Rawalpindi
3	Attock	Lahore	Mandi Bahauddin	Chiniot	Gujranwala	Chakwal
4	Chakwal	Chakwal	Chakwal	Sheikhupura	Faisalabad	Faisalabad
5	Gujrat	Attock	Faisalabad	Mandi Bahauddin	Hafizabad	Gujranwala
Bottom Five Districts						
1	Muzaffargarh	Bahawalpur	Rajanpur	Sialkot	D. G. Khan	Layyah
2	D. G. Khan	Kasur	Muzaffargarh	Jhelum	Bahawalpur	Bahawalnagar
3	Khanewal	Rajanpur	Kasur	Rahimyar Khan	Mianwali	Rahimyar Khan
4	Bhakkar	Muzaffargarh	Narowal	Mianwali	Rahimyar Khan	Narowal
5	Rajanpur	Narowal	Rahimyar Khan	Narowal	Narowal	Rajanpur

Source: Author's work

Table 3.10: Top Five/Bottom Five Districts of High/Low Social Welfare SW_j^1 in Sindh

Rounds Rank	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
Top Five Districts						
1	Karachi	Karachi	Karachi	Karachi	Karachi	Karachi
2	Hyderabad	Hyderabad	Hyderabad	Hyderabad	Dadu	Hyderabad
3	Jamshoro	Sukkur	Sukkur	Dadu	Hyderabad	Matiari
4	Ghotki	Larkana	Larkana	Naushero Feroze	Naushero Feroze	Tando Allahyar
5	Sukkur	Naushero Feroze	Dadu	Sukkur	Thatha	Tando M Khan
Bottom Five Districts						
6	S.Benazirabad ⁵	Tharparker	Thatta	Jacobabad	S. Benazirabad	Ghotki
7	Shikarpur	Tando M. Khan	Naushero Feroze	Shikarpur	Tharparker	Shikarpur
8	Mirpurkhas	Khairpur	Khairpur	Kamber Shahdadkot	Khairpur	Jacobabad
9	Tharparker	Mirpurkhas	Mirpurkhas	Umerkot	Ghotki	Kashmore
10	Umerkot	Umerkot	Kashmore	Tharparker	Jacobabad	Badin

Source: Author's work

⁵ The district name was Nawabshah till Sep 2008 and renamed as Shaheed Benaziabad (S. Benazirabad) in Dec 2008

3.6 Conclusion

The provision of social welfare services is a crucial aspect of the development and wellbeing of society. The disparities in the level of economic welfare between different districts in Pakistan highlight the need for a more in-depth investigation into the underlying causes. Accurate measurement of welfare is important as policies formulated based on the welfare level have significant political implications.

Pakistan is a developing country that faces numerous economic challenges such as poverty, low human development, and high levels of food insecurity. The poverty rate and food insecurity are particularly high in rural areas, and there are significant disparities in economic conditions between the regions of the country.

In this chapter, we evaluate the social welfare of households at the district level, taking into account their levels of income, income inequality, and poverty. The charts and tables have been used to present the data in a clear and concise manner, making it easier for the reader to understand the results of the analysis. Our empirical assessment of the state of social welfare provides valuable insights into the challenges and opportunities for improving access to social services in Pakistan.

The findings of this study will contribute to the existing body of literature on social welfare in developing countries and inform future policy development to address the disparities. Policymakers, researchers, and practitioners working in the field of social welfare and development in Pakistan will find the results of this study to be useful in their efforts to improve the lives of the population, particularly the most vulnerable. The next chapter of the study focuses on the analysis of terrorism and its impact on social welfare in the districts of Pakistan. Through a comprehensive examination of available data and case studies, this chapter aims to uncover the interplay between terrorism and social welfare indicators.

CHAPTER 4

ANALYSIS OF TERRORISM AND SOCIAL WELFARE IN THE DISTRICTS OF PAKISTAN

4.1 Introduction

Although social welfare includes many facets of wellbeing, security is an essential precondition. In this chapter, the state of terrorism in Pakistan is examined with particular attention to how much it affects household living conditions in various districts. This analysis will clarify how, at the district level, terrorism impairs social welfare by impeding access to basic services and economic opportunities.

Terrorism has emerged as a significant security challenge in many nations, including Pakistan, with far-reaching economic and social consequences that impact the welfare of individuals and communities. In Pakistan, the issue of terrorism has resulted in instability and violence, particularly in the country's four provinces. The period from 2006 to 2020 has witnessed a significant increase in terrorist incidents, which has led to the loss of life and damage to property (Malik et al., 2020). The Pakistan Security Report 2024 says that attacks of terrorist raised by 17% in the year 2023 as compared to previous year (PIPS, 2024).

Terrorism and living conditions especially of the poor group are always under debate. The rising trend of terrorist activities diverted the focus of policymakers to find out its root causes. Destruction in infrastructure, poor security conditions, and especially rising threats to life will lead to economic failure. That is further going to deteriorate the living standards in society. So, researchers worked to explore the connection between living conditions and terrorism. Pakistan, regrettably, has witnessed these terrible consequences. The nation has been actively engaged in the war on terror since 9/11 as a result of internal

conflicts brought on by terrorist activity. The prolonged hostilities have taken a heavy financial toll. The Economic Survey of Pakistan (2015–2016) estimates that over the previous 15 years, the war on terror has cost the Pakistani economy \$118.32 billion (Pakistan Economic Survey, 2015 & 2016). This startling statistic highlights the heavy financial cost that terrorism has had on Pakistan.

The government of Pakistan has taken significant measures to counter the terrorist groups operating in the province. These measures, including military operations, intelligence gathering, and border management, have contributed to a reduction in the number of terrorist attacks and improved the security situation in the region which enhances the social welfare across the districts of Pakistan.

This thesis chapter explores the relationship between terrorism, economic and social welfare in the four provinces of Pakistan. The primary objective of this research is to investigate the impact of terrorism on the social welfare of individuals and communities in the affected regions.

The study will analyze data on terrorist incidents in the provinces and districts, focusing on the type and target of attacks and considering the geographic distribution and concentration of these incidents. Additionally, the research will examine the government's response to the security challenges posed by terrorism, including counter-terrorism measures and policies aimed at promoting economic and social welfare.

The findings of this research will provide valuable insights to policymakers, security analysts, and scholars interested in comprehending the intricate relationship between terrorism, security, and economic and social welfare. By identifying the magnitude of incidents at the regional level causing security threat with the rise of terrorism and the associated impact on the welfare of individuals and communities, this study can help develop effective policies and strategies to promote security, economic development, and social welfare in the four provinces of Pakistan.

4.2 Literature Review for Security Challenges, Terrorism, and Social Welfare

Terrorism has been a longstanding issue in Pakistan, with its impact on social welfare becoming increasingly pronounced in various districts since the turn of the century. This literature review examines how terrorism has affected social welfare in the different districts of Pakistan, using relevant sources and references from the past two decades.

The empirical analysis of [Collier and Hoeffler \(2002\)](#) states that as opportunities to earn income worsen in agriculture or the formal labor market, they will create an incentive to carry arms more than those with higher expected income. The main argument raises fundamental causes to drive civil wars, which start due to such economic opportunities.

[Krueger and Maleckova \(2003\)](#) explore the link between poverty, education, and terrorism. The study depicts that terrorism arises due to political factors, not economic factors. So, the existence of the linkage between poverty and transnational terrorism was rejected. However, identifying the linkage between the two at the national level was highlighted and provided the base for further research.

These results are based on the data of these three regions at the time when severe political uplift and religious insurgencies were raised in the West Bank, Gaza Strip, and Lebanon, which may lead to the lack of accuracy in results and biasedness. The abnormal circumstances during the study take the author to draw results and conclusions opposite of the studies by [Collier and Hoeffler \(2000\)](#) and [Miguel et al. \(2004\)](#). These studies conclude that terrorist activities trigger most due to low GDP per capita.

The panel data analysis of 177 countries was done by [Blomberg et al. \(2004\)](#) from 1968 to 2000. The structural VAR model was employed and suggested that the important determinants of terrorism are economic variables. However, there is a negative and significant impact of terrorism on economic growth exist.

The determinants of terrorism in the 37 Muslim countries are analyzed in the study of [Testas \(2004\)](#). The results depict the positive association of repression and education with terrorism, whereas income and incidence of terrorism are negatively related in Muslim countries.

The relationship between policies of economic welfare and terrorism was explored by [Burgoon \(2006\)](#) in pooled cross-section countries. A strong relationship between the efforts made for the welfare of the economy and terrorism exists. It is suggested that the incidence of terrorism declines by increasing the policies for the welfare of the economy. The targeted policies adopted to alleviate poverty and reduce economic inequality affects the level of terrorism. So effective and targeted policies are helpful to combat the level of terrorism in the country.

[Abadie \(2006\)](#) findings show that terrorism and economic variables are unrelated. National and transnational terrorism both were incorporated; it is concluded in this study that those countries are more prone to terrorism which are in some intermediary political freedom, especially the expectation of oppression and temporary conflicts accompanying the regime of democracy from authoritarian regime transition.

These factors are causing terrorism, and the relationship between economic variables with terrorism does not exist. Studies by [Krueger and Laitin \(2008\)](#) and [Piazza \(2006\)](#) concluded the same, so the results of [Abadie \(2006\)](#) are consistent with these.

[Berrebi \(2007\)](#) analyzes the linkage of poverty, education, and terrorism by employing data from Hamas and Palestine Islamic Jihad (PIJ) documentary sources from the 1980s to May 2002. The conclusion drawn based on the results is that a positive correlation exists between higher education, the standard of living, and terrorism in Palestine. However, [Koseli \(2007\)](#) investigated the case of Turkey and concluded that the root cause of terrorism in Turkey is poverty and income inequality. In various states of Turkey, it is considered, based on results that the motivating force to join terrorist groups is poverty.

[Caruso's \(2011\)](#) study analyzes the socioeconomic factors causing terrorism. The empirical finding depicts that in Western Europe, the fatalities caused by terrorism and per capita income are positively associated. The data from 12 European countries were taken through GTD for the chosen period of 1994 to 2007. Thus, more opportunity cost of participating in unproductive activities is pulling towards less involvement in terrorism.

In their study, [Enders and Hoover \(2012\)](#), while analyzing the link between poverty and terrorism, concluded that the relationship between these is non-linear. It is further concluded that poverty has little effect on transnational terrorism and has a stronger effect on national terrorism. The increase in the gap between rich and poor income increases the incidence of terrorism. It suggests a need to decrease income inequality by fairly redistributing income in the country.

The time series data of thirty years was used by [Enders et al. \(2016\)](#) of various countries from 1970 to 2010 to investigate the relationship between terrorism and per capita GDP. The national and transnational terrorist activities are shown by formulating a terrorism Lorenz curve. The results depict the nonlinear relationship between Gross Domestic Product (GDP) per capita and terrorism. However, middle-income countries were more targeted by terrorism before the 1990s. The concentration of terrorism is shifting towards those low-income countries that suffer from socioeconomic and religious grievances.

To investigate the cointegration between inflation, economic growth, and terrorism [Shahbaz \(2013\)](#) used data from Pakistan for the years 1971 to 2010 and employed the ARDL model for this purpose. It is concluded that the cointegration exists between the above three and further states that the number of terrorist activities rises due to an increase in inflation and economic growth in the case of Pakistan. VECM Granger causality confirmed the bidirectional causality of inflation and terrorism. The nexus of income inequality and domestic terrorism was also analyzed by [Shahbaz et al. \(2014\)](#) in

the case of Pakistan. Like [Goldstein \(2005\)](#) and Enders and Hoover (2012), it is concluded that the incidence of domestic terrorism is affected by income inequality.

In the case of South Asian countries, [Akhmat et al. \(2014\)](#) state that economic variables like inflation, poverty, inequality, unemployment, population, and political instability are positively associated with terrorism and negatively related to GDP per capita. The FMOLS and DOLS were applied to the panel data of South Asian countries from 1980 to 2011. However, the techniques used on the heterogeneous panel data do not address the econometric problems of endogeneity and heterogeneity, so the results drawn may lead towards biasedness and lack of accuracy.

The effect of economic indicators on terrorism is seen by Ismail and [Amjad \(2014\)](#), and the direction of causality between the variables examined in the case of Pakistan. The economic indicators taken in the study are GDP per capita, inflation, and unemployment. The results indicate that a bidirectional relationship exists between inflation and terrorism. The conclusion is consistent with [Shahbaz \(2013\)](#), who confirmed the same causal relationship between these two variables. However, results of economic growth and terrorism, economic growth with unemployment, depict the one-way relationship between these variables.

The analysis of [Hyder et al. \(2015\)](#) about the impact of terrorism on Pakistan's economic growth from 1981 to 2012 confirmed the negative correlation between them, as a one percent increase in terrorism will hamper economic growth by 0.39 percent in this region. It is suggested that Pakistan should adopt a counter-terror policy to get rid of catastrophic activities by terrorists and militants, as it is affecting growth adversely.

[Syed et al. \(2015\)](#) used pooled cross-sectional data from 1980 to 2010 from five regions of Pakistan. The five regions are the four provinces and the Federally Administered Area (FATA) of Pakistan. The fixed effect negative binomial regression was done to reveal the determinants of terrorism in Pakistan.

The estimated results depict that terrorism is highly connected with higher horizontal inequality and cross-provincial in Pakistan. It is also positively related to the expenditure by the government on welfare, which implies that welfare expenditures cause a rise in terrorism. The rise may be due to the asymmetries in the distribution causing inequality. [Anwar et al. \(2017\)](#) did a dynamic panel examination to see the effect of terrorism on investment in the 26 Muslim countries by employing the Feasible generalized least square (FGLS), Difference Generalized Method of Moments (DGMM), and System generalized method of moments (SGMM) and covered the period of 1990 to 2015 which is more than two decades.

It is explored that investment is affected significantly and negatively due to the rise in terrorism in these Muslim developing countries, and it is also confirmed that the increase in terrorist incidents decreases the level of investment in the long run as well.

The impact of terrorist activities or insurgencies on the welfare of children in the context of Africa was investigated by [Abonye and Ezehe \(2017\)](#) used the Boko Haram sect in Nigeria as a case in point. The cross-sectorial survey research design collected data from 180 respondents from three states (Benue, Enugu, and Edo). The data elucidates that terrorist activities and insurgencies affect the welfare of children as they are most vulnerable in Nigeria and other African countries during these attacks. As they remain in consternation after insurgencies, and it affects psychology. In this regard, [Corral et al. \(2020\)](#) elucidate that the consequences of conflicts persist in the long term as it affects long-term productivity due to human capital loss. Which in turn has a negative impact on welfare. The analysis by [Bravo and Castello \(2021\)](#) reveals that terrorism has effects on health at birth due to emotional distress in mothers.

Various districts of Pakistan have been affected by terrorist attacks after 9/11, leading to loss of life and property and having a strong effect on the social welfare of people across various districts in Pakistan. According to the Global Terrorism Index 2020 by [Institute for Economics and Peace \(2020\)](#), the Khyber Pakhtunkhwa province has been the hardest hit, with the most deaths resulting from terrorism. The impact of these attacks has led to a

climate of fear and insecurity among the population, affecting their overall social welfare. The province has witnessed a significant number of terrorist attacks, which have resulted in the loss of life, displacement, and economic instability. The impact of terrorism on social welfare in the region has been significant, with limited access to education and healthcare services.

South Asia, comprising countries such as Pakistan, India, and Bangladesh, has witnessed a significant increase in terrorist activities in recent years. The impact of terrorism on social welfare in the region has been significant, affecting education, healthcare, and economic opportunities. The terrorist activities had significantly affected access to education and resulted in the closure of many schools. A study by [Saleem et al. \(2020\)](#) explored the impact of terrorism on economic growth, affecting employment opportunities and economic stability.

The empirical relationship between armed conflict and poverty was the focus of the study conducted by [Mueller and Techasunthornwat \(2020\)](#). For this purpose, two data sets were utilized to get conflict data i.e., Georeferenced Event Dataset (GED) and Armed Conflict Location and Event Data Project (ACLED), and three poverty data sets. It is concluded after a detailed examination of data that conflict prevents the eradication of poverty.

The Middle East has been a hotspot of terrorist activities for many years, with the impact of terrorism on social welfare being significant. A study by [Mahmud \(2020\)](#) examined the impact of terrorism on human development and concluded that the main dimensions of human development i.e., health, education, and income affect a lot in Iraq due to terrorism. Furthermore, healthcare services were affected due to the rise in the prevalence of terrorism, and found that healthcare access and quality had significantly declined due to terrorist activities ([Ulmer et al., 2022](#); [Cavaliere et al., 2021](#)). Africa: Africa has also witnessed a significant increase in terrorist activities, affecting social welfare in various ways. The impact of terrorism on social welfare is significant, affecting various aspects of society.

The living conditions deteriorate with the rise in terrorism because it not only hinders employment opportunities and reduces income levels but also has negative effects on the social and economic status in that region. This conclusion was drawn by [Ndinda \(2022\)](#) in a study based on the survey data with a special focus on the effects of terrorism on the livelihood of the people living in Garrisa County located in Kenya.

The effect of terrorism on economic variables has always remained important ___for analysts. [Oji and Afolabi \(2022\)](#) analyzed the effects of terrorism on economics and peace. They concluded that the economic losses from terrorism are huge, i.e., in trillion dollars, and suggested adopting counterterrorism policies. Likewise, [Iraqi and Akhtar \(2022\)](#) explore the genesis of terrorism and the damages caused due to terrorist activities in Pakistan. The summary of losses due to terrorism was presented and it concluded that the rise in the expenditure on the stabilization of security by reducing the expenditure on health, education, and infrastructure, which are the main contributors to the quality of living.

The studies reviewed in this literature review demonstrate that terrorism profoundly impacts social welfare, resulting in loss of life, displacement, limited access to necessities, and economic instability. Addressing this issue will require a multifaceted approach, including increased investment in education, healthcare, employment opportunities, and greater resources to combat terrorism.

4.3 Data and Methodology

This chapter examines the impact of terrorism on social welfare across various districts in Pakistan. The study will focus on the period between 2006 and 2016. It will utilize data from the Global Terrorism Database (GTD) to identify trends and patterns in the different attacks and targets (GTD, n.d.).

The GTD is a comprehensive resource that provides data on terrorist incidents worldwide. Specifically, for the period between 2006 and 2016 in Pakistan, the database contains information on the different types of attacks that took place and the targets of

these attacks (Javeid et al., 2022). The researcher compiled this data district-wise for this study. This data is valuable in understanding the nature and extent of terrorism in Pakistan during this time frame and in identifying trends and patterns that may be present in the data.

The study focuses on the impact of terrorist incidents on the overall social and economic development of the districts, and the total number of terrorist incidents in a given year is used as one of the factors in calculating the yearly score for each district.

The methodology will involve several key steps to provide a comprehensive understanding of the impact of terrorism on social welfare in Pakistan. The methodology will conclude with policy recommendations from the data analysis, literature review, and the researchers' expertise. The policy recommendations will provide a roadmap for policymakers to develop effective counterterrorism strategies and policies aimed at reducing the threat of terrorism and improving social welfare in affected areas.

4.3.1 Data Collection

The first step in this methodology will be to collect data from the GTD on terrorist incidents that occurred in Pakistan between 2006 and 2016. The database provides information on the different types of attacks that took place during this period, as well as the targets of these attacks. This information will identify the areas and communities most affected by terrorism in Pakistan.

4.3.2 Data Analysis

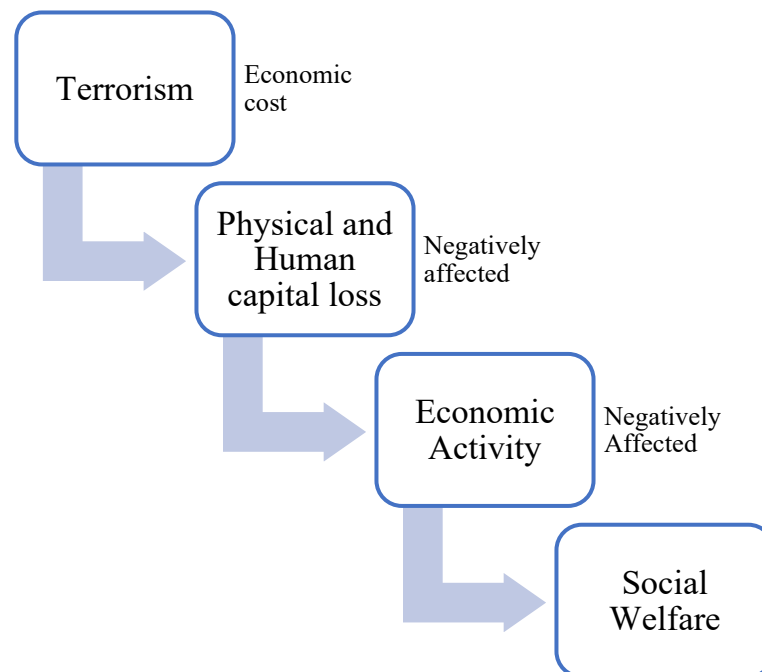
Once the data has been collected, it will be analyzed to identify trends and patterns in the different attacks and targets. Statistical methods, such as descriptive statistics, correlation analysis, and spatial analysis through charts, tables, and figures, provide detailed data analysis.

The data analysis using charts and figures will provide a clear and concise representation of the trends and patterns identified in the data. This will enable policymakers to better

understand the nature and extent of terrorism in Pakistan during the specified time and to identify potential solutions that can mitigate its impact on social welfare.

The relevance of terrorism with social welfare can be determined by analyzing its impact on various social welfare indicators, such as health, education, employment, and economic development. To conduct this analysis, the first step is to identify the social welfare indicators relevant to Pakistan. Next, the impact of terrorism on these indicators can be analyzed by examining available data on different types of attacks and their impact on social welfare. The channel through which terrorism causes an impact on social welfare is presented in Figure 4.1. The underlying factors contributing to terrorism can then be identified through a literature review and analysis of existing studies.

Figure 4.1: Impact of terrorism on socioeconomic conditions



Source: Authors' work from analysis of data GTD and Economic Survey

4.3.3 The Terrorism Index (TI)

The Terrorism Index is a tool used to rank districts in Pakistan based on their level of terrorism, using the methodology of the Global Terrorism Index (GTI). The GTI employs a scoring system that takes into account the impact of incidents over a given year. This

scoring system includes four dimensions of terrorism and associated indicators, each with a weight assigned to it. The weights for each dimension fall between 0 and 3 and are highlighted in Table 4.1.

To calculate the raw score for each district, the weighted sum of each variable is used. This scoring system aims to provide a quantitative measure of the level of terrorism in each district, which can be used to compare and rank districts across the country. This information can be used by policymakers to identify areas that require increased security measures and resources to address the issue of terrorism effectively which will ensure the social welfare insecurities in the districts.

Table 4.1: Indicators of Terrorism and Weights for Raw Score

Indicators	Weight
Total number of incidents	1
Total number of fatalities	3
Total number of injuries	0.5
Total number of hostages	0.5

Source: GTI (2022)

Once the raw scores for each district have been calculated using the weighted sum of each variable, banded scores will be determined by finding the range from the raw scores. The resulting banded scores will then be used to assign each district to a band ranging from 0 to 1. The analysis of the Terrorism Index can provide valuable insights into the factors contributing to terrorism and their impact on social welfare.

The comprehensive approach used in this methodology allows for a nuanced understanding of the complex relationship between terrorism and social welfare in Pakistan. This understanding can inform the development of effective policies and strategies to mitigate the impact of terrorism on society, with the ultimate goal of promoting peace and security in the country.

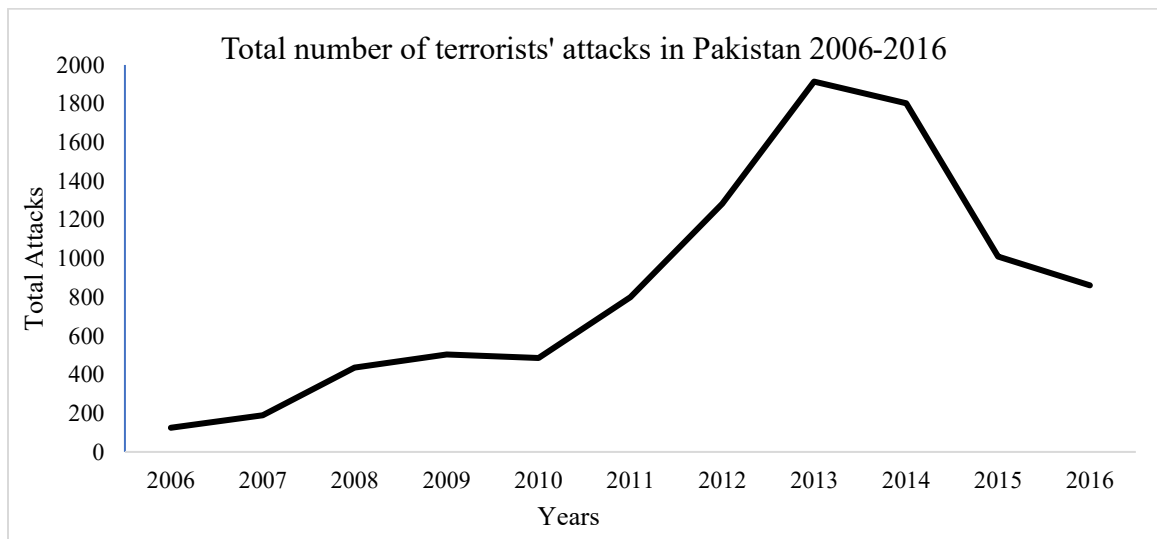
4.4 Results and Discussion

After the 9/11 incident in the United States, Pakistan's involvement in the US-led war on terror resulted in a significant increase in terrorist attacks within Pakistan. Militants who had previously fought in Afghanistan turned their attention to Pakistan and launched attacks on Pakistani security forces, government installations, and civilians.

The graph shows that the number of terrorist attacks in Pakistan started increasing after 2006, and the trend continued until 2013, with a peak in 2012. The increase in attacks was mainly concentrated in Balochistan, KP, and Sindh, while Punjab and Islamabad remained comparatively less affected.

The incidents of terrorism in the districts of Pakistan from 2006-2015 are shown in Figure 4.2. The data reveals that the number of terrorist attacks increased sharply in 2007 and remained high until 2013. The worst affected area during this period was Swat, Peshawar, and Karachi. However, with the maximum number of incidents in 2012-13, there was a gradual decline starts after these years in the number of attacks.

Figure 4.2: Trend of Terrorist Incidents in Pakistan

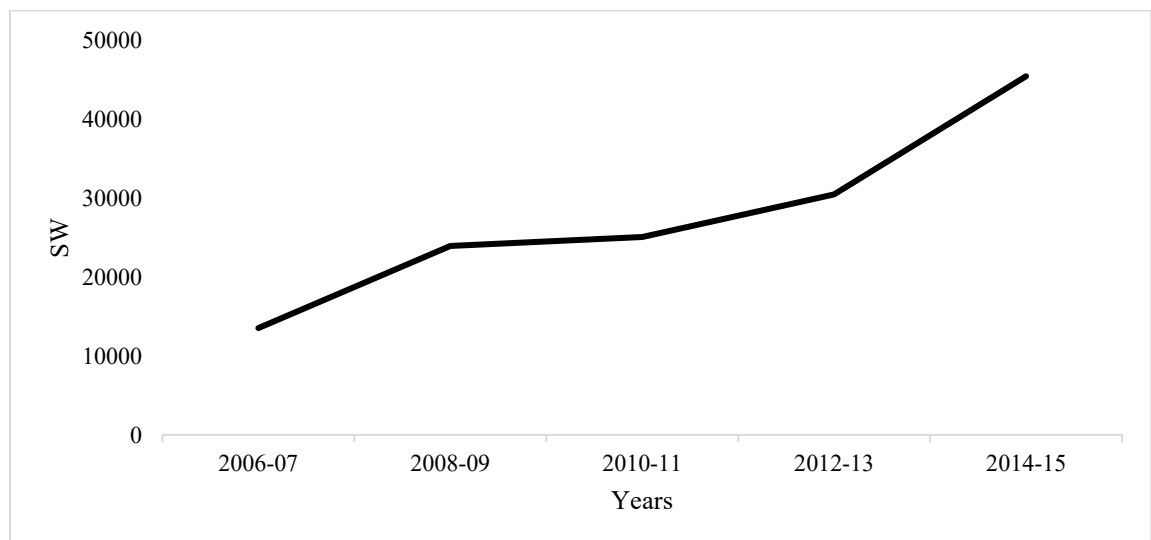


Source: Author's work based on data from Global Terrorism Database (GTD).

The researcher provides a more detailed breakdown of the regions and types of attacks in Table 4.2. Balochistan and KP were the most affected regions, with many bombings and armed assaults. Karachi also experienced a significant number of attacks. Other attacks included targeted killings, suicide bombings, and sectarian violence.

The information presented in Figure 4.3 shows the trend of social welfare in Pakistan over a period of 10 years, from 2006 to 2015. Social welfare can be defined as the wellbeing of individuals and society as a whole, which encompasses various factors such as health, education, income, and social services. According to the graph, social welfare in Pakistan improved from 2006 to 2008, which suggests that policies and programs implemented during this time had a positive impact on the wellbeing of the people.

Figure 4.3: Trend of Social Welfare in Pakistan



Source: Author's work based on SW_j^1

However, social welfare remained stagnant from 2008 to 2014, indicating that the government may not have introduced sufficient measures to further enhance the wellbeing of the population during this period. It is important to note that this trend in social welfare could have been influenced by various economic and social factors, such as political instability, terrorism, and global economic conditions. This was the time when terrorist incidents were also at their peak impacting the living conditions in the

targeted areas. It not only damaged the property and infrastructure but also caused injuries and fatalities which have a strong impact on the health of the individuals who get targeted in these incidents. Therefore, Pakistan has been facing significant challenges in areas such as poverty, health, and education, which could have also impacted social welfare.

Despite efforts by the Pakistani government and security forces to combat terrorism, the threat of terrorism remains a significant issue in Pakistan. The data presented in the graph and Table 4.2 shows that Pakistan remained the target of terrorists in this decade, while the situation has improved in recent years, especially after 2015 but there is still a need for continued efforts to address the root causes of terrorism and maintain security throughout the country.

Table 4.2: Number of attacks by type in the provinces of Pakistan

Provinces	Balochistan	KP	Punjab	Sindh	Islamabad	Total
Armed Assault	804	776	121	845	17	2568
Assassination	170	246	62	169	14	661
Bombing/Explosion	1926	2281	219	672	39	5152
Infrastructure Attack	88	94	8	36	-	227
Hijacking	5	11	1	-	-	17
Hostage Taking⁶	222	210	19	74	15	542
Unarmed Assault	6	6	-	-	1	13
Unknown	23	52	6	13	1	96
Total	3244	3676	436	1809	87	9276⁷

Source: Authors work based on GTD

4.5 Examining District-Level Trends of Terrorism in Pakistan (2006-2020)

The prevalence of terrorist attacks in various districts has had severe economic, social, and political consequences for Pakistan. There is an urgent need for the government and

⁶ Hostage taking includes Barricade Incidents and Kidnapping

⁷ 9252 out of 9276 attacks happened in the four provinces and 24 are unknown

relevant authorities to take effective measures to combat terrorism, improve security, and promote socio-economic development in the affected regions.

The province of KP has been the most affected by terrorist attacks, with Swat, Peshawar, Mardan, Noshera, Hangu, Charsadda, Lakki Marwat, Kohat, Swabi, Bannu, and Tank being the most targeted districts. As per Table 3.7 in Chapter 3, the districts that ranked in the bottom five after 2006-07 are the ones where terrorist attacks are more frequent. The Peshawar district is an exception, as it is not in the bottom five according to the social welfare index (SW¹), but its rank deteriorated over time. The living conditions in these districts have also worsened, as evidenced by the increasing MPI and Gini Index and the decreasing welfare index over time.

The situation in Balochistan has also been difficult, as indicated by the darker regions in Figure 4.4. Unfortunately, the survey of PSLM in 2014 did not cover the two districts of Kech and Panjgur due to security challenges.

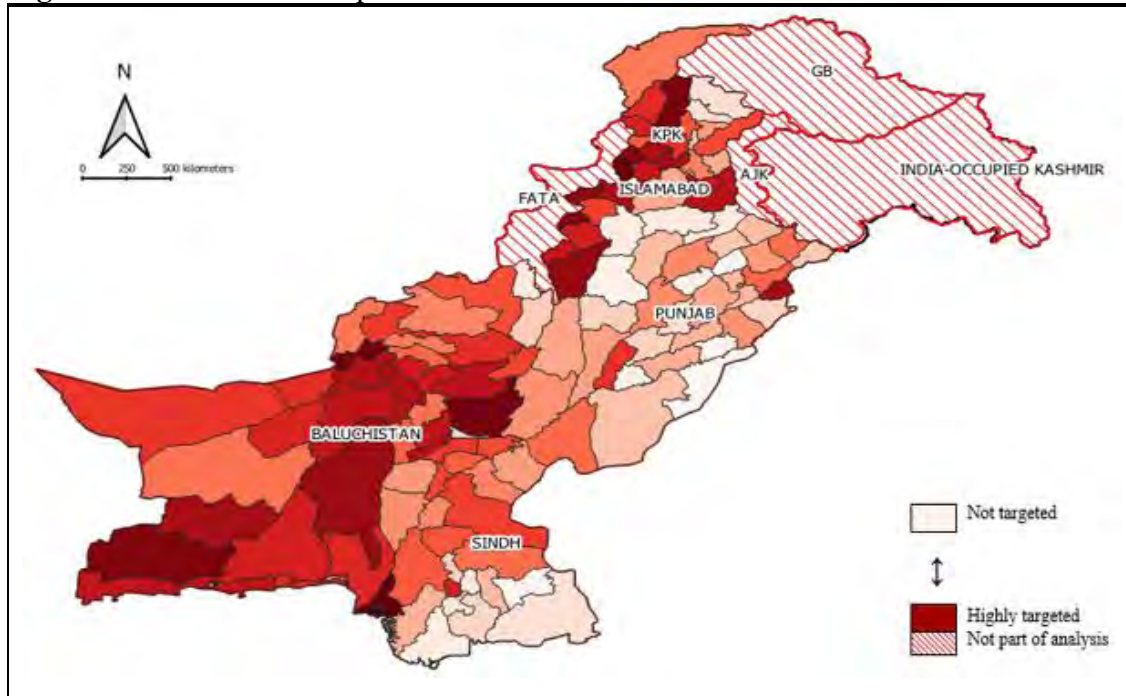
Furthermore, Bannu's situation was particularly alarming, as its rank in social welfare fell by 47 levels in 2008-09 and continued to decline in the following years. However, a recovery started in 2016, and Bannu regained its position by climbing 40 ranks (the ranking of districts is given in Appendix B).

The issue of terrorism and its impact on social welfare in Pakistan has been a subject of interest for many scholars and policymakers. The geographic distribution of terrorist incidents in Pakistan reflects the country's complex social, economic, and political landscape. According to a United Nations Development Program report, Pakistan's social welfare indicators have been negatively affected by violence and conflict. The impact of terrorism on social welfare is especially pronounced in the affected districts of the four provinces.

The most affected districts are concentrated along the Afghan border in KP, as noted by GTI. These districts have been the epicenter of the Taliban insurgency and are

characterized by high levels of violence and insecurity. The violence in these areas has led to the displacement of local populations, loss of life and property, and a significant decline in economic activity.

Figure 4.4: District-wise Spread of Terrorist Attacks in Pakistan



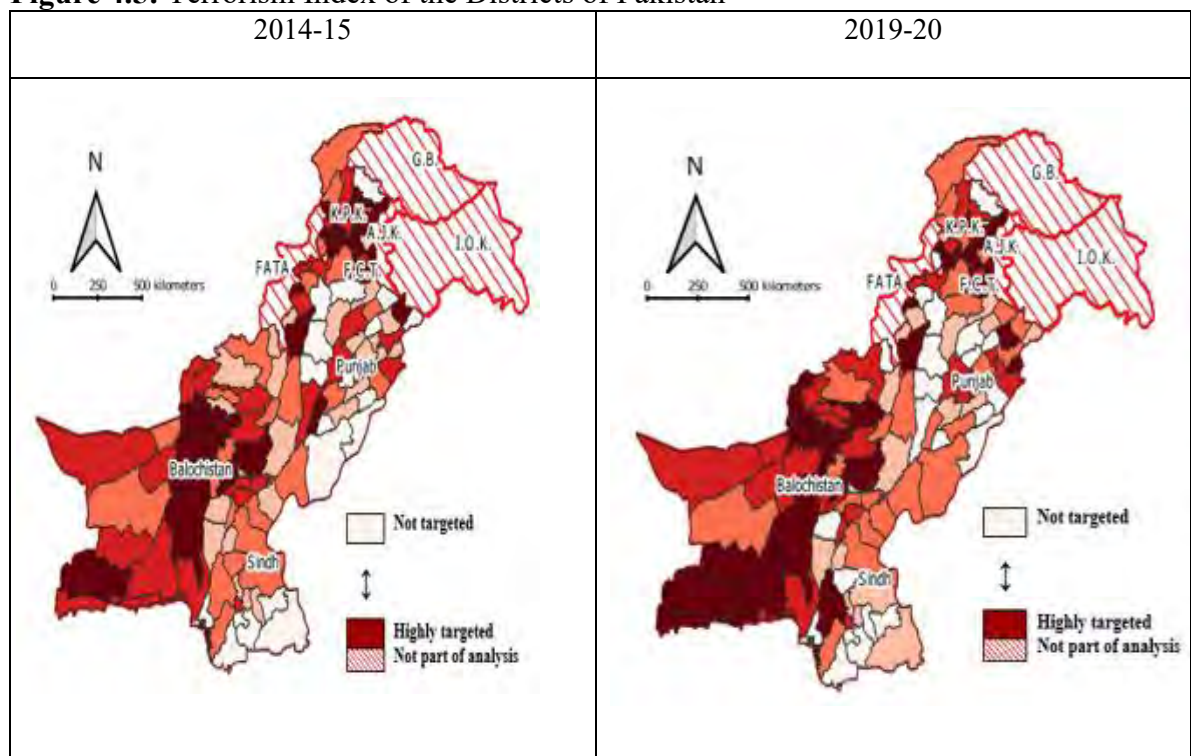
Source: Authors work based on GTD

In contrast, Punjab and Islamabad have experienced the least violence of any province in Pakistan over the past decade. This trend can be attributed to many factors, including strong governance, effective law enforcement, and the absence of violent extremist groups. However, this does not mean that these provinces are immune to terrorism, as evidenced by the occasional attacks. The Terrorism Index in the year 2014 and 2020 is also presented in Figure 4.5.

In Sindh, the district of Karachi has been the most affected by terrorism, with a tenfold increase in violence between 2006 and 2013. The violence in Karachi is linked to various factors, including political, ethnic, and sectarian tensions and criminal activity. The impact of terrorism on social welfare in Karachi has been significant, with high levels of insecurity, loss of life and property, and a decline in economic activity.

In Balochistan, the city of Quetta has experienced frequent attacks, reflecting the region's complex socio-political landscape. The violence in Balochistan is linked to a range of factors, including ethnic and sectarian tensions, separatist movements, and violent extremist groups. The impact of terrorism on social welfare in Balochistan has been significant, with high levels of insecurity, displacement, loss of life and property, and a decline in economic activity (Butt et al., 2019).

Figure 4.5: Terrorism Index of the Districts of Pakistan



Source: Author's work

Overall, the impact of terrorism on social welfare in the affected districts of the four provinces of Pakistan has been significant. The violence and insecurity have led to a decline in economic activity, loss of life and property, displacement of local populations, and a deterioration of social welfare indicators. Policymakers must develop effective strategies to combat terrorism and promote economic and social welfare in the affected regions.

It is essential to note that all the data on the districts affected by terrorism incidents are presented in Appendix B.

The table provides the ranks for the districts accordingly to the number of terrorist incidents from 2006-20. This information is essential for policymakers, security analysts, and scholars interested in understanding the complex relationship between terrorism, security, and social welfare in Pakistan.

The impact of terrorist attacks on social welfare indicators, including education, health, and economic growth, has been a major concern for policymakers and researchers in Pakistan. In this section, we present a detailed analysis of the attack patterns in the districts of Pakistan and their consequences on social welfare. The analysis aims to identify the types of attacks that have the most significant impact on social welfare indicators and to provide insights into the measures that can be taken to mitigate the negative effects of terrorism on social welfare.

4.5.1 Terrorist Violence in Balochistan

Balochistan, the largest province of Pakistan, has been a victim of terrorism and violence for several years. The region has faced numerous security challenges due to the cause of terrorism. In this section, it is tried to explore the terrorist attack types in the districts of Balochistan, and Table 4.3 depicts it.

Table 4.3 provides information on the type of attacks on the districts of Balochistan. The table shows the total attacks of different types of terrorism, including bombing/explosion, armed assault, assassination, infrastructure attack, and hostage and hijacking. Quetta district had the highest number of attacks, with a total of 727, where more than 80% of the attacks were attributed to bombing and armed assault. Other types of terrorism were also present, including armed assault, assassination, infrastructure attack, hostage, and hijacking.

Dera Bugti district had 410 attacks, of which 80% were attributed to bombing/explosion and the remaining 20% to other types of terrorism. Similarly, Nasirabad district had 160 attacks, with more than 80% attributed to bombing/explosion. Khuzdar district had 134 attacks, where 50% were attributed to armed assault and 50% to bombing/explosion. Panjgur district had 127 attacks, most of which were attributed to bombing/explosion. Bolan/Kachhi district had 110 attacks, Kalat district had 92 attacks, Mastung district had 90 attacks, and Killa Abdullah district had 78 attacks. In all these districts, most of the attacks were attributed to bombing/explosion and armed assault.

In conclusion, the table indicates that the districts of Balochistan are facing a high number of attacks, with more than 80% of the attacks attributed to bombing/explosion and armed assault. The table provides essential information to policymakers and stakeholders to devise strategies to counter these threats and maintain peace and stability in the region.

The major terrorist groups involved in carrying out attacks in Balochistan from 2006 to 2015 include the Baloch Liberation Army, Tehreek-e-Taliban Pakistan, Lashkar-e-Jhangvi, Sipah-e-Sahaba Pakistan, and Jundullah. These groups were responsible for carrying out bombings, armed assaults, and assassinations in the region, leading to a significant negative impact on the social welfare indicators of the districts.

To effectively control the issue of terrorism in Balochistan, Pakistan forces will need to adopt a multifaceted approach that addresses the root causes of terrorism, while also taking steps to disrupt the operational capabilities of the major terrorist groups. Firstly, efforts should be made to improve socio-economic conditions in the region through targeted development programs that address issues such as poverty, unemployment, and lack of education. This can help to address the underlying grievances that contribute to the recruitment of individuals into terrorist groups.

Secondly, Pakistan forces should undertake counter-terrorism operations to disrupt the operational capabilities of the major terrorist groups in the region. This can include

targeted military operations, intelligence gathering, and efforts to disrupt terrorist financing and recruitment networks. In addition, efforts should be made to strengthen the capacity of law enforcement agencies in the region, including training and equipping police forces to effectively respond to terrorist threats.

4.5.2 Terrorist Violence in KP

The province of KP in Pakistan has been a victim of terrorism and violence for many years, presenting several security challenges. The rise of terrorist organizations in recent years has only exacerbated the situation, leading to increased attacks, loss of human life, and property damage. Unfortunately, the impact of these terrorist activities extends far beyond immediate destruction, with long-term implications for the social welfare and development of the region.

The researcher shows the types of attacks in the districts of KP in Table 5.4. The data presented show the total number of attacks of different types of terrorism, including suicide bombings, armed assaults, assassinations, infrastructure attacks, and hostage and hijacking. A closer analysis reveals that over 90% of the attacks in KP are due to suicide bombings and armed assaults. While other types of attacks, such as assassinations and infrastructure attacks, account for only 10-15% of the total, it is crucial to consider all forms of terrorism and violence in developing strategies to address the social welfare challenges faced by the districts of KP province. All the types of attacks by their numbers of most targeted districts are highlighted in Table 4.4.

The terrorist groups operating in this province include the Tehrik-i-Taliban Pakistan (TTP), Lashkar-e-Islam, and the Jamaat-ul-Ahrar. These groups have carried out numerous terrorist attacks targeting civilians, security forces, and government installations. The TTP has been responsible for some of the deadliest attacks, including the Army Public School attack in Peshawar in 2014. The government of Pakistan has launched several military operations against these groups, resulting in a significant reduction in the number of terrorist attacks in the region in recent years.

The government of Pakistan has implemented many measures to counter the terrorist groups operating in the province, including military operations, intelligence gathering, and border management. These measures have been aimed at disrupting the operational capabilities of terrorist groups and reducing the number of terrorist attacks in the region. Military operations have been a key part of Pakistan's strategy to counter terrorism in the province.

Operation Zarb-e-Azb was launched in 2014 to target terrorist groups in the region, particularly the Tehrik-i-Taliban Pakistan (TTP). The operation was successful in eliminating many terrorists and disrupting their operational capabilities. Similarly, Operation Radd-ul-Fasaad was launched in 2017 to eliminate the residual threat of terrorism in the province. These military operations have contributed to a significant reduction in the number of terrorist attacks in the region in recent years. In addition to military operations, the government has focused on strengthening intelligence-gathering capabilities in the region.

This has involved the deployment of intelligence agents to gather information on terrorist activities and networks. The government has also encouraged the public to report any suspicious activities to the authorities. This has helped to preempt terrorist attacks and disrupt terrorist networks in the region.

Border management has also been a key aspect of Pakistan's counter-terrorism strategy in the province. The government has taken measures to improve border management, particularly along the Pakistan-Afghanistan border. This has involved the deployment of additional security personnel and the installation of surveillance equipment to monitor border crossings. These measures aim to prevent the movement of terrorists and weapons across the border.

Table 4.3: Most Targeted (Top 10) Districts of Balochistan

Rank	District Name	Total Attacks	Armed Assault	Assassination	Bombing Explosion	Infrastructure Attack	Hostage & Hijacking	Unarmed Assault	unknown
1	Quetta	727	224	46	407	12	33	1	4
2	Dera Bugti	410	16	6	373		6		1
3	Kech/ Turbat	212		12	94	11	29		3
4	Nasirabad	160	15	3	114	3	12		3
5	Khuzdar	134	64	14	68	7	10		1
6	Panjgur	127		8	66	5	3	3	42
7	Bolan/Kachhi	101	16	5	63	9	7	1	
8	Kalat	92	26	14	39	5	8		
9	Mastung	90	28	3	37	16	5	1	
10	Killa Abdullah	78	2	3	59	2	4	1	

Source: Author's work

Table 4.4: Most Targeted (Top 10) Districts of KP

Rank	District Name	Total Attacks	Armed assault	Assassination	Bombing Explosion	Infrastructure Attack	Hostage & Hijacking	Unarmed assault	unknown
1	Peshawar	1174		78	778	3	76	1	18
2	Swat	307	79	25	114	42	32	3	12
3	Bannu	239	37	12	180		9		1
4	Charsadda	236	36	16	180		2		2
5	Hangu	221		15	136	1	21	1	2
6	Dera Ismail Khan	145	41	11	90		3		
7	Mardan	134		3	98	2	2		2
8	Swabi	131	34	10	87		0		
9	Kohat	125	22	4	84	3	9	1	2
10	Tank	87	33	6	39		9		

Source: Author's work

4.5.3 Terrorist Violence in Punjab

The province of Punjab in Pakistan has also faced numerous terrorist attacks in recent years, with Lahore being the most affected district. Such incidents of terrorism not only cause immediate loss of human life and property damage but also have long-term implications for social welfare and development in the region.

Table 4.5 provides a breakdown of the types of attacks in the districts of Punjab. The data presented show the total number of attacks and the percentage of different types of terrorism, including armed assaults, suicide bombings, assassinations, infrastructure attacks, and hostage and hijacking. A closer analysis reveals that in Lahore, the most affected district, over 80% of the attacks are due to armed assaults and suicide bombings. While other types of attacks, such as assassinations and infrastructure attacks, account for only a small percentage of the total.

The information presented in Table 4.5 highlights the prevalence of bombing and armed assault in the districts of Punjab, with Lahore bearing the brunt of such attacks. It is essential to consider all forms of terrorism and violence in developing strategies to address the security challenges faced by the province and promote social welfare and development in the region. The mentioned data in Table 4.5 is from 2006-15.

4.5.4 Terrorist Violence in Sindh

Sindh province in Pakistan has been a major target of terrorist attacks for several years, and these attacks have had a significant impact on the social and economic wellbeing of the region. Table 4.6 provides a detailed breakdown of the types of attacks in each district of Sindh, which is crucial in understanding the dynamics of terrorism in the region. Karachi, the largest city and commercial hub of Pakistan, has been the most affected district in Sindh, with a total of 1,395 attacks, mostly 90% being armed assaults and bombing explosions. Other types of attacks include assassination, hostage-taking, and hijacking.

The data from the table indicates that terrorist attacks in Sindh are primarily aimed at creating chaos and instability by disrupting the social, economic, and political systems of the region. These attacks often result in significant loss of life and property damage, leading to a deterioration in the quality of life for the people in the affected areas. The attacks also have a significant impact on the social welfare of the region, as they lead to increased fear, anxiety, and trauma among the population.

Furthermore, the high number of armed assaults and bombings indicates that terrorist groups in Sindh have access to a significant amount of weapons and explosives, which can be used to carry out attacks at any time. This underscores the need for effective security measures, intelligence gathering, and law enforcement to address this critical issue. The table serves as a valuable resource for policymakers, security officials, and researchers in developing effective strategies to combat terrorism and enhance social welfare in Sindh.

Table 4.5: Most Targeted (Top 10) Districts of Punjab

Rank	District Name	Total Attacks	Armed assault	Assassination	Bombing Explosion	Infrastructure Attack	Hostage & Hijacking	Unarmed assault	unknown
1	Lahore	113	28	14	64	1	5		1
2	Rawalpindi	107	30	12	55	5	3		2
3	Multan	46	17	6	19		4		
4	RAINCMylar Khan	13	2	1	9		1		
5	Sargodha	12	2	3	6		1		
6	Sialkot	12	1	2	9		0		
7	Okara	10		5	5		0		
8	Muzaffargarh	9	5	1	2	1	0		
9	Sheikhupura	8	1	2	5		0		
10	Jhang	6	4		1		1		

Source: Author's work

Table 4.6: Most Targeted (Top 10) Districts of Sindh

Rank	District Name	Total Attacks	Armed assault	Assassination	Bombing Explosion	Infrastructure Attack	Hostage & Hijacking	Unarmed assault	unknown
1	Karachi	1395	744	137	434	26	0		10
2	Hyderabad	60	23	4	31	2	0		
3	Jacobabad	28	1	1	24		0		
4	Kashmore	26	4		20		0		
5	Khairpur	26	3	1	22		0		
6	Shaheed Benazirabad	25	3	1	16	1	0		
7	Larkana	23	3		15		0		
8	Jamshoro	22	6		13	2	0		1
9	Sanghar	17	3	3	8		0		
10	Shikarpur	17	1	4					1

Source: Author's work

4.6 Government Strategies to Counter Terrorism

In recent years, the Pakistani government has implemented several strategies to counter terrorism in the country. The National Action Plan (NAP), launched in 2014, includes 20 points aimed at addressing issues such as sectarianism, hate speech, and the financing of terrorism (Saleem et al., 2021). Military operations have also been carried out in areas such as Khyber Pakhtunkhwa and Balochistan, resulting in a reduction in the number of terrorist attacks. Military courts have been established to try terrorists, though there have been concerns about due process and transparency.

The Anti-Terrorism Act has been amended to conform to international standards, and non-profit organizations are being monitored to prevent them from being used as fronts for terrorist financing. Additionally, a program has been launched to de-radicalize youth and rehabilitate former terrorists, offering counseling, education, and vocational training (Schmeitz et al., 2022). Finally, a media campaign has been launched to counter extremist narratives and promote tolerance and social harmony.

The NAP has targeted the root causes of terrorism such as sectarianism, hate speech, and the financing of terrorism. The establishment of military courts has expedited the trial process and has resulted in the swift punishment of terrorists. Furthermore, the efforts to regulate the activities of non-profit organizations and monitor their funding have reduced the inflow of funds to terrorist groups.

The de-radicalization programs launched by the government have helped to rehabilitate former terrorists and prevent the youth from being recruited into terrorist organizations. The media campaigns have countered extremist narratives and promoted a message of tolerance and social harmony.

These measures have created a more secure environment in the country, which has boosted the socio-economic wellbeing of the people. With a reduction in terrorist attacks,

people have been able to resume their daily lives and engage in economic activities, which has resulted in increased economic growth. Moreover, with the introduction of new programs to improve education, healthcare, and infrastructure, the government is taking steps to further enhance the social welfare of the people.

4.7 Conclusion

The cross-sectional analysis of terrorism and social welfare in the districts of Pakistan reveals a significant negative impact of terrorism on social welfare indicators, including education, health, and economic growth. The literature review indicates that terrorism hinders economic growth, reduces the quality of education, and impairs access to healthcare facilities. The data from various districts in the four provinces of Pakistan shows a significant increase in the number of terrorist attacks from 2006 to 2015. The most affected provinces include Khyber Pakhtunkhwa, Balochistan, Punjab, and Sindh, with the most vulnerable districts being Peshawar, Quetta, Karachi, and Lahore.

The analysis of the data shows that most of the terrorist attacks in these districts were either bombing explosions or armed assaults, with very few incidents of sabotage, infrastructure attacks, or kidnapping. The frequency and intensity of terrorist attacks have led to fear, trauma, and insecurity among the people, which has significantly affected their social and economic wellbeing of the people.

The lack of adequate security measures and infrastructure has made it difficult for the government to tackle the menace of terrorism in Pakistan. Similarly, the Pakistani government has implemented various strategies and plans to counter terrorism in the country. The most important are National Action Plan (NAP), Anti-Terrorism Act, and media campaigns. These efforts have led to a significant reduction in the number of terrorist attacks in the country.

In conclusion, the cross-sectional analysis of terrorism and social welfare in the districts of Pakistan suggests that terrorism has a negative impact on social welfare indicators, including education, health, and economic growth. The data from various districts in the four provinces of Pakistan indicates that terrorism has become a serious challenge to the socio-economic development of the country. The government needs to take urgent measures to enhance security measures, build infrastructure, and promote social welfare programs to address the problems arising from terrorism in the country. The next chapter delves into the topic of resource allocation and its impact on social welfare through a spatial analysis of the districts of Pakistan. This chapter examines how resources are allocated across different districts and analyze the relationship between resource allocation patterns and social welfare outcomes.

CHAPTER 5

RESOURCE ALLOCATION AND SOCIAL WELFARE: A SPATIAL ANALYSIS OF DISTRICTS OF PAKISTAN

5.1 Introduction

The main concept of regional science revolves around the idea that location and distance play a critical role in determining social and economic interactions. Because spatial analysis offers tools to formally model and analyze spatial interactions, it allows researchers to investigate these dynamics. Spatial econometric models, for example, can be used to find areas of concentrated economic activity, pinpoint areas with comparable sociodemographic traits, and evaluate the influence of geographic factors on regional growth. [Anselin \(1988\)](#) has given a thorough explanation of numerous aspects of spatial econometrics. Traditional econometric methods are extended by spatial econometrics to take spatial dependency and heterogeneity into consideration. Spatial lag and spatial error are the two main forms of spatial dependence. In spatial lag models, dependent variables are geographically lagged, meaning that the result in one place depends upon the result in nearby areas ([Anselin, 2001](#)). Conversely, spatial error models take into account the correlation in the error terms across space, representing spatially correlated yet unobserved causes.

Researchers can associate welfare indices with geographic aspects including access to natural resources, metropolitan centers, and transportation networks by using spatial

analysis. Furthermore, the provision of resources by government and private sector may have an impact on social welfare in one area, which has a spillover effect on the welfare in the neighboring area.

This chapter examines the state of social welfare and policies in the country, focusing on key indicators such as education, healthcare, poverty rates, and access to basic services. The focus is on the analysis of resource allocation and its impact on social welfare through a spatial analysis of the districts of Pakistan. Building upon the previous chapter's findings on terrorism and social welfare, this chapter examines how resources are allocated across different districts of Pakistan and explores their influence on social welfare indicators such as income inequality, and poverty levels.

The study will explore the role of government and private sectors in addressing the disparities and their impact on the provision of social welfare services. In addition, this study will analyze data and literature on the sources causing differences in the living standards and social welfare in Pakistan over the past decade to identify any changes and improvements. The exploratory analysis is done to explore the impacts of different sectors on social welfare in the regions of Pakistan.

5.2. Review of Literature Resource Allocation, and Social Welfare

The differences in the standard of life occur in different regions. These differences among the regions of Pakistan are due to some different and important circumstances besides income and employment affecting social welfare. In some regions, households enjoy better health status, good education facilities and public satisfaction are more with government institutions. The role of the private sector and public sector in the availability of facilities raises living standards in some regions while low in others. Once the level of welfare is determined then the structuring of government expenditure and imposition of taxes as the policy adopted to maintain a better standard of living. In this regard,

theoretical and empirical literature exists on whether the expenditures from the private sector and the government sector have a role in welfare and influence living conditions.

The restructuring of government expenditure can be developed by keeping in view the resource interactions of individuals as well as their standard of living. Especially the concept of multidimensionality of the living standard must be considered. [Ferroni and Kanbur \(1990\)](#) presented the framework in this regard for restructuring government spending. The direct expenditures and indirect expenditures (i.e., those that enhance the income) were distinguished in the study. The interpretation of results depicts that the living standards would be improved by the combination of spending through direct and indirect expenditures.

Poverty has a connection with the redistribution of income. In the redistribution of income, government plays a salient role. When a poverty reduction occurs, it will help in improving the living standards of the households. To explore the relationship between economic growth and poverty with government expenditures, the Computable General Equilibrium (CGE) models were employed. [Matovu and Dabla-Norris \(2002\)](#) investigated the case of Ghana by utilizing the CGE model to find the impact of government spending. Whether it leaves an impact on education and infrastructure which is also influencing poverty and economic growth or not. The findings elucidate that the human capital augmenting expenditures are helpful in amelioration of poverty and also have benefited influence on macroeconomic variables. However, a trade-off exists between rising expenditures on education to develop human capital and other types of physical capital like infrastructure.

Other studies on developing countries show that spending on infrastructure has a significant impact on the alleviation of poverty like [Klump and Bonschab \(2004\)](#) findings on Vietnam depict that infrastructure spending has resulted in the reduction of poverty but the effects on the distribution of income are unknown.

The difference in the outcome can be expected by creating quality targeting. It is important to identify policy objectives and targets in the correct dimension. The programs are designed to improve living conditions then to be more rewarding. Therefore, analysis of many programs related to the spending of the government on health and education is reducing poverty and inequality (Paternostro et al., 2007). The paper is designed to develop the conceptual framework to study the public policy instruments used to achieve economic objectives like poverty reduction, equity, and growth. The findings show a positive impact on wellbeing.

Thus, it is seen that the programs launched by the government sector also have an impact on the distribution of income. Claus et al. (2012) also assess the case of Asia by using the panel data of 150 countries out of which 23 are Asian countries for the years 1970 to 2009 to see the impact of the redistributive policy of the government on the distribution of income in these countries. Four types of government expenditures are considered which are social protection, education, health, and housing taken as a percentage of GDP. They conclude that the most effective tool is government expenditure which is affecting the redistribution of income more than other tools. In Asia, income inequality increases with the spending on social protection by the government showing a distinctive differential finding from the rest of the world where income inequality declines with such spending. The one percent increase in expenditure on housing also increases inequality by 2.16%, however, reduces income inequality in the case of health and education.

Another empirical analysis of a large panel of developed and developing countries for the period of 1970 to 2006 is done by Martinez-Vazquez et al. (2012) to explore the role of government expenditure on the distribution of income. The four types of expenditures taken have a role in improving welfare by targeting households and individuals and such expenditures also can improve income distribution. Thus, the share of GDP spends on the improvement of human capital by creating services on education and health and spending

on social welfare as well as on housing. It is concluded that a higher share of GDP spends by the government on these four will create a positive impact on the distribution of income individually as well as collectively also.

The benefit incidence approach is used to analyze the welfare impacts on the primary health care services of the government expenditure. The expenditures did improve the health status. But if the benefits of the program do not reach those who are more vulnerable then it will increase inequality in the availability of health facilities. The case of Nigeria is assessed by collecting data from primary and secondary sources and decomposed into three categories of non-poor, moderately poor, and core poor by [Richardson and Israel \(2014\)](#). The data analysis depicts that the non-poor are taking more benefit from the health care services provided by the public sector however accessibility of the poor towards health care services is hurdled due to relative inaccessibility regarding drugs. It is recommended based on the findings that pro-poor policies are required which should be properly implemented so that the welfare of those will be improved who are more vulnerable to society.

The policies were introduced in Argentina after the crises of 2001 to improve welfare by deteriorating the main welfare indicators which are poverty and inequality. Because poverty ameliorates and inequality reduces then living standards would improve. The case of Argentina was analyzed by [Rossignolo \(2016\)](#) to see the impact of public spending on income distribution and poverty. The survey data was employed for the year 2012 to 2013 and introduced CEQ methodology. The findings depict that the indicators of welfare are strongly affected by government spending and there is a high reduction in poverty and a strong effect on inequality occurs. However, when government targets the poor through indirect subsidies a spillover effect still occurs. Additionally, the problem of sustainability to run these welfare programs occurs due to high government spending in the phase of public deficit.

Government spending causing an effect on the wellbeing of society but the magnitude of the impact at the macro level brings out by calculating the multiplier. [Sims and Wolffs \(2017\)](#) investigated the effects of changes in government spending on the output and measure of welfare. Output multiplier and welfare multipliers are introduced to see the response in output and welfare of the one unit change in government spending. The government consumption output multiplier is positive and equal to 1.07 at steady state whereas the results show that the welfare multiplier is negative and equal to -2.41 at steady state, which implies that government consumption will increase the output as the output multiplier also exceeds one and aggregate welfare deteriorated due to increase in government spending when evaluated at steady state.

[Omodero \(2019\)](#) suggested that an increase in government expenditure is required to reduce poverty and allocate a budget in the sectors of agriculture, building, and construction, education, and health. [Maharda and Aulia \(2020\)](#) findings also elucidate that the impact of government expenditures on the sector of education affects HDI positively but health has no significant effect on HDI. While [Astuti and Lestari \(2020\)](#) concluded based on their empirical findings that education has no significant impact on economic growth and health spending by the government has a significant impact on it.

The analysis of data to disclose the impact of government spending on different macroeconomic variables was also undertaken by [Indrayana \(2021\)](#). The data analysis shows that the increase in government expenditure on health services, and education positively affects human development, and no significant effect occurs in the case of infrastructure. This is due to the uneven development in the sector of infrastructure.

The health expenditure by the government through domestic resources and the distribution of foreign-sourced health expenditure by the government was investigated to see the influence on health equity ([Li and Yuan, 2019](#)). The empirical results show that government expenditure from domestic sources effectively helps in improving health i.e.,

reducing the male child mortality rate, and foreign-sourced government expenditure effectively helps in reducing the female child mortality rate. Likewise, [Boachie et al. \(2020\)](#) also concluded that government expenditure on health has a significant impact on the infant mortality rate and private expenditures have less effect on it. Therefore, redistribution policies of the government have positive impacts on health outcomes.

The employment generation by private corporations and spending by non-profit organizations also influence the income and development of households. The resources allocated by the private sector affect the economic conditions through multiple channels.

The employment generation by private corporations and spending by non-profit organizations also influence the income and development of households. The resources allocated by the private sector affect the economic conditions through multiple channels. For better employment, many individuals migrate and in Pakistan, migration abroad is also common. As remittances sent by the migrants will benefit their families to improve their consumption and hence enjoy better living conditions. A study on the Peshawar district by [Awan et al. \(2013\)](#) depicts that the households of the migrants' families receiving remittances spend half of their income on consumer expenditure including food, health, education, shelter or housing, and transport. The other 49% is spent on loan repayment, generation of sources of further income, on consumers' durables to improve quality of life, and on the formation of assets like the purchase of property and savings, etc. They stated that the use of remittances in this way in the Khyber Pakhtunkhwa (KP) province is rational.

According to [Amjad and Arif \(2014\)](#), average receipts of remittances from abroad calculated from the (2010-PPHS Pakistan Panel Household Survey based microdata of 16 districts of Pakistan among which 3 are from KP) is highest in KP than Sindh and Punjab. The pattern of spending remittances by the migrants' households of KP province was explored and the result shows that mainly expenditures done on food which is around

40% and around 30% is spent on the purchase of real estate and agriculture machinery, 3.64% on health, 3.93% on education and approximately 7.97% on durable goods and leftover income of remittances used on marriage, loan repayment, saving and donations.

The Index of Vulnerability (IoV) was developed and utilized as a tool by [Cheng et al. \(2019\)](#) to evaluate the spatial disparities in the elderly population in China. The index includes the Aging Population Ratio (APR), Health status (HS), and Gross Domestic Product per capita which calculates the vulnerability. The regional disparities in terms of vulnerability are identified and therefore, might lead the policy makers for the provision of resources.

5.3 Data

5.3.1 Introduction to Sources of Data

The following section presents an overview of the data and variables employed to present available provincial development statistics for Pakistan, including Balochistan Development Statistics, KP Development Statistics, Punjab Development Statistics, and Sindh Development Statistics. These statistics are comprehensive and cover a wide range of socio-economic sectors, with data broken down by division, district, and tehsil. The Bureau of Statistics Punjab has been issuing Punjab Development Statistics since 1972, with the latest available data ranging from the 34th series published in 2008 to the 47th series published in 2021. Therefore, data is extracted for the six rounds from 2006-07 to 2019-20.

Similarly, the Bureau of Statistics KP has been publishing KP Development Statistics annually since 1980, providing statistics on economic, social, demographic, and other important dimensions. The Bureau of Statistics Balochistan has also compiled data on the provincial and district levels and published it in Balochistan Development Statistics. This section presents the details regarding the composition of the variables to get valuable

statistics that can help us to gain a better understanding of the data utilized for the analysis of wellbeing disparities.

5.3.2 Data for Socio-Economic and Demographic Variables

The adjustment of data for socio-economic and demographic variables is important in capturing disparities in welfare, as it allows for comparisons between districts with different population sizes, household numbers, and geographical areas. By normalizing these variables, researchers can analyze the impact of resource allocation on the social welfare of districts.

Unequal allocation of resources can lead to disparities in the provision of essential services such as healthcare, education, and infrastructure, which can significantly impact the overall wellbeing of communities. Therefore, understanding the role of resource allocation in capturing disparities in welfare is essential for policymakers and stakeholders in developing effective strategies to address these disparities and promote sustainable development.

The selected dimensions for the study are based on existing literature. To simplify the analysis and ensure replicability, all indicators have been normalized using the “Min-Max Normalization” technique, which is consistent with the approach used in the measurement of the Physical Quality Life Index and Human Development Index. The details of the dimensions which are potential for social welfare are presented in Table 5.1.

This technique has been employed by [Saleth and Swaminathan \(1993\)](#), [Singh and Hiremath \(2010\)](#), and [Garai et al. \(2019\)](#). The equal weights are assigned to the variables for the composition of each dimension index separately. This approach ensures that each component responsible for determining the provision of resources is given equal importance, which in turn may cause differences in social welfare. Equation (5.1) is utilized to calculate the Dimension Indices that are expected to have positive effects on

social welfare and equation (5.2) is utilized to construct a quantitative index for each component of social welfare.

$$DI_{ij} = \frac{X_{kj} - \text{Min}_j(X_{kj})}{\text{Max}_j(X_{kj}) - \text{Min}_j(X_{kj})} \quad (5.1)$$

$$\prod_{I=1}^6 ERII_j = \sum_{j=1}^I DI_{kj} \quad (5.2)$$

ERII is the Economic Resource Indicator Index Where I vary from 1 to 6 i.e., health, education, transport and communication, security condition, agriculture, and energy. In equation (4.1), 'k' represents the specific variable of the Dimension indices being considered (e.g., Land utilization, source of irrigation e.t.c.), and 'j' represents the specific district being analyzed. The variable ERII_j is the value of the Economic Resource Indicator Index score for the kth component of the jth district. The variable X_{kj} signifies the value of the indicator equivalent to the kth constituent for the jth district. The MIN_jX_{kj} variable indicates the minimum value of the indicator X_{ij} for the jth district, while the MAX_jX_{kj} variable indicates the maximum value of the indicator X_{kj} for the jth district.

By using these variables, the equation can standardize the values of each indicator across all districts to compare across districts and overtime. This normalization process is important for ensuring that no one indicator disproportionately influences the results and that the ERII index is a fair representation of the different dimensions of social welfare being analyzed.

Table 5.1: Components of Economic resources potential for social welfare

Economic Resource (ER) Components	Indicator	Description
ER in Health (ERH)	• Health Institutes per capita	The ratio of the number of Health institutes to population (Pop) in each district
	• Health institutes Beds to Population ratio	The ratio of the number of Beds in health institutes of a district and population (000)
	• Doctors to Population ratio	The ratio of the number of doctors, surgeons, and dentists to population
	• Number of Paramedical staff to Population ratio	The ratio of the number of paramedical staff and the population (000) of a district
ER in Education (ERE)	• Material Resources	The ratio of the number of schools (Primary, Middle, and Secondary) to the population
	• Human Resources	The ratio of the pupil to the teacher in each district and the ratio of enrolment to population
ER in Transport and Communication (ERTnC)	• Transport infrastructure	Road length (KM) to the area of the district in square km Number of registered motor vehicles per household in each district Access to public transport within 15 minutes
	• Communication infrastructure	Number of phone connections per capita
Resources in Security (ERS)		Number of police stations in each district and inverse of the number of crimes registered. The inverse of a TI score calculated for each district in chap4
ER in Agriculture (ERAg)	• Land utilization	Cultivated land (km) to the area of the district per sq km and area covered by forests (km) to the area of the district per sq km
	• Machinery	Available number of tractors per sq km of cultivated land Installed the number of tube wells per sq km of cultivated land
	• Electricity connections	Number of electricity connections per capita in each district
ER in energy (EREC)		

5.4 Exploring the Health Variable: Understanding Disparities in Access to Health Care Services

The health of a population is a key indicator of their overall wellbeing and can have significant impacts on their quality of life. The composition of the health variable in this section is based on various indicators such as the provision of resources, access to health

care, number of hospital dispensaries, and basic health units. By analyzing these indicators, we can identify areas where there are disparities in access to health care services and resources which is affecting the wellbeing of the population in the various districts in Pakistan.

This information can to understand, how to allocate resources to address these disparities and improve the overall health of the population. Therefore, understanding the health variable is crucial in understanding social welfare disparities and developing policies that promote equitable access to health care services.

In addition to the provision of resources and access to health care, the health variable is also composed of other variables such as the number of hospital dispensaries and basic health units (BHUs) in each district. The number of hospital dispensaries, Maternal and child health centers (MCHs), and BHUs are important indicators of the availability of primary health care services in districts. These facilities provide essential health services such as immunization, maternal and child health, family planning, and treatment of minor illnesses.

The role of resource allocation in capturing disparities in welfare is crucial in ensuring that all individuals have equal access to health care services. Resource allocation refers to the distribution of resources to different regions or groups based on their needs and capabilities. In the context of healthcare, resource allocation involves the distribution of financial and human resources to different healthcare facilities based on their capacity to provide quality healthcare services.

Effective resource allocation can help address disparities in welfare by ensuring that healthcare services are distributed equitably. By identifying areas that lack adequate resources or have limited access to health care, resource allocation can be used to allocate

additional resources to those areas. This can help improve the quality of health care services and increase access to social welfare in the districts of Pakistan.

5.4.1 Hospital and Dispensaries Units

A hospital is defined as an institution that provides medical and surgical treatment and care to patients and has a minimum capacity of ten beds. The hospitals in Pakistan are categorized into three types: Tehsil Headquarter (THQ) Hospitals, District Headquarter (DHQ) Hospitals, and Teaching Hospitals. THQ hospitals assist as the primary health care centers at the tehsil level, while DHQ hospitals provide secondary level health care services to patients from a district. Teaching hospitals are affiliated with medical colleges and universities and serve as tertiary-level healthcare facilities, providing specialized services to patients and also serving as training centers for medical professionals.

A dispensary is a type of healthcare institution that provides outpatient medical services and treatments. Typically, a dispensary is smaller than a hospital and has fewer resources, staff, and equipment. According to the definition used in this study, a dispensary is an organization that has fewer than ten beds. This means that it is a small medical facility that may have limited capacity to provide inpatient care or long-term treatments. Dispensaries are often located in rural or remote areas where there is limited access to healthcare services, and they play an important role in providing basic medical care and treatments to local communities.

5.4.2 Basic Health Units (BHUs)

A Basic Health Unit (BHU) is a fundamental component of the healthcare system in Pakistan, providing primary-level healthcare services. Typically, each Union Council (UC) has a BHU, with the facility usually comprising two beds, though there are cases where two facilities exist per UC. BHUs offer basic medical services such as maternal and child healthcare, immunization, family planning, and treatment for common illnesses such as respiratory infections and diarrhea.

They also act as referral points for specialized medical services provided in larger health facilities, such as hospitals and district health centers. The BHUs are especially important in rural and remote areas where access to healthcare facilities is limited, and people have to travel long distances to access the nearest health facility. The catchment population of each BHU ranges from approximately 10,000 to 25,000 people, depending on the population density and geographical location. The BHUs are crucial in providing essential healthcare services to the population residing in these areas.

5.4.3 Maternal and Child Health Centers (MCHs) Units

MCHs in Pakistan are specialized healthcare facilities that primarily focus on providing maternal, neonatal, and child health services. These centers also offer reproductive health and family planning services. MCHs are typically situated in densely populated urban areas and larger rural regions, where there is a high demand for such services. The centers are managed by Lady Health Visitors, who are trained healthcare professionals responsible for providing basic health education, maternal and child healthcare services, and family planning counseling.

The trained traditional birth attendant assists the Lady Health Visitors in the management of maternal and child health centers. MCHs play a vital role in reducing maternal and infant mortality rates in Pakistan. They provide essential healthcare services to women during pregnancy, childbirth, and postpartum periods. These centers also offer immunization services to children, which is crucial for preventing childhood illnesses and reducing mortality rates.

5.5 Composite Index of Education: A Tool for Assessing Welfare Disparities

Education is a key variable for capturing welfare disparities in different districts of Pakistan. This variable is crucial in terms of its impact on social and economic development. Providing education without any discrimination is the responsibility of

state authorities, and equal access to quality education is essential for inclusive economic growth and social development.

To measure the education variable, a composite index has been developed in this chapter, which takes into account several factors such as the number of schools at different levels (primary, middle, and secondary), enrollment in schools, and teaching staff. The student-teacher ratio and girls' enrollment to boys' enrollment ratio are also considered to assess gender disparities.

Primary schools in Pakistan are institutions that cater to students from grades I to V, while middle schools cover grades I to VIII. High schools offer education from grades I to X. The characteristics of these schools, such as the number of schools and enrollment, reflect the state of living and human development in a region. High female literacy rates and sex ratios are indicators of progress in the economy, showing increased social and economic participation of females.

It is essential to allocate resources for education to reduce welfare disparities, particularly in terms of gender and geographical location. By providing equal educational opportunities to all, it is possible to ensure inclusive economic growth and social development. Moreover, education is an investment in human capital that can contribute to poverty reduction, improved health outcomes, and increased productivity.

The education variable plays a crucial role in capturing welfare disparities in various districts of Pakistan. The author of this study explores that the variable of education is important to ensure equitable access to education and reduce welfare disparities. By providing equal educational opportunities to all, Pakistan can ensure inclusive economic growth and social development, which can lead to poverty reduction, improved health outcomes, and increased productivity.

5.6 Transport and Communication: Assessing the Impact on Welfare Disparities through Resource Allocation

The variable of transport and communication is a crucial factor in measuring welfare disparities in the districts of Pakistan. It focuses on the role of transportation infrastructure as a factor of development and its linkages with social welfare and economic opportunities. Efficient transportation is expected to create positive multiplying effects, but inadequate investments in transport infrastructure, capacity, managerial deficiencies, and coordination between modes have impacted districts in the four provinces of Pakistan. To assess the transport and communication variable, several indicators are used.

The road length in kilometers of each district is taken, and to make comparisons across districts, road length is divided by the area of the districts. This enables a more accurate analysis of transport infrastructure investments and their impact on economic growth and social welfare. The number of registered motor vehicles by type in the district is also considered to analyze the availability of resources. Motor vehicles per household are taken to assess the accessibility of transportation to households. This is a crucial factor in determining the impact of transport infrastructure investments on welfare disparities. Access to public transport within 15 minutes from each district is taken for all rounds.

This is essential for assessing the quality and efficiency of transport infrastructure in terms of accessibility to public transport for the population. Phone connection per capita is also considered an indicator of communication infrastructure. The transport and communication variable's composition and the use of these indicators enable policymakers to identify the existing level of development, quality, and efficiency of infrastructure, modal preferences, and coordination challenges. This information is essential for designing efficient transport infrastructure investments that can have a positive impact on welfare disparities and promote economic growth and social development.

5.7 Security Conditions: A Crucial Factor in Measuring Welfare Disparities

Security is an essential aspect of social welfare and economic development. In Pakistan, the provision of services to maintain law and order situations is often inadequate, leading to an increase in crime rates and a decrease in citizen safety. To assess the security conditions, the number of reported crimes by district and the number of police stations in each district have been taken as indicators.

To assess the level of security and its impact on welfare disparities across districts in Pakistan, two variables have been considered: the number of reported crimes and the number of police stations. The number of reported crimes provides a rough estimate of the level of criminal activity in each district. This variable is important because high crime rates can lead to a sense of insecurity among the population, which can have negative effects on economic and social development.

Additionally, crime can deter investment and reduce economic activity, leading to further disparities. To complement this variable, the number of police stations in each district has been included. This is an important factor in measuring the state's ability to provide law and order and ensure the safety of citizens. The presence of police stations can serve as a deterrent to criminal activity and increase the sense of security among the population.

Though, police stations can serve as a point of contact for citizens to report crimes and seek help. Overall, security conditions are a crucial factor in measuring welfare disparities across districts in Pakistan. Policymakers must allocate resources to improve the level of security in each district, especially in areas with high crime rates. By doing so, it is possible to promote economic and social development and ensure a more equitable distribution of resources and opportunities.

5.8 Assessing Welfare Disparities in Agriculture through Land Utilization, Irrigation, and Mechanization

The Agriculture variable focuses on assessing the welfare disparities in the agricultural sector, which plays a vital role in Pakistan's economy. The variable comprises several sub-variables, including land utilization, irrigation, and mechanization. To capture land utilization, the data of cultivated land in km per square km of the total reported area of the district is taken. This provides insights into the extent to which land is being utilized for agricultural purposes in a given district. Similarly, the forest area in km to the total geographical area per square km of the district area is taken to assess the availability of forest resources in a given district.

For irrigation, the mode of irrigation on the cultivated land is considered. The number of tube wells installed per square km of cultivated land provides insights into the availability of groundwater resources for irrigation purposes. Additionally, the data on the number of private and government-owned tractors per square km of cultivated land is taken to assess the level of mechanization in agriculture, which has implications for productivity and efficiency.

Assessing welfare disparities in the agricultural sector is essential as agriculture is a significant source of income and livelihood for a large segment of the population, particularly in rural areas. By analyzing the different sub-variables, policymakers can identify the areas where investments are needed to improve the productivity and efficiency of the agriculture sector, reduce poverty, and promote inclusive economic growth.

5.9 Energy Consumption and Access: A District-wise Analysis of Access to Energy Resources in Pakistan

The variable of Energy includes the measurement of access and consumption of electricity in different sectors. In Pakistan, the Water and Power Development Authority

(WAPDA) is responsible for the generation and distribution of electricity. Domestic, Commercial, Industrial, Agriculture, and Other sectors are considered for measuring the consumption of electricity.

Domestic Consumption refers to the usage of electricity in households for single-phase houseware appliances such as lamps, fans, and others with a rated capacity not exceeding 4 kilowatts. Commercial Consumption includes the usage of electricity for commercial purposes, such as lighting, heating, and cooling, refrigeration, and tube wells with a rated capacity of up to 4 kilowatts. Industrial Consumption includes the usage of electricity in factories and for tube wells and water pumps operating on three-phase 400 volts. Agriculture Consumption includes the usage of electricity for agricultural purposes, primarily for irrigation pumps and tube wells. The others category includes public lighting and bulk supply.

The number of electricity connections per capita in each district is taken to assess access to electricity. The measurement of energy consumption and access is crucial in determining the level of development in a region. Unequal access to electricity and limited infrastructure can lead to disparities in economic growth and social welfare. The availability of energy resources and infrastructure plays a vital role in enhancing economic opportunities and improving living standards. Thus, resource allocation in the energy sector is crucial in capturing welfare disparities across regions. The data on the electricity consumption of all the districts is not available therefore, in this study, we are taking the number of electricity connections in each district to assess the access to energy resources.

5.10 Summary

In this data section, we have examined the socio-economic and demographic variables in four provinces of Pakistan. This study focused on five main areas: health, education, transportation and communication, security, and agriculture. For each area, we analyzed

various sub-variables to assess the impact on welfare disparities through resource allocation.

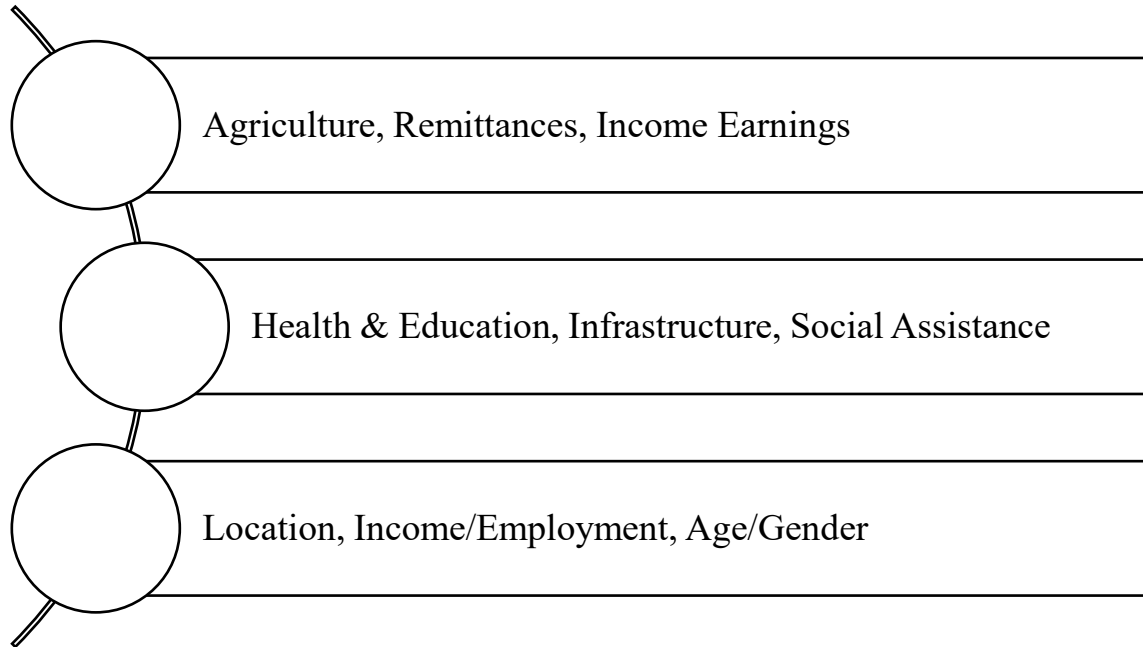
Finally, in the agriculture sector, analyzed the data on land utilization, forest area, mode of irrigation, and number of tractors and tube wells across districts. The disparities may have significant implications for agricultural productivity, food security, and rural livelihoods. Overall, our study highlights the need for better resource allocation and policies to address welfare disparities in the four provinces of Pakistan. The findings from this study can provide valuable insights for policymakers and development practitioners to improve socio-economic outcomes and promote sustainable development in the region.

5.11 Methodology

The sources of disparities in social welfare need to be explored. Therefore, the allocation of resources to build infrastructure in education, health, roads and communication, security, agriculture, and energy is required to be analyzed keeping in view the population density in each district. Demographic conditions also influence social welfare because earnings differ due to the differences in earning age population. The main determinants which may cause disparities in social welfare are presented in Figure 5.1. The socio-economic conditions of the individuals in the districts of Pakistan are mainly based on the public and private provision of services that are required to maintain living standards. Participation of the private sector in agriculture, income earned through different sources including remittances have great impact on the social welfare of households. Likewise, the role of government in providing health services and education in the development of its human capital, and building infrastructure i.e., roads and transportation networks is also important due to its impact on social welfare. Additionally, demographic conditions are also considered to have influence on socioeconomic conditions of the households. Location is important because households

in urban regions have better access to services and employment opportunities than households in rural areas.

Figure 5.1. Determinants of Socioeconomic Conditions



Source: Author's work based on academic literature.

5.11.1 Equation with Spatial Framework

The spatial framework is developed to analyze the level of social welfare in various districts of Pakistan. It is also required to capture the spatial spillover effects on the level of social welfare in these districts.

5.11.2 Theoretical Framework of Resource Allocation and Regional Disparities in Social Welfare

Spatial econometrics is employed to get a deeper insight into the regional dynamics of social welfare i.e., to capture the sources of regional imbalance in Pakistan. Classical regression analysis does not allow in-depth analysis and to treat spatial data. The spatial

data contains two sets of information in which the first one relates to the observed values of the economic and socio-economic variables, whereas the second set of information relates to the particular location where those variables are observed and to the various links of proximity between all spatial observations. Therefore, turning towards exploratory spatial data analysis to deal with spatial effects and the two sets of information. The set of techniques involved in exploratory spatial data analysis (ESDA) are meant to describe and visualize spatial distributions, identification of typical locations and clusters, and discover patterns of spatial association and spatial heterogeneity (Anselin, 1998, 1999; Ertur and Le Gallo, 2003).

Two categories of specification in terms of spatial effects exist. One is spatial dependence, and the other one is spatial heterogeneity. The structural relationships that change with the location of the object are termed spatial heterogeneity whereas systematic spatial changes that are observed as clusters of similar values are referred as spatial dependence.

There are two sources of quantifying the location in the model. The first source of information is the latitude and longitude of the location in cartesian space, and the contiguity is the second source of information which reflects the relative position in space of one regional unit of observation of other such units (Lesage, 1999).

One is the closeness of the regions can be straightforwardly defined by choosing between the rook criterion (two regions are said to be close to one another if the sides are shared) or the queen criterion (two regions are said to be close to one another if the side or an edge is shared by them) or Bishop contiguity criterion (two regions are said to be close to one another if the vertex of the two regions shared). In the case of the irregularly spaced administrative units. The connectivity matrix which is generally called a weight matrix based on the simplest definition of determining neighboring units i.e., the neighboring distance between location i and location j is as follows (5.3):

$$W = [w_{11} \dots w_{\tilde{n}1} \dots w_{lj} \dots w_{1\tilde{n}} \dots w_{\tilde{n}\tilde{n}}] \quad (5.3)$$

Where $w_{lj} = \begin{cases} 1 & \text{if } j \in \tilde{N}(l) \\ 0 & \text{otherwise} \end{cases}$ w_{lj} is unity if $j \in \tilde{N}(l)$ & w_{lj} is zero otherwise

$\tilde{N}(l)$ here is the set of neighbors to location l of location j , $w_{ll} = 0$ and W (weight matrix) is the symmetric matrix. Another way of creating a weight matrix is the inverse distance criterion in which the distance decay effect of location i with all others is specified in the distance weight matrix.

5.11.3 Quantifying Spatial Effects for Pakistan

The first step is to employ a weight matrix for Pakistan which is also a symmetric matrix but with non-binary elements with a dimension of 100x100, (100 districts are being analyzed in this study). In the inverse distance matrix as mentioned above, it is specified by the distance decay effect which implies that the local influence of each measured point (location) diminishes with distance. It is more appropriate for cluster detection and classification therefore, the inverse average road distance from district i to district j of Pakistan is referred to as the developed inverse distance weight matrix in this study. The longitude and latitude of the unit centroid are employed for the computation of distances between the geospatial units.

The phenomenon under study here is the social welfare in which socioeconomic and demographic drivers vary across space. Therefore, the inverse distance weight matrix has more exploratory power in terms of welfare i.e., geographic economy. The shapefile of the districts is used to create a spatial weight matrix in this study. The weight matrix is row standardized by dividing each weight element by its row sum. The next step is to explore the Global spatial autocorrelation which determines the overall patterns in the whole system, for this purpose global Moran's I statistics will be employed. It is helpful

in testing the similarity between values in one location and the values in its neighboring location i.e., it employs a vector of observed values and the weighted averages of the neighboring values that is why the weight matrix is created to test for the global SA. Moran's scatter plots also be displayed to visualize the global spatial autocorrelation of district-wise social welfare. But to detect clusters Local Indicators of Spatial Association (LISA) is used to calculate and plot local Moran's I scatter plot.

$$I = \frac{n}{s_0} \cdot \frac{\sum_i^{\tilde{n}} \sum_j^{\tilde{n}} w_{ij} (y_i - \bar{y})(y_j - \bar{y})}{\sum_i^{\tilde{n}} (y_i - \bar{y})^2} \quad (5.4)$$

5.11.4 The Spatial Effects in the Panel and Cross-Sectional Data Model

One of the optimal properties of OLS is that the autocorrelation does not exist in the stochastic disturbances i.e., off-diagonal entries are non-zero in the variance-covariance matrix. In this case, the individuals are assumed to be independent of one another but individual heterogeneity exists and spatial interactions are also present in the case of the availability of geolocated information. Due to the violation of the assumption stated above and modeling the spatial effects needed in the presence of spatial autocorrelation. The following spatial lag model given in equation (5.5) is employed to estimate.

Fixed effect cross-sectional model

$$sw_{lt} = \rho \sum_{l \neq j}^{\tilde{n}} w_{lj} sw_{jt} + x_{lt} \beta + \alpha_l + \epsilon_{lt} \quad (5.5)$$

Where $u_{lt} \overset{i.i.d.}{\sim} \tilde{n}(0, \sigma^2)$

The spatial autoregressive model (SAR) is alternatively called the spatial lag model and the model given above in equation (5.5) is quantifying the effects of social welfare in a region with the social welfare of the neighboring region. The parameter ρ defines how much the social welfare of one region is going to affect the level of social welfare of the neighboring region, irrespective of the values of x where x is a vector of independent

variables (ER Health, ER Education, ER Transport and Communication (TnC), ER Security, ER Agriculture, ER Energy Consumption). The model given in equation (5.6) is estimated.

$$SW_{lt} = \rho W_{lt} SW_{lt} + \beta_1 ERH_{lt} + \beta_2 ERE_{lt} + \beta_3 ER TnC_{lt} + \beta_4 ERS_{lt} + \beta_5 ER Ag_{lt} + \beta_6 ER EC_{lt} + \alpha_l + \epsilon_{lt} \quad (5.6)$$

Where SW is the vector of Social Welfare, ρ is the parameter to capture the spatial spillover effect, W is the weight matrix, and independent variables which include ERH, ERE, ERTnC, ERS, ERAg, and EREC. The error term epsilon in the model explained the variation in the dependent variables other than the X vector.

The Spatial Durbin Model includes spatial autoregressive terms and the spatial lag of independent variables and $U \sim N(0, \sigma_{u_{lt}}^2 I)$. The term ΘWX is the spatial lag of regressors which is included in addition to the spatial lag of dependent variable ρWSW . The specific form of SDM is presented in equation (5.7). The model with a spatial lag of dependent and independent variables is estimated by employing the maximum likelihood estimation (MLE) technique.

$$SW_{lt} = \rho \sum_{l \neq j} \tilde{w}_{lj} SW_{jt} + x_{lt} \beta + \theta \sum_{l \neq j} \tilde{w}_{lj} x_{lt} + \alpha_l + \epsilon_{lt} \quad (5.7)$$

The spatial error model (SEM) is employed to capture the spatial dependence in the error term. The following model in equation (5.8) is utilized to regress the SEM for cross-section data.

$$SW_{lt} = \beta_1 ERH_{lt} + \beta_2 ERE_{lt} + \beta_3 ER TnC_{lt} + \beta_4 ERS_{lt} + \beta_5 ER Ag_{lt} + \beta_6 ER EC_{lt} + \alpha_l + \lambda \sum_{l \neq j} \tilde{w}_{lj} U_{lt} + \epsilon_{lt} \quad (5.8)$$

The MLE technique is utilized to estimate the SEM, it determines the values of the parameter's (beta, and lambda). The diagnostic tests for spatial patterns which include Moran's I, Lagrange Multiplier (LM) test, and Robust LM test are employed. The Akaike

Information Criteria and Bayesian Information criteria assist to select the parsimonious model for regression analysis.

5.12 Results and Discussion

The analysis of economic resources in health highlights the disparities in the provision of health services across different districts of Pakistan. The top districts in terms of the provision of health services are Quetta, Kohlu, Sibbi, Peshawar, Jhelum, Multan, Lahore, Loralai, Bahawalpur, Kharan, Chitral, and Abbottabad. On the other hand, Karachi, Kamber Shehdadkot, Killa Abdullah, Ghotki, Nasiraabad, Chaghi, Dadu, Jacobabad, Sherani, and Kashmore are among the districts that are lagging in terms of the provision of health services. Interestingly, the districts on top in 2014-15 and 2019-20 are the same, indicating a consistent pattern of service provision in these areas.

The analysis also shows that the number of services, such as hospitals and beds, is not significantly higher in the districts of Balochistan than in other top districts in Punjab. However, due to the lower population density in Balochistan, the per capita health services are relatively high in these districts. The results of the economic resources in health analysis align with the welfare and inequality results presented in chapter 3 of the thesis. The welfare results show that Balochistan has a lower welfare level compared to other provinces, indicating that the province faces significant challenges in terms of poverty and access to basic needs. However, the provision of health services in Balochistan is higher than expected, given the resource constraints and security risks in the province.

This suggests that targeted interventions in health and education can make a significant impact on improving welfare in Balochistan. On the other hand, the red areas in Punjab, which indicate a lower provision of services, are in line with the inequality results presented in Chapter 3, which highlight the disparities in service provision across different regions of the country. The high population density in Punjab exacerbates the

challenges of service provision, leading to a more significant burden on the limited resources available in these areas.

5.12.1 Analysis of Geographic Disparities of Economic Resources in Health (ERH)

Access to healthcare is a fundamental right of every citizen. The provision of healthcare services in a country is an important indicator of its economic development and social welfare. The Economic Resources in Health (ERH) analysis is an essential tool for evaluating the availability and accessibility of healthcare services in different districts of Pakistan. This paper presents an analysis of the ERH in Pakistan for the year 2019-20.

The ERH analysis shows that Sibi, Chitral, Lahore, Multan, Kharan, Harnai, Kohlu, Jhelum, Jhal Magsi, and Abbottabad are the top districts in the provision of health services. These districts have a higher number of health institutions, beds, doctors, and paramedical staff per population compared to other districts in Pakistan. This implies that these districts have better access to healthcare services and are likely to have a higher level of economic development and social welfare.

On the other hand, the ERH analysis shows that Larkana, Ghotki, Kohistan, Sanghar, Tando Muhammad Khan, Badin, Kashmore, Nasirabad, Sukkur, and Jamshoro are the most deprived districts in terms of health services. These districts have a lower number of health institutions, beds, doctors, and paramedical staff per population compared to other districts in Pakistan. The deprivation of healthcare services in these districts is an important aspect contributing to the deprivation of households in these districts. These districts also have a high poverty rate and low social welfare, which further exacerbates the problem.

The ERH analysis also shows that the highest ratio of total health to population is in Kohlu district, beds to thousand people is highest in Lahore district, Doctor to thousand

person ratio is highest in Hyderabad, and Paramedical staff to thousand people is highest in the district Multan. These ratios indicate the level of access to healthcare services in these districts and highlight the areas where more resources are required to improve the provision of healthcare services.

Finally, the ERH analysis highlights the issue of distance as a major obstacle to accessing healthcare services in some districts of Pakistan. The harsh terrain of Tharparkar, with no road network, is a major deterrent to the provision of healthcare services in this district. The Tharparkar health facilities are under dual management of the People's Primary Healthcare Initiative (PPHI) and the provincial health department, which further complicates the provision of healthcare services.

An analysis of economic resources in health (ERH) in Pakistan for the years 2014-15 and 2019-20 reveals certain trends and patterns in the provision of health services across different districts (see Figure 5.2). The top districts in the provision of health services remained consistent between 2014-15 and 2019-20. This indicates that these districts have maintained their high level of health services over the years. Despite having a lower number of hospitals and beds compared to other top districts in Punjab, Balochistan districts such as Quetta, Kohlu, and Sibbi have a lower population density, resulting in higher per capita health services in these districts.

On the other hand, Karachi district was found to be at the bottom in terms of the provision of health services, possibly due to the high population density and inadequate resources. Other districts that ranked low in both years included Kamber Shehdadkot, Killa Abdullah, Ghotki, Nasiraabad, Chaghi, Dadu, Jacobabad, Sherani, and Kashmore. Furthermore, districts such as Jacobabad, Peshawar, Quetta, Sibi, Lahore, Abbottabad, Jhal Magsi, Kharan, Bannu, and Chaghi were among the top ten districts in both 2012-13 and 2019-20, indicating that they have consistently maintained their high level of health services over the years.

Districts in southern Punjab, such as Muzaffargarh, Rajanpur, and Lodhra, as well as districts in central Punjab like Kasur, Narowal, Mandi Bahauddin, and Khanewal, and districts in KP such as Noshera, Buner, and Hangu were found to be deprived in terms of provision of health services compared to other districts. This suggests that there is a need for targeted efforts to improve health services in these districts.

5.12.2 Analysis of Geographic Disparities of Economic Resources in Education (ERE)

The ERE (Economic resources in education) results for 2019-20 show that there are districts in Balochistan and Punjab that have a better provision of education services in terms of institutes per population, enrolment per population, student-to-teacher ratio, and girls-to-boys ratio. In Balochistan, the Education Sector Plan (2013-18) aims to promote education and invest in human resource capital. However, there are still some districts in both provinces where living conditions are poor and lack the provision of resources for education. These districts include Killa Abdullah, Kohistan, Dera Bugti, Rajanpur, Tando Allahyar, Nasirabad, Shirani, Jamshoro, Hangu, Kalat in Balochistan, and Sindh, Multan, Muzaffargarh, Dera Ghazi Khan, Lodhran, and Lahore in Punjab. The results suggest that there is a need for targeted investment in these districts to improve the provision of education services and promote human resource development.

According to the data collected for the year 2014-15, the top ten districts with the best ERE scores were mostly located in Balochistan. However, in 2019-20, the ERE scores of two-thirds of Balochistan districts fell with respect to the increase in population. The situation in Khyber Pakhtunkhwa (KP) was also alarming, as one-fifth of the districts witnessed a decline in the ERE scores. Two-thirds of the districts in Sindh also recorded a decrease in their ERE scores. Punjab, on the other hand, witnessed improvement in almost all districts, except for two.

The districts that scored poorly in terms of ERE were identified as the bottom districts. These included Killa Abdullah, Hangu, Chaghi, Rajanpur, Jaffarabad, Ghotki, Nasirabad, Muzaffargarh, Peshawar, and Multan. The reasons for their poor performance varied across provinces. In Punjab, districts with high population density such as Lodhran, Lahore, Rahimyar Khan, Rajanpur, Chiniot, Bahawalpur, and Pakpattan lacked the provision of services. In Sindh, districts such as Ghotki, Jamshoro, Sujawal, Shikarpur, and Tando Allahyar faced a shortage of human resources, leading to a high student-to-teacher ratio. In KP, districts such as Hangu, Peshawar, Shangla, Torghar, Charsadda, and Buner had fewer schools to cater to the population, leading to a lack of provision of educational services. In Balochistan, districts such as Killa Abdullah, Chaghi, Jaffarabad, Nasirabad, and Sherani faced a shortage of infrastructure, resulting in low enrolment rates and a low gender parity ratio. Figure 5.3 shows the spatial disparities in the provision of resources in the education sector.

The poor performance of these districts in terms of ERE scores reflect the need for increased investment in the education sector in these regions. The government needs to prioritize the allocation of resources to these districts to ensure the provision of quality education services to their citizens. This can be done by establishing new schools, increasing the number of teachers, and improving the infrastructure of existing educational institutes. Additionally, the government needs to focus on improving the living conditions in these regions to provide a conducive environment for learning. By investing in the education sector, the government can play a crucial role in promoting human capital development and ensuring the country's long-term economic growth.

Access to quality education is a fundamental right for every citizen, and it plays a vital role in shaping the future of any society. Despite the government's efforts to improve the education system in Pakistan, there are still some districts that lack adequate resources for education. In this regard, the present study aims to identify the districts where the

provision of education resources is deficient in two of Pakistan's provinces, namely Balochistan and Punjab.

In the province of Balochistan, the availability of resources for education is not evenly distributed across all districts. While the province as a whole has some resources in education, there are still some districts where living conditions are poor, and the provision of education resources is inadequate. The districts that have been identified as having a lack of education resources are Killa Abdullah, Kohistan, Dera Bugti, Rajanpur, Tando Allahyar, Nasirabad, Shirani, Jamshoro, Hangu, and Kalat. These districts suffer from a shortage of schools, a lack of trained teachers, and inadequate facilities.

In Punjab, although the province has a better overall education system than Balochistan, there are still some districts that lack adequate educational resources. Multan, Muzaffargarh, Dera Ghazi Khan, Lodhran, and Lahore are identified as the bottom districts where the resources for education are less according to the population. These districts suffer from a shortage of schools, inadequate infrastructure, and a lack of trained teachers.

It is worth noting that the availability of educational resources is a crucial factor in ensuring quality education. The lack of resources can lead to poor quality education, low enrolment rates, and ultimately, an uneducated population. Therefore, it is necessary for the government to focus on improving the education system and ensure that resources are evenly distributed across all districts, especially in the bottom districts identified in this study.

The provision of education services is a crucial aspect of any society's development, and it is essential to ensure that all districts within a country have access to quality education resources. A recent study conducted in Pakistan sheds light on the current state of education services in the country's various districts. The study found that the top ten

districts with the best provision of education resources are mostly located in Balochistan, with only one district from Khyber Pakhtunkhwa (KP) and one district from Chitral. However, in 2019-20, the ranks of several of these districts deteriorated, with five districts from Balochistan and two from KP showing a fall in their education resource scores.

Additionally, 20 out of the 30 districts in Balochistan witnessed a decrease in education resource scores with respect to the increase in population. On the other hand, Punjab and Sindh provinces showed overall improvements in their districts' education resource scores, except for two districts from Punjab and 15 districts from Sindh that showed a decrease in their scores in 2019-20. The study also found that several of the bottom-ranked districts, including Killa Abdullah, Hangu, Chaghi, Rajanpur, and Jaffarabad, have persistently low education resource scores.

Furthermore, the study also analyzed the provincial breakdown of the districts with the least provision of education services. In Punjab, districts such as Lodhran, Lahore, and Rahimyar Khan lacked sufficient educational resources due to high population density. In Sindh, districts such as Rajanpur, Ghotki, and Shikarpur were found to be deprived of education services, with a high student-teacher ratio and a lack of human resources. In KP, districts such as Hangu, Peshawar, and Shangla showed low provision of education services, with a low number of schools compared to the population and a high student-teacher ratio. Finally, in Balochistan, districts such as Killa Abdullah, Chaghi, and Nasirabad had a lack of infrastructure for education services, low enrollment rates, and high gender disparity.

If 2019-20 is compared with the previous rounds from 2008-09 to 2014-15 for a detailed analysis to review the changes over time in the education sector in Pakistan to highlight the state of provision of education resources in different districts of the country. The study focused on various indicators such as the number of schools, enrolment rates,

student-teacher ratios, and gender parity to analyze the status of education in different districts.

The study identified that there were significant regional disparities in the provision of resources in education across the country. The districts in Balochistan, such as Barkhan, Sibi, Noshki, Kalat, Awaran, Kech, Mastung, Kohlu, and Chitral, ranked at the top in 2014-15. However, in 2019-20, the ranks of Kalat, Kech, Mastung, Loralai, and Killa Saifullah deteriorated, indicating a decline in the provision of educational resources. Similarly, two-thirds of the districts in Balochistan witnessed a fall in the provision of education resources in 2019-20 compared to 2014-15.

The study also highlighted the districts that performed poorly in terms of educational resources. The districts of Killa Abdullah, Hangu, Chaghi, Rajanpur, Jaffarabad, Ghotki, Nasirabad, Muzaffargarh, Peshawar, and Multan were identified as the bottom districts. It was observed that the provision of education resources was lacking in these districts, as reflected in their low ranks in terms of social welfare indices. Provincially, the districts of Lodhran, Lahore, Rahimyar Khan, Chiniot, Bahawalpur, and Pakpattan in Punjab, Rajanpur, Ghotki, Jamshoro, Sujawal, Shikarpur, and Tando Allahyar in Sindh, Hangu, Peshawar, Shangla, Torghar, Charsadda, and Buner in KP, and Killa Abdullah, Chaghi, Jaffarabad, Nasirabad, and Sherani in Balochistan were identified as deprived in the provision of education resources. The study found that in these districts, the number of schools was less than required, and the student-teacher ratio was high, reflecting a scarcity of human resources.

The study also identified districts that showed improvement in the provision of education resources. The districts of Jacobabad, Sibi, Karachi, Barkhan, Hyderabad, Rawalpindi, Musakhel, Chakwal, and Kalat were identified as having better provision of resources in education. Furthermore, districts such as Upper Dir, Dera Bugti, Shaheed Benazirabad,

Dadu, Badin, Kohistan, Lakki Marwat, Zhob, Sukkar, Quetta, Pishin, and Naushero Feroz improved from the lowest level of resources towards a medium level.

5.12.3 Analysis of Geographic Disparities of Economic Resources in Transport and Communication (ERTnC)

Punjab has the highest number of districts in the top 50 with Lahore being the top district followed by Gujrat, Gujranwala, Sargodha, Multan, Rawalpindi, and Nankana Sahib. Karachi and Hyderabad, both in Sindh, are ranked 15th and 17th respectively. None of the districts from KP are in the top 50, while Quetta is the only district from Balochistan to make it to the list at number 37.

Within Punjab, several districts such as Rajanpur, Muzaffargarh, Bahawalpur, Bahawalnagar, Rahimyar Khan, and Narowal are lacking in economic resources related to transport and communication. All districts of Balochistan are at the bottom of the list, indicating a lack of economic resources in transport and communication, such as fewer motor vehicles and phone connections, and less road length to area. However, data for some districts in Balochistan is not available in PSLM. The provision of resources across districts of Pakistan is also presented in Figure 5.5 where it may be compared easily that districts in Balochistan are deprived of transport and communication resources.

Similarly, districts of KP, including Karak, Tank, Chitral, Upper Dir, Kohistan, Swat, Dera Ismail Khan, Buner, Lakki Marwat, and Shangla are also lacking in economic resources related to transport and communication. Additionally, districts such as Suggawal, Ghotki, Sanghar, Khairpur, Jacobabad, Jamshoro, and Tando Muhammad Khan, which are outside the top 50 districts, are also deprived in terms of road length and number of motor vehicles.

Although the score of several districts has improved in 2019-20 compared to 2014-15, disparities remain significant, and the districts that were at the bottom of the list have

remained so according to their score. The improvement in scores is mainly due to an increase in per capita phone connections and motor vehicles. However, these districts still have lower economic resources related to transport and communication compared to other districts.

The detailed security condition analysis is done in Chapter 4. However, figure 5.5 depicts the disparities in the provision of resources for security. Few districts where security measures are taken more than other districts but still are the target of terrorists therefore, security conditions are not stable i.e., Islamabad, Karachi, Lahore, Quetta, and Peshawar. Another aspect is that the deployment of security resources and measures are taken more in these districts due to the presence of security challenges. The overview of the security resources is displayed spatially in Figure 5.4.

5.12.4 Analysis of Geographic Disparities of Economic Resources in Agriculture (ERAg)

The distribution of economic resources across districts in Pakistan exhibits significant disparities, with the top-ranking districts primarily located in the province of Punjab. Specifically, the districts of Sialkot, Gujranwala, Narowal, Mandi Bahauddin, Pakpattan, Toba Tek Singh, Gujrat, Okara, Shiekhupura, Sajawal, Kasur, Hafizabad, Nankana Sahib, and Layyah are the richest in resources related to agriculture, which is the primary economic sector in the country. In contrast, the districts of Rajanpur, Muzaffargarh, Bahawalpur, Bahawalnagar, Rahimyar Khan, and Narowal are relatively deprived in this dimension (see Figure 5.5).

The situation is similar for the Transport and Communication (TnC) sector, where the top-ranking districts are again located in Punjab, while the districts of Balochistan and KP face significant deficits. Within Punjab, the districts of Rajanpur, Muzaffargarh, Bahawalpur, Bahawalnagar, Rahimyar Khan, and Narowal are lacking in TnC economic resources, while in Balochistan, all districts are deprived of resources related to TnC.

Regarding the agriculture sector, districts in Balochistan exhibit the lowest level of economic resources across all indicators. Additionally, districts in KP and Sindh show better resources in forest and cultivable land than in machinery. However, the condition of Sindh districts regarding the resources of machinery is more vulnerable than others. The situation is similar for TnC resources, where the districts of KP and Sindh face significant deficits, with the districts of Karak, Tank, Chitral, Upper Dir, Kohistan, Swat, Dera Ismail Khan, Buner, Lakki Marwat, and Shangla being the most deprived.

Furthermore, the bottom districts, including Kamber Shehdadkot, Jacobabad, Washuk, Tando Muhammad Khan, Musakhel, Tando Allahyar, Panjgur, Gwadar, Khuzdar, and Tharparker, are extremely deprived in various dimensions, including agriculture, TnC, and other indicators.

5.12.5 Analysis of Economic Resources in Energy Consumption (EREC)

Energy plays a crucial role in providing essential services and improving the quality of life for individuals and communities. It is a fundamental requirement for lighting, heating, cooking, and accessing clean water. In particular, reliable electricity sources have a significant impact on various sectors such as education, healthcare, and community centers, enabling better access to these services. This ultimately enhances the overall well-being and quality of life for individuals.

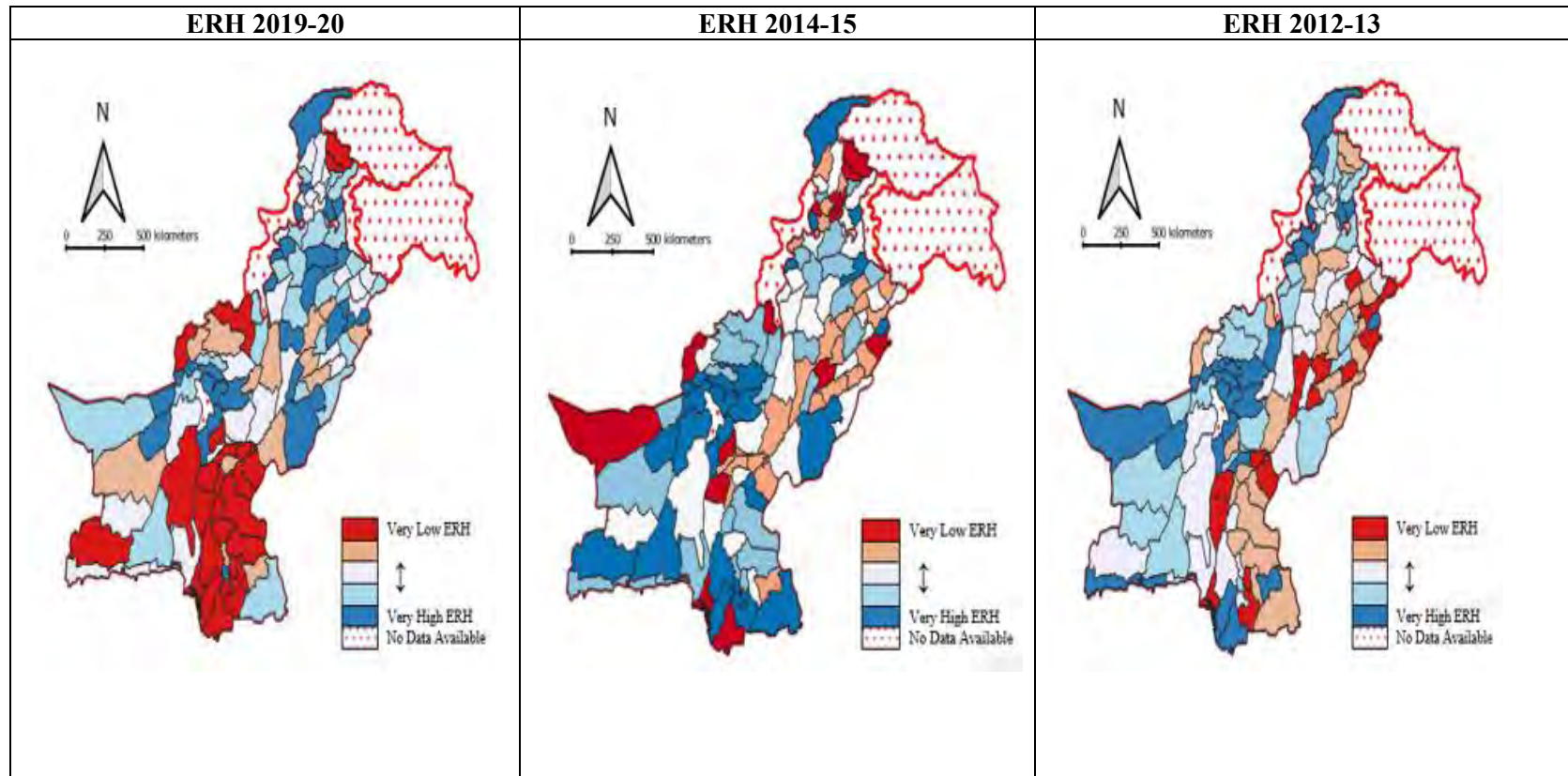
Access to energy resources, especially electricity, has transformative effects, particularly in rural and marginalized areas. It empowers individuals and communities by creating opportunities for entrepreneurship, facilitating communication through electrification and modern technologies, and promoting social connectivity. Energy access can also bridge the digital divide by providing opportunities for education, skill development, and information sharing, leading to greater social inclusion and empowerment. Examining the distribution of energy resources across districts, Figure 5.7 reveals significant disparities

in access. In Balochistan, districts such as Awaran, Barkhan, Chaghi, Dera Bugti, Gawadar, and Jhal Magsi, along with many others, face acute deprivation in energy access compared to other districts. Similarly, certain districts in Sindh, including Therparker and Thatta, also experience limited access to energy resources. In Khyber Pakhtunkhwa (KP), districts such as Upper Dir, Karak, Lower Kohistan, Upper Kohistan, and Tank struggle with household deprivation in accessing energy resources.

These disparities in energy access highlight the need for targeted interventions and policies to address the specific challenges faced by these districts. Improving energy infrastructure, expanding electricity connections, and promoting renewable energy sources can help alleviate the deprivation experienced by households in these areas. By prioritizing and addressing the energy needs of marginalized districts, policymakers can contribute to reducing disparities and promoting more equitable access to energy resources.

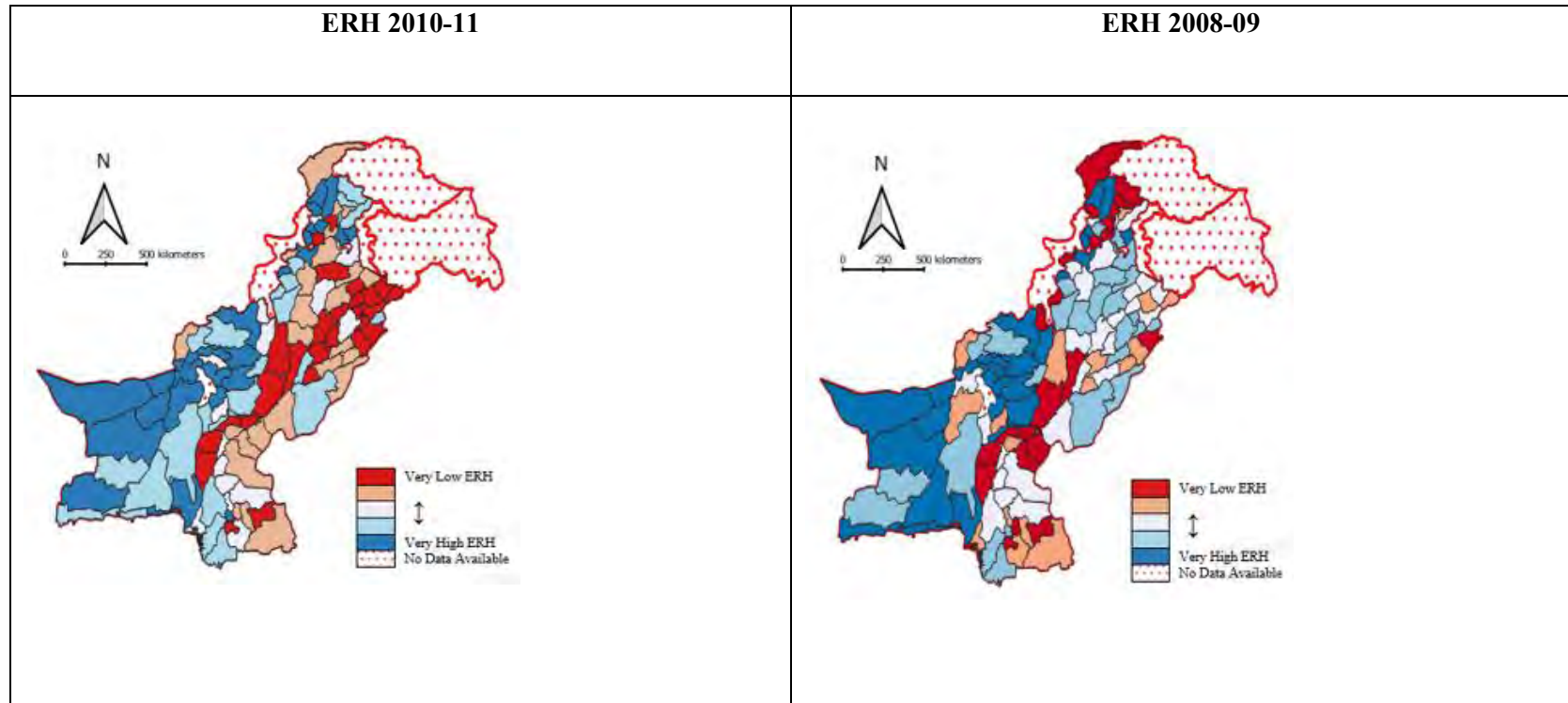
Ensuring reliable energy access is crucial for enhancing the overall well-being and empowerment of individuals and communities. By bridging the gap in energy access, particularly in disadvantaged districts, policymakers can unlock opportunities for economic development, education, healthcare, and social connectivity. It is essential to prioritize and invest in energy infrastructure to create a more inclusive and sustainable future for all individuals, regardless of their geographical location.

Figure 5.2: Overview of Economic Resources in Health



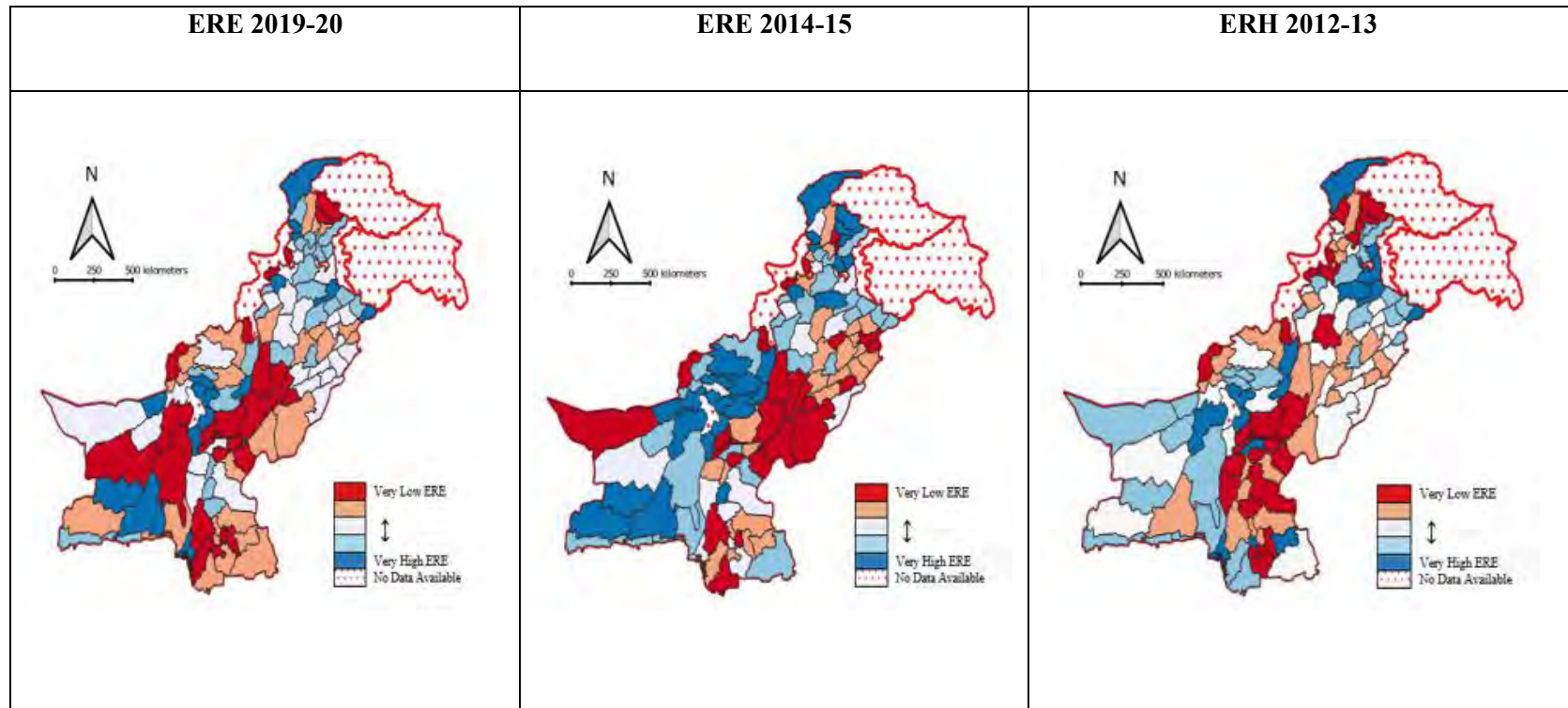
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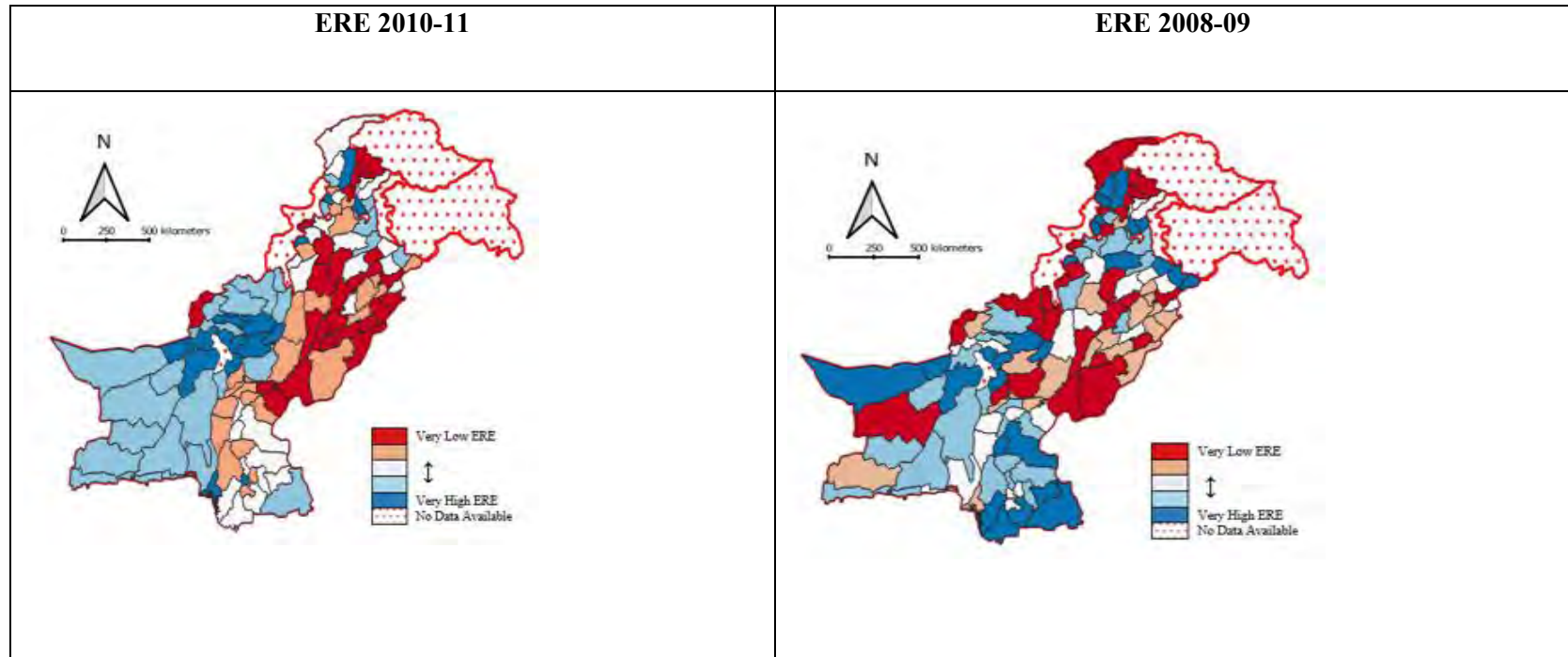
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Figure 5.3: Overview of Economic Resources in Education



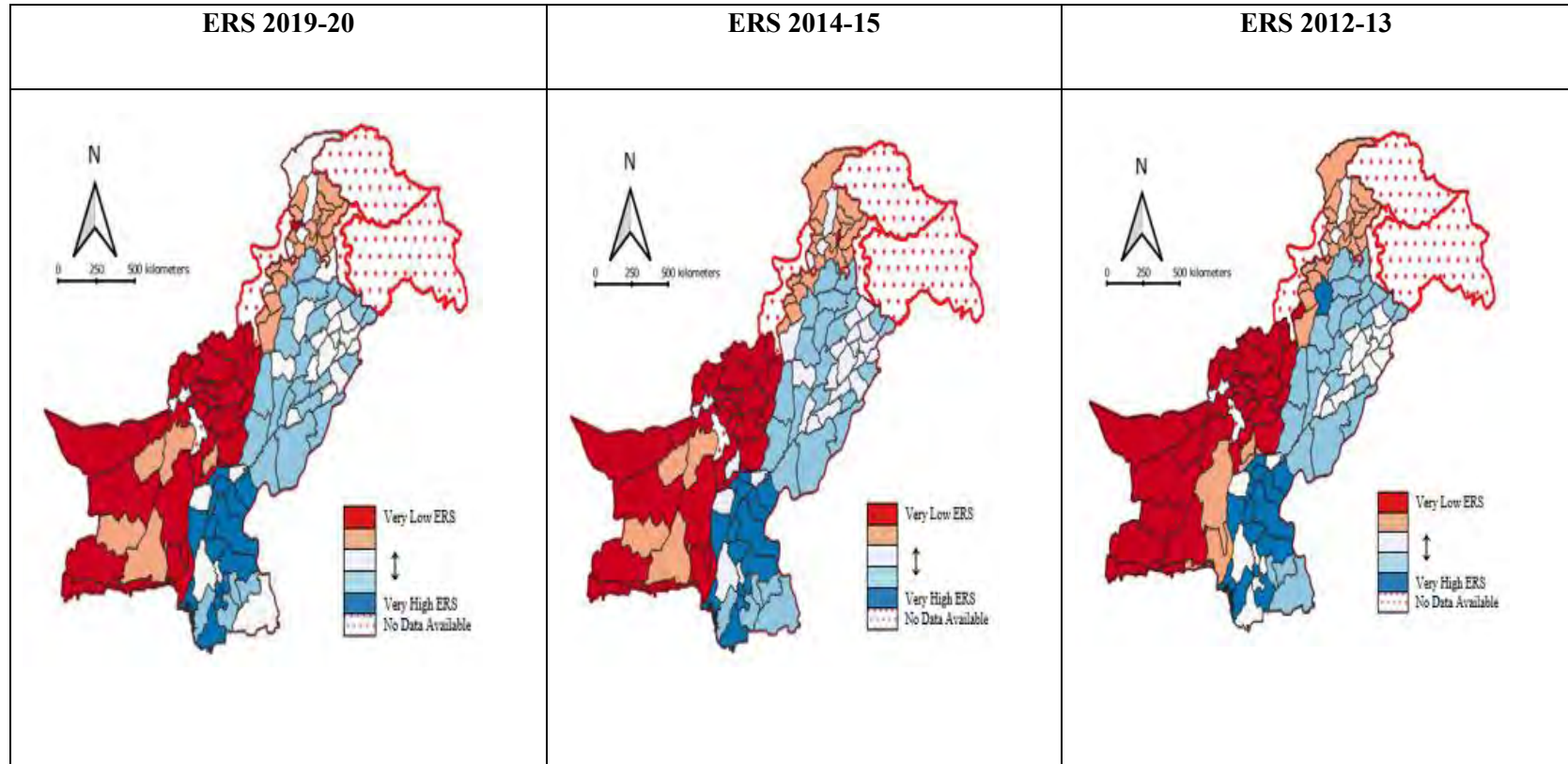
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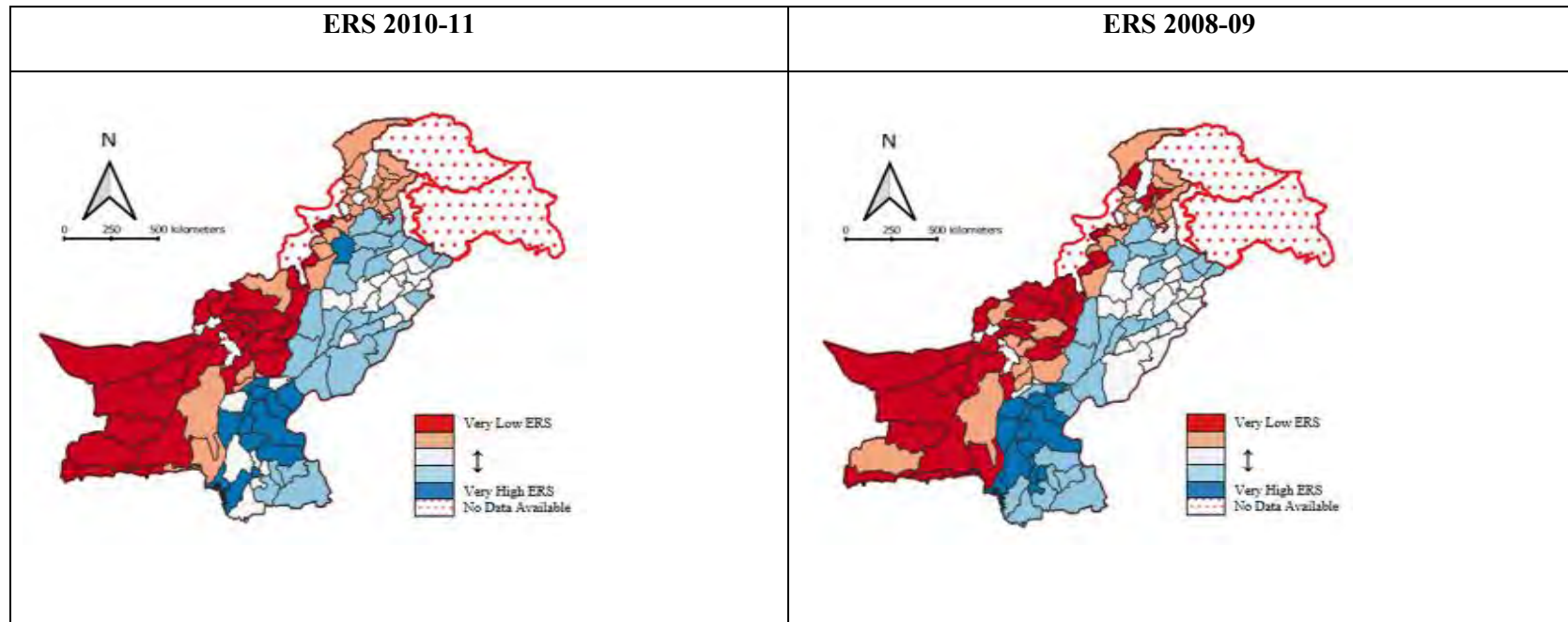
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Figure 5.4: Overview of Economic Resources in Security



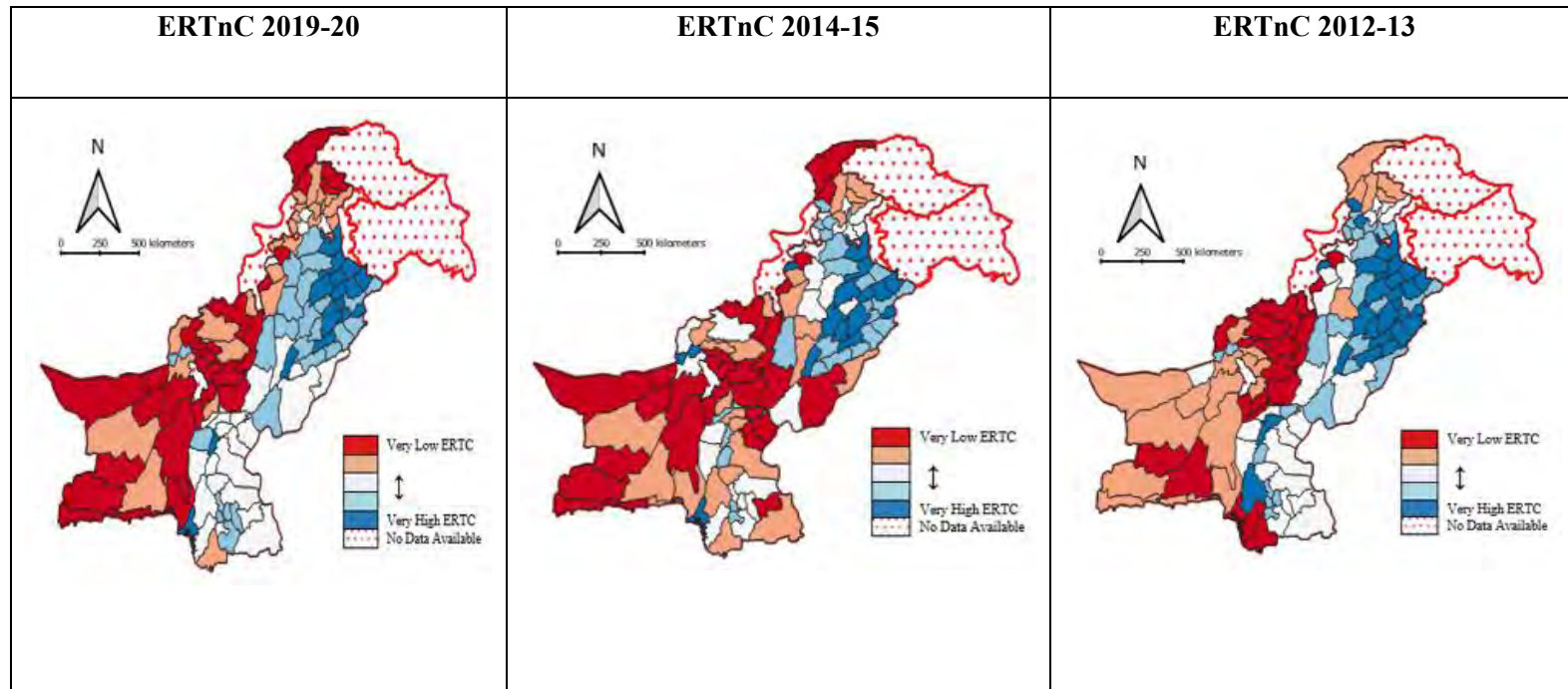
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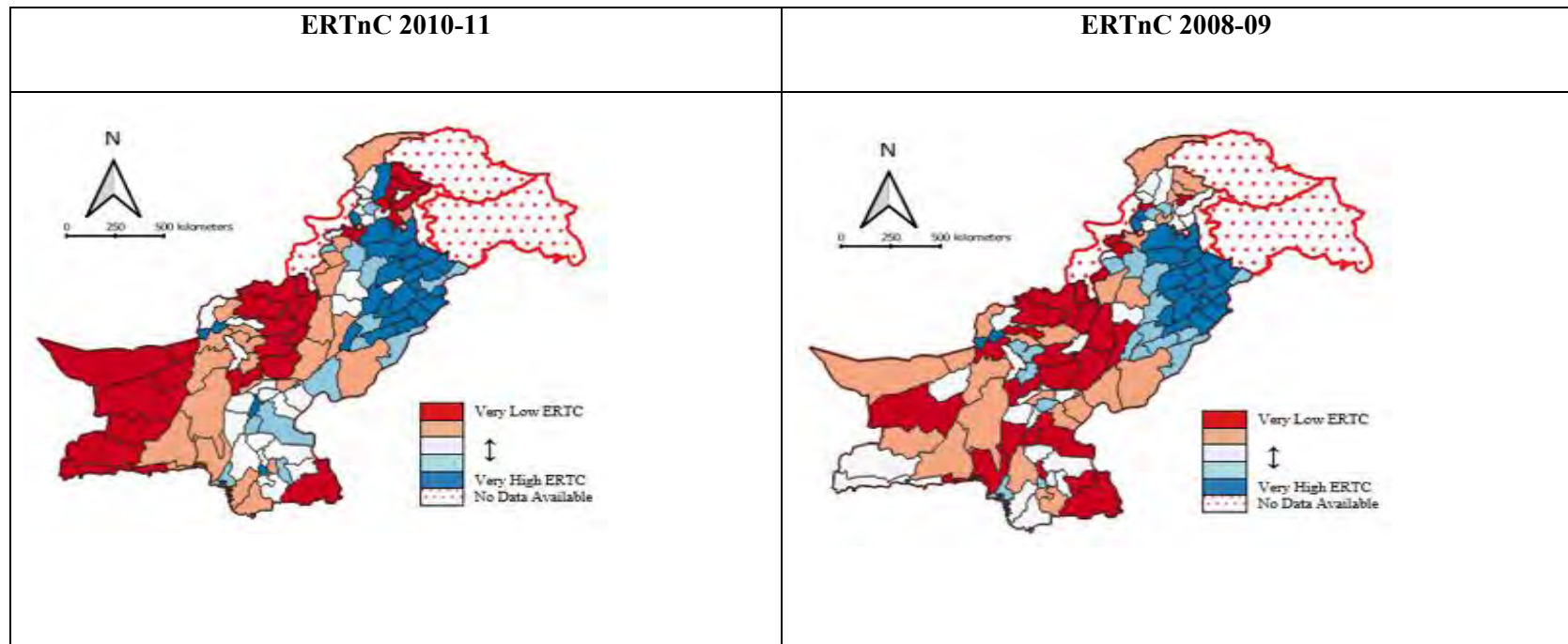
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Figure 5.5: Overview of Economic Resources in Transport and Communication



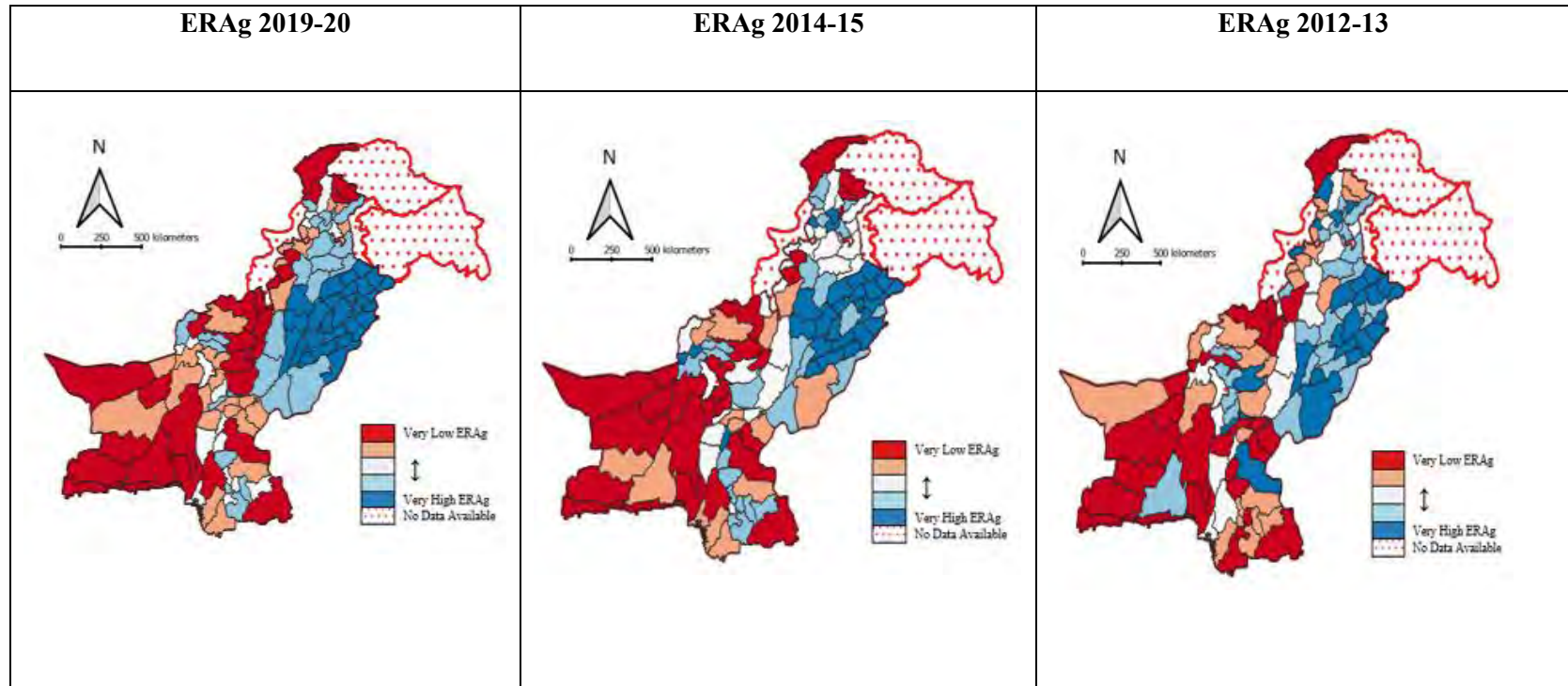
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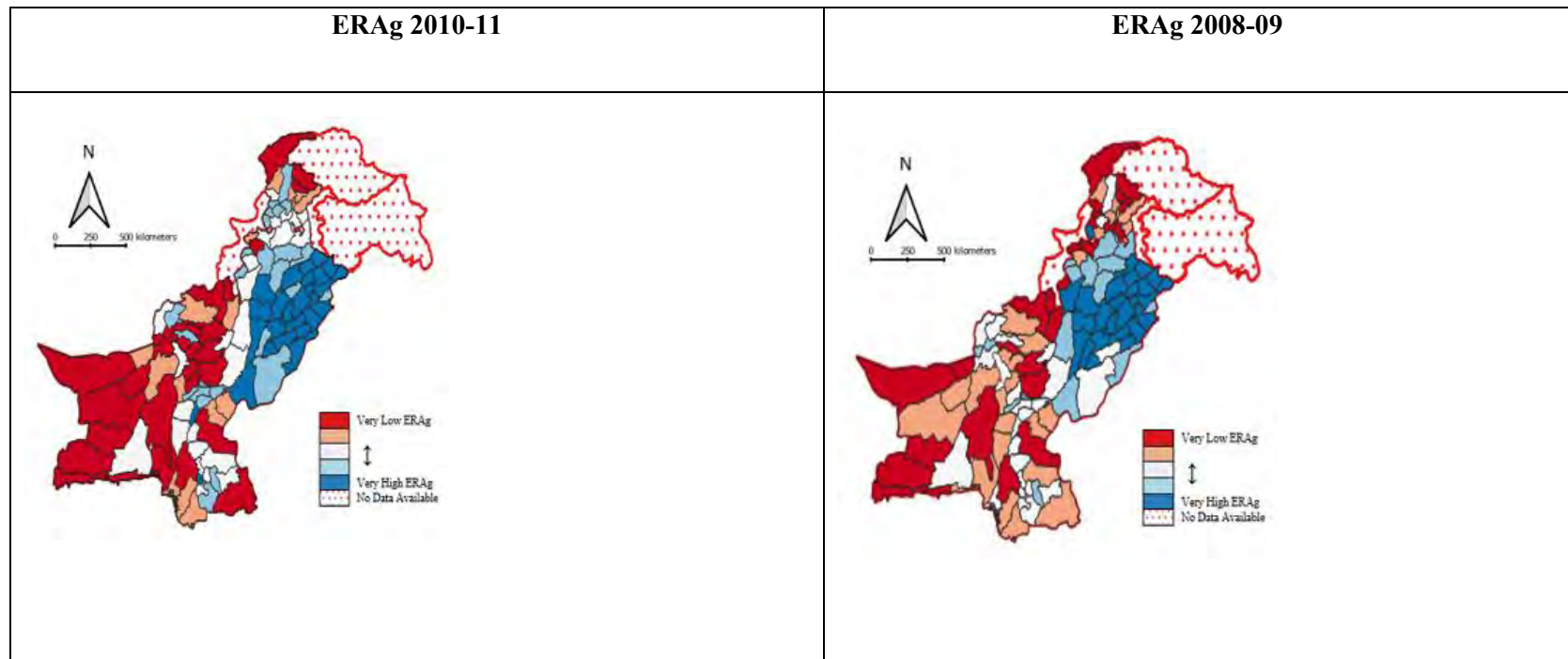
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Figure 5.6: Overview of Economic Resources in Agriculture



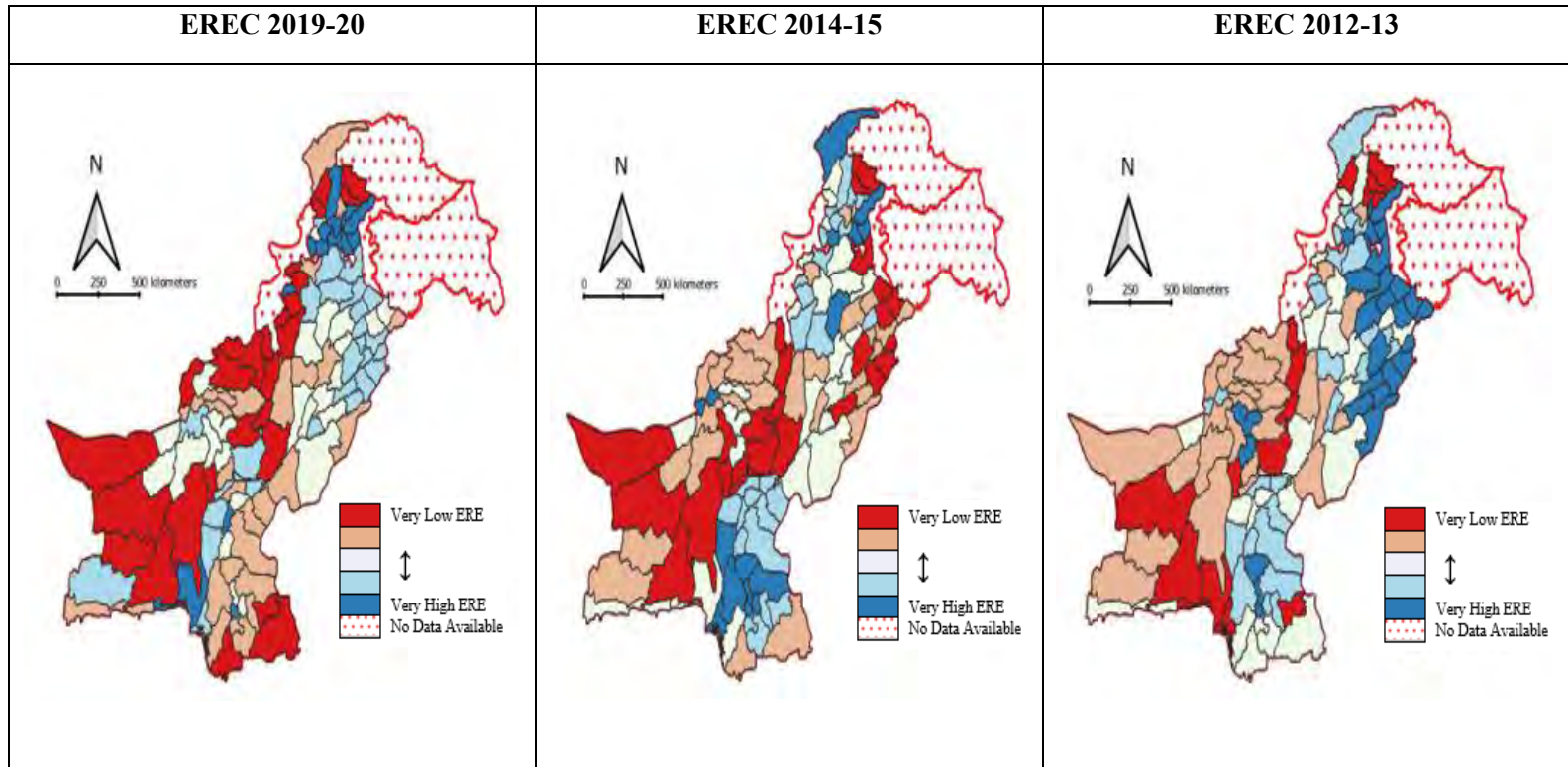
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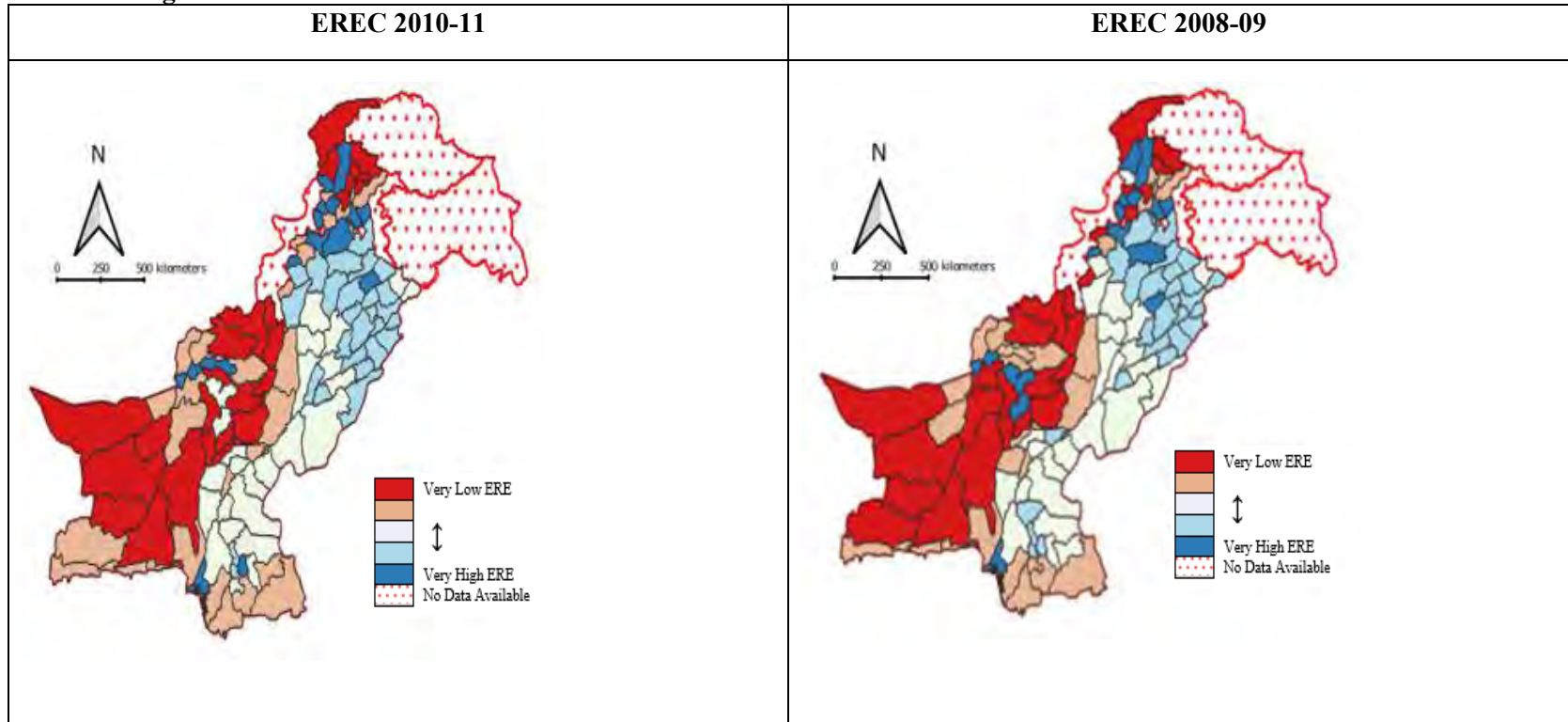
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Figure 5.7: Overview of Economic Resources in Energy



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Continue Figure 5.7



Source: Author's work

5.13 Cross-Sectional Spatial Regression Analysis of Social Welfare

The analysis conducted for the year 2019-20 indicates a spatial relationship among the variables under investigation. The statistical measure known as the global Moran's I demonstrate the presence of spatial autocorrelation in the analyzed variable. This finding suggests that neighboring locations tend to exhibit similar values, indicating the existence of spatial patterns or clustering. The positive value of the statistic signifies that there is a clustering of similar values within the dataset. Specifically, high values cluster with other high values, while low values cluster with other low values. Furthermore, the significance of Moran's I for spatial error, the Robust LM statistic for spatial error, and the spatial lag confirm the presence of spatial patterns in the errors associated with predicting social welfare (SW¹).

The results obtained from the cross-sectional analysis, employing Ordinary Least Squares (OLS), Spatial Lag Model (SLM), Spatial Error Model (SEM), and Spatial Durbin Model (SDM), are presented in the table. Based on the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), the SLM emerges as the most suitable model among the three, indicating its superiority in explaining the relationships between the variables and capturing the spatial dynamics inherent in the data.

The findings reveal that the parameters related to ER Health (ERH), ER in Transport and Communication (ERTnC), and ER in Agriculture (ERAg) have a significant positive impact on social welfare (SW¹) in the districts of Pakistan. Specifically, a one percentage point change in ERH leads to a 53% change in SW¹, while a one percent change in ERTnC, ERAg, and ERS results in 63%, 67%, and 32% changes in social welfare, respectively while keeping other variables constant. On the other hand, the parameter of ER Security (ERS) has a significantly negative effect on SW¹, indicating that districts with higher SW¹ scores are often targeted by terrorists and thus have lower ERS scores.

Among the dimensions analyzed, ERTnC has the most substantial and significant effect on SW¹, followed by ERH and ERAg. This implies that increasing investments in transport and communication, education, and agricultural development have a

greater positive impact on the social welfare of individuals in the districts of Pakistan compared to other dimensions. These findings highlight the importance of enhancing economic resources in these sectors to promote social well-being, economic growth, human capital development, and food security. Policymakers can utilize these insights to prioritize and allocate resources effectively, addressing the key determinants of social welfare and fostering overall development in the districts.

The estimation results from the Spatial lag model (SLM) and Spatial Durbin Model (SDM) reveal significant positive indirect effects of ERH, ERTnC, and ERAg on the social welfare (SW^1) of neighboring districts. This implies that improvements in these dimensions in one district have a positive impact on the social welfare of nearby districts. For example, a 1% point change in ERH in district l leads to a 28% change in the social welfare of its neighboring district (j th district). Similarly, ERTnC has a significant positive effect of 31% on the social welfare of neighboring districts, while ERAg has a 20% effect. These findings highlight the interconnectedness of social welfare outcomes across districts and the influence of neighboring regions on each other's well-being.

Moving on to the year 2014-15, the analysis reveals a significant positive value for the Global Moran's I, and R-LM for spatial errors indicating the presence of spatial autocorrelation in the data. This spatial pattern suggests that neighboring districts tend to exhibit similar social welfare outcomes. Additionally, while the R-LM test for endogeneity is insignificant, implying the absence of endogeneity in the model, the comparison of AIC and BIC favors the adoption of the SDM for analyzing spatial patterns in the cross-sectional data. This choice allows for a more comprehensive understanding of the spatial dynamics influencing social welfare.

The subsequent analysis focuses on the year 2014-15, examining the effects of various dimensions on social welfare (SW^1). The results indicate that ERH, ERE, ERTnC, and EREC have significant positive effects on social welfare during this period. However, the spatial lag parameter rho value is significant, but the individual dimensions are not affecting significantly its neighbor district in the year 2014-15. Notably, a 1%-point change in ERE, ERTnC and EREC in a district leads to a 13%,

19%, and 9% change, respectively, in the social welfare of its neighboring district. Although other variables, except for ERS, have a negative effect on the social welfare of neighboring districts, these effects are not statistically significant. These findings underscore the importance of considering spatial relationships and the potential ripple effects of improvements in certain dimensions on the well-being of neighboring districts.

The study examines the impact of various dimensions of resource allocation on social welfare indexes (SW^1 , SW^2 , and SW^3) in the districts of Pakistan. In terms of SW^2 , which includes AINC, Gini coefficient, and MPI, a 1%-point increase in ERH, ERE, ERTnC, and EREC leads to significant changes of 42%, 60%, 88%, and 44%, respectively. However, the parameters of ERAg and ERS are found to be insignificant, indicating that these dimensions do not have a significant effect on SW^2 . Furthermore, the indirect effects of the Spatial lag model (SLM) reveal that none of the dimensions significantly influence the SW^2 of neighboring districts. On the other hand, the analysis of SW^3 , another social welfare index, demonstrates that changes in ERH, ERE, ERTnC, and EREC have a significant positive impact on SW^3 . Spatial patterns in ERTnC and EREC further highlight that a 1%-point change in these dimensions in one district leads to positive changes of 28% and 14%, respectively, in the social welfare of its neighboring district.

Examining the results from the year 2008-09, the spatial cross-sectional data analysis confirms the presence of spatial patterns and clustering in variables to determine all three social welfare indexes. The Global Moran's I test indicates a positive spatial correlation among the variables. Additionally, the significance of Moran's I for error, LM, and R-LM tests in the spatial lag model supports the existence of spatial effects and autocorrelation. Based on the criteria of AIC, the SLM is deemed the most relevant model for this analysis.

Analyzing the resource allocation in the dimensions across districts, it is found that ERH and ERTnC have a significant positive effect on social welfare (SW^1). Conversely, ERE, ERS, and EREC also have a significant effect, but they negatively impact SW^1 . Moreover, the indirect effects reveal that changes in ERH and ERTnC in a district positively affect the social welfare of its neighboring district, leading to

spillover benefits. However, changes in ERE, ERS, and EREC in a district result in significant negative effects on the social welfare of nearby districts. Similar patterns are observed for SW^2 and SW^3 , as indicated in the table. Overall, these findings emphasize the spatial nature of resource allocation and its impact on social welfare in the districts of Pakistan. The study highlights the dimensions that have a significant positive influence on social welfare, along with the potential spillover effects on neighboring districts. These insights can inform policymakers in effectively allocating resources and promoting social welfare in the country.

Table 5.2: OLS estimates and Spatial Models-Maximum Likelihood Estimation Results (2019-20)

SW ¹	OLS regression	Spatial lag model		Spatial Error Model		Spatial Durbin Model
		Distance matrix	Contiguity matrix	Distance matrix	Contiguity matrix	Contiguity matrix
ER Health	0.53**	0.51***	0.57**	0.54***	0.54**	0.56**
EREducation	0.35	0.27	0.31	0.24	0.23	0.23***
ERTnC	0.63***	0.50***	0.61***	0.54***	0.67***	0.66***
ERSecurity	-0.32**	-0.13	-0.21	-0.87	-0.08	0.02
ERAgriculture	0.67***	0.30*	-0.41***	0.39*	-0.38*	0.31
EREnergy	-0.12	-0.15	-0.08***	-0.16	-0.11	-0.11
Constant	-4.6	31.74	-17.28	-3.21	-11.77	29.45
Lambda				0.93***	0.41***	
Rho		0.93***	0.35***			-0.01
Goodness of Fit						
AIC	968.83	939.87	960.13	953.06	967.03	948.47
BIC	987.86	964.34	984.59	977.52	991.50	989.24
Observations	112	112	112	112	112	112
Wald Test		204.14***	14.46***	180.36***	8.83***	43.05***
LR Test		32.96***	14.08**	19.77***	5.80*	
LM Test		64.06***	13.26***	29.00***	2.68	

Table 5.3: OLS estimates and Spatial Models-Maximum Likelihood Estimation Results (2014-15)

SW ¹	OLS regression	Spatial lag model		Spatial Error Model		Spatial Durbin Model
		Distance matrix	Contiguity matrix	Distance matrix	Contiguity matrix	Contiguity matrix
ER Health	0.45**	0.44**	0.43**	0.42***	0.45**	0.41**
EREducation	0.58***	0.54***	0.59*	0.54***	0.56***	0.62***
ERTnC	0.89***	0.77***	0.90***	0.78***	0.87***	0.86***
ERSecurity	-0.14	-0.07	0.12	-0.06	-0.13	-0.12
ERAgiculture	-0.01	-0.17	0.07	-0.12	-0.06	-0.04
EREnergy	0.45***	0.51***	0.44*	0.49***	0.43*	0.45*
Constant	-9.2	38.77***	16.38	-6.37	-7.98	-19.89
Lambda				0.77***	0.12	-0.12
Rho		0.80***	0.18			0.25
Goodness of Fit						
AIC	942.07	936.04	943.84	941.28	945.47	945.55
BIC	961.1	960.51	968.31	965.74	969.94	972.73
Observations	112	112	112	112	112	112
Regression Diagnostics						
Wald Test		21.68***	2.31	13.53***	0.62	2.71
LR Test		10.04**	2.23	4.80 **	0.6	
LM Test		16.32***	2.05	4.42**	0.45	

Continue Table 5.3 ...

SW²	OLS regression	Spatial lag model (distance matrix)		Spatial Error Model		Spatial Durbin Model
		Distance matrix	Contiguity matrix	Distance matrix	Contiguity matrix	Contiguity matrix
ER Health	0.48***	0.49**	0.43***	0.48***	0.48*	0.39**
EREducation	0.46**	0.42**	0.51***	0.41**	0.45**	0.55*
ERTnC	1.04***	0.88***	1.01***	0.88***	1.02***	0.99***
ERSecurity	0.01	0.05	-0.02	0.10	-0.004	-0.03
ERAgiculture	0.09	0.13	0.02	-0.08	0.03	0.05
EREnergy	0.58***	0.68***	0.61***	0.67***	0.59	0.62***
Constant	30.30***	51.63***	-35.77***	28.43*	-28.78	0.32**
Lambda				0.89***	0.16	0.20
Rho		0.88***	0.22**			
Goodness of Fit						
AIC	918.94	909.47	918.55	910.15	921	919.66
BIC	937.97	933.93	943.02	934.61	946.33	946.85
Observations	112	112	112	112	112	112
Regression Diagnostics						
Wald Test		70.39***	4.62***	69.27***	1.12	6.12**
LR Test		21.38***	4.39***	12.79***	1.07	
LM Test		40.33***	4.46***	16.82***	0.83	

Table 5.4: OLS estimates and Spatial Models-Maximum Likelihood Estimation Results (2008-09)

SW ¹	OLS regression	Spatial lag model		Spatial Error Model		Spatial Durbin Model
		Distance matrix	Contiguity matrix	Distance matrix	Contiguity matrix	Contiguity matrix
ER Health	0.79***	0.75***	0.74***	0.76***	0.71***	0.70***
EREducation	-0.67*	0.58***	-0.52**	0.62***	-0.42*	-0.64**
ERTnC	0.81**	0.71***	0.81***	0.73**	0.80***	0.74***
ERSecurity	-0.18***	0.13**	-0.13**	0.15**	-0.12*	-0.12*
ERAgiculture	0.27	-0.17	0.23	0.22	0.31*	0.14
EREnergy	-0.26***	0.24	0.24	0.24	-0.26	-0.20
Constant	35.16	-7.44	18.06*	35.61***	26.32***	16.77
Lambda				0.5***	0.31***	16.77
Rho			0.29***			0.40*
Goodness of Fit						
AIC	948.96	946.93	945.62	951.77	910.93	945.47
BIC	967.99	971.4	970.08	976.24	935.4	973.06
Observations	112	112	112	112	112	112
Regression Diagnostics						
Wald Test		9.39 (0.002)	7.95 (0.005)	1.98 (0.159)	4.81 (0.028)	12.96 (0.001)
LR Test		6.035 (0.014)	7.35 (0.007)	1.194 (0.275)	3.85 (0.05)	
LM Test		8.029 (0.005)	7.60 (0.006)	0.76 (0.384)	2.33 (0.127)	

Continue Table 5.4 ...

SW ²	OLS regression	Spatial lag model		Spatial Error Model		Spatial Durbin Model
		Distance matrix	Contiguity matrix	Distance matrix	Contiguity matrix	Contiguity matrix
ER Health	0.33**	0.34***	0.34***	0.32**	0.31**	0.33**
EREducation	-0.52***	0.47**	-0.47**	-0.51***	-0.43**	-0.46**
ERTnC	0.95***	0.88***	0.95***	0.91***	0.95***	0.95***
ERSecurity	-0.10*	0.08	-0.09*	-0.10*	-0.09*	-0.09
ERAgiculture	0.28**	0.2	0.26**	0.26*	0.30**	0.26*
EREnergy	-0.11	0.12	-0.12	0.1	-0.12	-0.12
Constant	14.12*	0.03	9.30	14.95***	11.23	9.33
Lambda				0.32	0.15 (0.263)	0.03 (0.916)
Rho		0.53***	0.12 (0.253)			0.11 (0.564)
Goodness of Fit						
AIC	907.69	908.63	910.61		910.93	912.6
BIC	926.69	933.09	935.08		935.4	939.79
Observations	112	112	112	112	112	112
Regression Diagnostics						
Wald Test		3.68 (0.06)	1.10 (0.295)	0.36 (0.546)	0.80 (0.370)	1.37 (0.503)
LR Test		3.06 (0.080)	1.08 (0.30)	0.30 (0.59)	0.76 (0.385)	
LM Test		3.58 (0.058)	0.94 (0.33)	0.18 (0.674)	0.48 (0.489)	

Table 5.5: Spatial spillover effects on social welfare (SW¹)

SW1	2008-09	2014-15	2019-20
	Indirect Effect	Indirect Effect	Indirect Effect
ERHealth	0.29**	0.09	0.28*
EREducation	-0.2	0.13	0.15
ERTnC	0.31*	0.19	0.31*
ERSecurity	-0.05	-0.03	-0.11
ERAgiculture	0.09	-0.01	0.20*
EREnergy	-0.09	0.09	-0.04
Moran's I	1.87*	0.93	1.96*
Global Moran's I	0.29***	0.15***	0.42***

Source: Author's work

5.14 Conclusion

This chapter focuses on the analysis of resource allocation and its impact on social welfare in the districts of Pakistan. By utilizing spatial analysis techniques and tools, we were able to explore the sources of disparities in social welfare and draw meaningful conclusions.

To conduct the analysis, we developed standardized indexes for six dimensions: ERH, ERE, ERTnC, ERS, ERAg, and EREC. These indexes were derived from cross-sectional data and were compiled to assess the distribution of resources provided by both the public and private sectors. The spatial analysis was carried out using QGIS, allowing us to examine the spatial patterns and relationships among the variables. Through regression analysis of the spatial cross-sectional data, we identified the main dimensions that contribute to changes in social welfare.

The findings highlight the significance of the health, education, transport, communication, and energy consumption sectors. Among these dimensions, the provision of resources in the transport and communication sector was found to have the maximum impact on social welfare. In the health sector, our analysis revealed significant disparities in health outcomes between districts, emphasizing the need for improved access to healthcare facilities. The education variables highlighted disparities in literacy rates and school enrollment, underscoring the importance of

addressing these gaps for human development and economic growth. Transportation and communication emerged as critical factors for development, as investments in infrastructure in this sector can have positive multiplying effects. However, our analysis also identified challenges such as inadequate transport infrastructure, capacity issues, managerial deficiencies, and coordination problems between different modes of transportation.

Addressing these challenges is essential to promote social welfare in the districts of Pakistan. Furthermore, our analysis of security variables demonstrated significant variations in crime rates and the number of police stations across districts. This highlights the importance of better resource allocation and more effective law enforcement strategies to ensure the safety and well-being of the population. This chapter provides valuable insights into the distribution of resources and its impact on social welfare in the districts of Pakistan. The findings underscore the need for targeted interventions and resource allocation strategies to address disparities and promote equitable development across sectors. By addressing these challenges and effectively allocating resources, policymakers can contribute to improving social welfare and fostering inclusive growth in the country.

This final chapter serves as the conclusion of the entire thesis, summarizing the main findings, discussing their implications, and providing policy recommendations based on the results. The analysis conducted throughout the thesis has shed light on various aspects of social welfare in the districts of Pakistan and has highlighted the factors that contribute to disparities in welfare outcomes.

CHAPTER 6

CONCLUSION

This dissertation on social welfare contributed to the literature by exploring the multidimensional indices. The spatial analysis sheds light on the prevailing disparities in social welfare in the regions of Pakistan. The concept of social welfare and approaches to assess it differs. Measurement of social welfare is a complex issue and is important because different measures and assessments can lead to different policy priorities. The selection of dimensions to assess social welfare is the key element of a welfare index.

The spatial analysis in this dissertation indicated that resource allocation and demographic factors play a crucial role in determining the socioeconomic conditions and well-being of individuals in different regions. Specifically, we found that economic resources in health, transport and communication, and agriculture, which are allocated by both private and public sectors, have a significant positive effect on social welfare in the districts of Pakistan. On the other hand, economic resources allocated to education have a significant negative effect on social welfare, indicating the need for policymakers to re-evaluate the allocation of resources to promote social welfare effectively.

The methodology used in our thesis is based on a combination of spatial and regression analysis, as well as the use of indexes, maps, and ranking. Through spatial analysis, we were able to identify patterns and relationships between Social Welfare and various geographical factors such as population density, access to resources, and infrastructure. Regression analysis helped us identify the key drivers of Social Welfare and their impact on overall Social Welfare levels. Indexes were used to aggregate multiple dimensions of Social Welfare, allowing us to better understand the multidimensional nature of Social Welfare. Maps and rankings were used to identify the areas most affected by Social Welfare, allowing for targeted policy interventions.

The study employed secondary data from the Pakistan Social and Living Standards Measurement (PSLM) to measure the level of welfare in districts and provinces. The cross-sectional spatial regression analysis showed that economic resources in health, transport and communication, and agriculture were significant sources of spatial disparities in social welfare. Moreover, the allocation of resources by both the public and private sectors had a positive effect on social welfare. However, the spatial analysis of cross-sectional data revealed that economic resources in education had a significant negative effect in 2008-09 on social welfare, indicating that policy interventions should focus on improving access to education in underprivileged areas.

The analysis of our study has identified terrorism as a significant factor that impacts the social welfare of Pakistan. The country has been grappling with political instability and violence for many years, which has resulted in widespread economic losses, social dislocation, and psychological trauma for its citizens. The incidence of terrorist attacks in the country has led to a sense of fear and insecurity among the population, thereby negatively affecting their quality of life.

The impact of terrorism on the country's social welfare is significant and multidimensional. It has resulted in increased Social Welfare, reduced access to education, and limited economic opportunities for many people. Furthermore, terrorist attacks have disrupted the delivery of essential services, such as healthcare, and have led to displacement and migration of people. Therefore, addressing the issue of terrorism is crucial for promoting social welfare in Pakistan. The government needs to take effective measures to combat terrorism, including improving the security situation, enhancing intelligence and surveillance systems, and strengthening the rule of law. It is essential to address the root causes of terrorism, such as Social Welfare, inequality, and lack of education, by implementing policies that promote economic growth and social inclusion.

To achieve sustainable development and promote social welfare, policymakers in Pakistan need to prioritize resource allocation in various regions of the country. Our analysis revealed that the allocation of economic resources in health, education, transport and communication, agriculture, security, and energy plays a crucial role in determining the overall welfare of the population. The government should invest

more in infrastructure development in these sectors to improve access and quality of services in different regions, especially in underdeveloped areas.

Pakistan has been facing significant challenges due to political instability and violence caused by terrorism. The impact of terrorism is not limited to the loss of lives and property but also affects the psychological well-being of the population. The government should adopt an effective counterterrorism policy to curb this issue and promote a safe and secure environment for the people. This will not only enhance the social welfare of the population but also contribute to economic development by attracting foreign investments and promoting tourism.

This thesis highlights the need for a multidimensional approach to measuring social welfare, including economic and social indicators. The study revealed significant disparities in social welfare among different regions of Pakistan, indicating the need for policy interventions to address these disparities. Additionally, the analysis of economic resources and terrorism showed their significant impact on social welfare. Policymakers should take these factors into account when designing policies aimed at improving social welfare and promoting sustainable development.

This study presents policy recommendations to address multidimensional Social Welfare in districts of Pakistan. The findings indicate that lack of assets is the most significant contributor to Social Welfare, particularly in rural areas. Therefore, it is imperative to boost the income of the poor by creating livelihood opportunities and strengthening existing rural support programs. Education is also a crucial driver of Social Welfare, and resources must be allocated to enhance access to primary education, which has proven effective in reducing Social Welfare. Health is another major contributor to multidimensional Social Welfare, and the healthcare system needs restructuring to ensure accessibility for all, regardless of their financial standing. Moreover, landlessness, poor housing quality, lack of safe drinking water, and inadequate sanitation facilities also contribute to Social Welfare and require appropriate policy intervention.

It is noteworthy that the contribution of deprivation to the Multidimensional Social Welfare Index varies across districts, necessitating tailored policies for each context.

Furthermore, Policymakers should account for district-level variations in the significance of Social Welfare drivers and develop context-specific policies. Regional clustering of Social Welfare provides an opportunity to target the most vulnerable, and provincial governments should develop tailored regional development plans to target the most vulnerable districts. This study highlights the need for decentralization beyond the provincial level and emphasizes the importance of addressing Social Welfare to achieve key education, health, living conditions, and income inequality indicators.

This study presents policy recommendations for addressing multidimensional Social Welfare in Pakistan's districts. Variation in social welfare is also the outcome of the varying levels of AINC in the districts of Pakistan. However, income inequality is high but due to the high AINC of the individuals and households in the districts achieve ranks in the upper cadre. Education is also a significant factor in Social Welfare, and resources must be allocated to improve access to primary education, which is effective in reducing Social Welfare. A report published by the World Bank in 2018, found that investing in primary education can help to reduce income inequality and promote social mobility. The report notes that children who receive a good quality primary education are more likely to go on to higher education, which in turn can lead to better employment opportunities and higher incomes. Health is another significant contributor to multidimensional Social Welfare, and the healthcare system needs restructuring to make it accessible to all, irrespective of their ability to pay. Additionally, landlessness, poor housing quality, lack of safe drinking water, and inadequate sanitation facilities also contribute to Social Welfare and should be addressed through appropriate policies.

The Social Welfare Indices indicate the order of districts based on their level of social welfare that provincial governments should prioritize the following districts: Musakhel, Awaran, Washuk, Dera Bugti, Kohlu, Chaghi, Qilla Abdullah, Bolan/Kachi, Jhal Magsi, and Nasirabad in Balochistan; Kohistan, Shangla, Upper Dir, Batagram, Bonair, D.I Khan, Swat, Tank, Malakand, and Lower Dir; Rajanpur, Muzaffargarh, D.G Khan, Bahawalpur, Layyah, Lodhran, Multan, Pakpattan, Rahim Yar Khan, and Bhakkar in Punjab; and Mirpur Khas, Tharparker, Badin, Thatta, Jamshoro, Nawabshah, Shahdadkot, Larkana, and Jacobabad in Sindh. While

prioritizing these districts, the indicators' respective shares must be considered since Social Welfare drivers vary across districts. The dimensions that make a higher contribution to the low score of Social Welfare should receive priority. These main dimensions are, low AINC in SW¹, education in MPI, and low GNI in HDI in SW² and SW³.

The high incidence of vulnerability also suggests that promoting Social Welfare cannot be achieved by focusing solely on the more deprived districts and ignoring those where a large proportion of households are vulnerable to Social Welfare. Development planning needs to focus on the districts with the highest incidence of vulnerability within each province. Vulnerability can be reduced by improving economic opportunities and investing in key Social Welfare drivers such as education, health, and living conditions

Finally, this study highlights several areas that require further research and analysis. The multidimensionality of the Social Welfare approach needs to be adopted to provide official estimates of Social Welfare, and provincial governments must provide estimates of Social Welfare at the disaggregated level. District-level analysis of Social Welfare opens up new avenues for debate and policies. The nationally representative standard surveys must be available at the disaggregated level, providing data on all districts and covering all significant indicators. These surveys must also provide information on social identities, particularly language since Social Welfare distribution in Pakistan overlaps linguistic diversity. A significant amount of research is necessary to explore the factors that could explain the geography of Social Welfare in Pakistan. Some possible factors that require prudent analysis are highlighted in this study.

One limitation of this study is that it relies solely on secondary data sources, which may have limitations in terms of accuracy and reliability. While efforts were made to ensure the validity of the data, it is possible that the results may be affected by errors or biases in the original data sources. Additionally, due to data availability constraints, this study only considers a limited set of indicators of Social Welfare and may not capture the full range of factors that contribute to Social Welfare.

Despite the comprehensive nature of this study, there are still some research gaps that need to be addressed. One area that requires further investigation is the impact of cultural and social norms on Social Welfare in the studied districts. Additionally, the study did not address the potential role of political and institutional factors in shaping Social Welfare outcomes. Future research could explore these factors and provide a more nuanced understanding of Social Welfare dynamics in the region. Furthermore, this study was limited to a single country and region and therefore its generalizability to other contexts may be limited. Therefore, there is a need for further research in other contexts to validate the findings of this study.

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Appendix A1: The rank of the district according to the score of SW¹ social welfare index

District Name	SW ¹ 2019-20	SW ¹ 2014-15	SW ¹ 2012-13	SW ¹ 2010-11	SW ¹ 2008-09	SW ¹ 2006-07
	Rank & Score	Rank & Score	Rank & Score	Rank & Score	Rank & Score	Rank & Score
Federal Capital City Islamabad						
Islamabad	1 81171.9	1 58898	1 82610.1	1 52379.1	1 54200.2	1 55717.2
Balochistan						
Awaran	107 22692.2	42 29906.9	77 24538.3	10 32424.6	55 21288.9	60 9208.6
Barkhan	61 33033.5	62 26232.2	59 26849.2	93 19528	104 15609.8	84 6784.9
Kachhi	96 25826.2	107 18810.3	32 31127.2	61 21628.4	87 18156.8	91 6315.9
Chaghi		98 20960.9	51 27933.3	74 20685.4	38 23990.9	47 10236.2
Dera Bugti	87 27215.1	106 19118.1	87 22641.3	101 18191.7	85 18301.5	25 14030.6
Gwadar	29 41298.7	32 31147.8	16 34097.2	30 26519.1	23 26970.3	5 26001.3
Harnai	79 28962.2	77 24408.3	37 30096.3	6 37401.1	27 25482.1	53
Jaffarabad	89 26582.6	110 17673.7	105 19826	78 20451.7	102 15869.4	105 3441.1
Jhal Magsi		112 17481.9	108 19175.8	111 16122.1	63 19941.2	96 5039.9
Kalat	40 38850.9	7 41630.3	23 32950.6	23 27695.6	100 16081.4	90 6381.9
Kech	39 38958.9		27 32249.5	37 24436	13 29880.9	7 24117.1
Kharan	78 29050.9	85 23380.4	64 26459.5	71 20772.6	35 24414.1	28 13511.9
Khuzdar	109 20518.9	15 37530.1	48 28126.2	29 26528.9	61 20819.4	75 7596
Killa Abdullah	95 25990.2	74 25054.2	56 27169.6	11 32314.7	110 11724	37 12123.2
Killa Safullah	74 30383.7	64 26228.4	45 28703.3	8 35588	19 27645.5	86 6696.1
Kohlu	3 62951.2	73 25156.7	65 26277	70 20790.9	6 34925	102 4198.7
Lasbela	21 43432	86 23161.3	73 25056.5	53 22425.3	72 19020.7	38 11927
Loralai	32 40845.6	48 28629.3	50 27986.3	105 17413.2	109 12832.4	69 8369.5
Mastung	64 32560.3	6 44698.8	31 31612.7	12 31839.5	107 14135.7	24 14236.3
Musakhail		90 22772.8	86 22869	115 9891	36 24305.2	89 6559.4
Nasirabad	106 22795.3	114 13953.7	103 20151.9	108 17265.7	5 34929.6	106 1524.8
Noshki	56 34140.4	54 27331.3	62 26678.6	60 21916.2	37 24113.2	
Panjour				84 20241.1	12 30126.7	21 14608

Pishin	16 45560.8	50 28499	66 26250.4	7 36910.4	16 28506	20 14627.7
Quetta	52 34593.7	18 35714.2	8 40214.7	4 41656.6	11 30553	4 32024.4
Sherani	12 50390.3	67 25593.6	33 31113.2	3 44506.4		
Sibi	67 32160.3	84 23394.8	20 33089.3	9 32951.8	28 25482.1	54 9609.4
Sohbatpur	70 31081.7					
Washuk	66 32306.4	58 26693.6	75 24693.5	46 23407.5	69 19486	
Zhob		31 31199.2	34 31033.8	73 20718.6	40 23892.4	81 7097.7
Ziarat	75 30042.4	83 23463.5	40 29729	16 29903.5	4 39623.5	30 13317
Khyber Pakhtunkhwa						
Abbottabad	15 47150.7	33 30993.9	21 33076.3	66 21143.9	80 18523.5	23 14442.9
Bannu	49 35831.4	65 26193.8	81 23682.8	47 23337.8	66 19589.4	35 12163.1
Battagram	76 29898	57 26816.1	42 29275	100 18374.1	89 17621.9	66 8688.7
Buner	97 25826	104 19929	104 20021	112 13626.6	106 14788.8	95 5402.8
Charsadda	94 26079.5	78 24213.8	17 33905.3	88 20069.3	51 21793.1	39 10885
Chitral	28 41357	20 34903.6	70 25622.8	58 21926.5	24 26860.4	29 13421.9
Dera Ismail Khan	38 39101.3	96 21566	100 20963.6	69 20872.4	84 18310.2	83 6802.5
Hangu	91 26337.7	70 25273.2	83 23496.6	65 21193.9	99 16189.7	78 7182
Haripur	34 40077.8	12 38441.6	26 32633.1	50 22952.3	46 22098.6	50 9985.2
Karak	53 34506	68 25433	71 25362.7	114 11126	112 7954.1	88 6651.6
Kohat	85 27294.7	45 29506.4	67 26248.3	90 19826.7	103 15697.6	51 9752.9
Kohistan	82 27923.2	44 29740.9	107 19810.1	102 18044.4	77 18848.9	72 8135.5
Lakki Marwat	46 37142.9	91 22501.5	92 21994.2	107 17290.8	95 17239.9	61 9194.9
Lower Dir	71 30921.6	52 28066.3	52 27877.6	104 17605.2	76 18857	52 9634.4
Malakand	27 41395.2	41 30169.4	14 34559.5	44 23428.7	54 21403.8	34 12656.1
Mansehra	58 33080	76 24657.7	25 32633.2	76 20473.1	49 21829.5	63 9051.6
Mardan	98 25650	72 25169.8	69 25641.9	91 19787.2	88 17666	43 10635.6
Noshera	100 25013.9	51 28126.6	55 27518.4	81 20315.2	42 23297.3	27 13574.2
Peshawar	51 35581.4	17 36895.5	13 35007.7	19 29105.5	7 33391.3	9 20209.1
Shangla	55 34167.1	39 30324.4	78 24404.2	72 20756.5	86 18285.2	32 13066.9
Swabi	68 31914.3	47 28820.8	76 24632.1	99 18439.5	101 15936.1	42 10659.6

Swat	48 36249.6	60 26345.4	47 28479.3	109 17193.3	97 16760.2	33 12678.8
Tank	11 50842.5	105 19615	111 18166.1	98 18540.8	78 18758	55 9447.6
Tor Ghar	83 27590.2	71 25195.3	112 17675.4	77 20473.1	50 21829.5	64 9051.6
Upper Dir	77 29877.6	109 18039.7	101 20673.9	97 18662.6	98 16199.8	100 4446.7
Punjab						
Attock	9 51911.9	9 40217.4	29 31922.1	55 22258.6	65 19596.5	22 14581.2
Bahawalnagar	84 27370.4	61 26338	53 27612.9	67 21013.1	81 18487.4	77 7188.6
Bahawalpur	73 30567.7	79 23920.4	46 28588	51 22882.8	92 17461.2	56 9446.6
Bhakkar	104 23071.4	63 26228.7	60 26768.8	63 21437.6	70 19363.4	67 8687.1
Chakwal	13 47664.3	8 41207.8	6 42619	48 23114.6	52 21779.1	8 21813.7
Chiniot	63 32806.1	21 34167.1	10 39779.9	17 29839.4		
Dera Ghazi Khan	101 24949.5	75 24670.9	74 24704.4	62 21463.6	82 18410.5	73 7934.4
Faisalabad	33 40678.8	11 39305.5	7 41980.5	14 30239.9	14 29785.8	10 19511.5
Gujranwala	23 42639.6	27 32284.7	24 32887	28 26663.9	10 30856.2	11 18814.7
Gujrat	14 47463.6	10 39660	11 37518.2	75 20625.1	41 23833.2	31 13100
Hafizabad	37 39203.3	30 31638.7	41 29705.7	33 25014.7	17 27947.8	49 10110
Jhang	60 33039.8	14 37775.1	18 33537.9	40 24204	60 20907.7	70 8292.8
Jhelum	42 38064.2	4 46516.8	9 39842.4	89 19854.8	25 26373.1	19 14800.6
Kasur	47 36746.6	82 23540.9	89 22223.2	32 25562.2	20 27619.3	26 13854.9
Khanewal	103 23305.2	40 30174	63 26640.1	36 24687	48 21986	48 10172.6
Khushab	72 30775.3	38 30352.1	38 29924	43 23663	74 18963.2	41 10671.9
Lahore	7 52705.3	5 44802.3	4 43234.7	5 38932.1	3 40850.4	3 34785.4
Layyah	43 37823.9	19 34927.4	30 31684.7	35 24953.9	33 24793.2	76 7328.2
Lodhran	45 37391.8	46 29412.5	44 28831.6	56 22228.3	39 23984.6	65 8806.4
Mandi Bahauddin	31 40950.5	13 38347.8	5 42860.4	20 29071.6	18 27944.2	46 10505.4
Mianwali	36 39336.5	37 30370.6	54 27522.2	110 16137.4	94 17345.4	16 16197.6
Multan	50 35729.3	28 31867.7	49 28035.4	34 24988.1	29 25278.8	12 17576.2
Muzaffargarh	93 26102.1	99 20932.1	82 23605.2	79 20423.7	67 19504.5	62 9194.3
Nankana SAINCb	20 43896.8	24 32946.7	22 32993.1	21 28873.2	26 25971.3	
Narowal	57 33375.7	100 20907.4	99 21137.1	113 12544.4	111 11295.7	97 4879.1

Okara	18 45457.7	34 30972.7	39 29857.4	27 27336.7	34 24620.5	68 8413.1
Pakpattan	24 42605.4	25 32463.5	43 29150.6	31 25818.6	31 25124	74 7727.3
Rahim Yar Khan	80 28761.2	59 26492.2	109 19011.4	95 18832	108 13846.9	82 6867.6
Rajanpur	105 23065.1	88 22996.5	80 23766.1	38 24352.8	68 19494.4	104 3591.6
Rawalpindi	8 52201.1	2 48533.6	3 46739.7	25 27481.7	8 32595.7	6 25971.1
Chakwal	19 45300.1	26 32419	15 34168	24 27612.5	56 21162.6	57 9409.9
Sargodha	62 32860.3	36 30641.8	35 30541.4	52 22534.6	43 22668	36 12132.9
Sheikhupura	22 43029.4	49 28557.1	36 30368	18 29138.5	22 27216	18 15787.6
Sialkot	30 41272.2	22 33803.5	19 33336.6	82 20299.7	57 21021.1	17 15994.1
Toba Tek Singh	54 34296.6	16 37231.8	12 35644	22 28223.9	30 25172.1	59 9248.7
Vehari	26 41728.7	23 32952.8	58 27023.5	80 20321.5	71 19342.1	58 9254.8
Sindh						
Badin	102 24176.5	97 21225.8	88 22336.8	85 20222.8	58 20994.2	103 3912
Dadu	69 31404.9	56 27021.5	68 26014.1	15 30055.5	9 31313	71 8177.9
Ghotki	41 38355.6	81 23582	91 22151.8	59 21925.3	96 17028.1	98 4849.1
Hyderabad	25 41865.8	29 31863.6	28 32075.9	13 30960.5	15 28847.8	13 16412
Jacobabad	110 18977	80 23712.2	96 21387.4	92 19604.4	105 15543.8	101 4333.2
Jamshoro	35 39543.2	66 26010.3	79 23773.4	41 24062.2	59 20957.4	
Kamber Shahdadkot	59 33063.2	93 21928.7	97 21385.5	96 18670.1	73 18984.9	79 7108.7
Karachi Central	5 55331.4	3 47056	2 49352	2 45326.3	2 45336.6	2 43861
Karachi East	2 70307.4					
Karachi South	4 57119.8					
Karachi West	17 45537.2					
Korangi	6 55174					
Malir Cantonment	10 51160.2					
Kashmore	111 18650.4	95 21690.4	114 17020.9	68 21001	45 22419.7	
Khairpur	108 21471.3	108 18061.8	106 19822.9	86 20219	93 17457.8	92 6124.4
Larkana	65 32404.4	43 29760.1	61 26739.1	54 22327.1	47 22083.8	80 7108.7
Matiali	90 26568.8	89 22926.5	72 25232.5	49 22969.3	53 21426.3	
Mirpurkhas	115 13756.6	111 17577.3	110 18203.4	83 20294.2	44 22581.9	94 5434.6

Naushero Feroze	86 27275.5	53 27870.7	102 20320.2	26 27437.8	21 27606.2	40 10803.3
Nawabshah/Shahed Benazirabad	113 15692.6	55 27207.9	93 21960.9	64 21199.5	90 17607.3	87 6692.4
Sanghar	112 17332	87 23122.5	84 23382.9	42 23780.7	79 18625	85 6699.4
Shikarpur	114 14370.6	92 22429.3	85 23163.6	94 19048.9	83 18333.7	99 4569.7
Skkur	44 37606.9	35 30655.5	57 27087.5	39 24245.7	64 19601.2	44 10624.7
Sujawal	99 25586	101 20412.8				
Tando Allahyar	92 26327.2	94 21745.8	94 21906.6	57 21989.7	75 18959.7	14 16412
Tando Muhammad Khan	88 26820.7	103 19993.7	95 21888.6	87 20097.3	62 20563.8	15 16412
Tharparker	116 11358.7	102 20285.7	90 22177.4	106 17342.1	91 17595.1	93 5687.4
Thatta	81 28051.5	69 25390.8	98 21150.3	45 23408.7	32 25108.1	45 10526
Umerkot	117 9448.3	113 16882.4	113 17633.6	103 17862.5		

Source: Author's work

Appendix A2: The rank of the district according to the score of SW² social welfare index

District Name	SW ² 2014-15	SW ² 2012-13	SW ² 2010-11	SW ² 2008-09	SW ² 2006-07
	Rank & Score	Rank & Score	Rank & Score	Rank & Score	Rank & Score
Federal Capital City Islamabad					
Islamabad	1 95298.9	1 129036.9	1 75913.9	1 85005.1	1 90442.7
Balochistan					
Awaran	71 26459.7	101 19697.6	25 31887.7	85 17754.6	75 9266.2
Barkhan	97 20253.5	97 21303.2	107 16061.1	108 12952.5	94 7047.9
Kachhi	107 18320.1	70 25731.3	69 22690.4	103 13963.6	87 7771.5
Chaghi	109 17849.3	83 23397.1	102 17322	64 20306.3	73 9788.7
Dera Bugti	111 17147.7	110 17574.2	112 13297.4	105 13786.1	56 11122.3
Gwadar	49 30730	33 35436	47 25440.9	25 28043	10 25274.4
Harnai	106 18638.7	62 27229.7	17 33555.1	42 23846.1	54
Jaffarabad	108 18201.9	104 18947.3	91 19432.3	102 14068.2	103 4359.7
Jhal Magsi	110 17350.6	109 17783.4	108 15187.9	96 15601.3	100 5518.7
Kalat	16 45611.4	49 30151.7	44 25723.7	106 13398.2	70 9982.8
Kech		46 30862.6	81 20862.4	31 27230.2	11 22132.1
Kharan	95 20500.4	86 22902.7	90 19436.9	65 20024.1	41 13026.8
Khuzdar	33 37839.9	64 27057.4	49 25171.9	82 18137.7	74 9414.7
Killa Abdullah	102 19485.5	91 22155.8	35 27965.7	111 10254.5	59 10998.8
Killa Safullah	67 26762.8	88 22714	26 31262.1	54 22167.1	92 7309.2
Kohlu	90 21831.1	105 18785.4	103 16287.1	33 26663.7	105 4089.7
Lasbela	86 22789.8	72 25695.7	85 20225	88 17222.2	50 11924.5
Loralai	54 29576.7	73 25670.7	105 16186.9	110 11969.8	85 8114.2
Mastung	13 46985.2	42 32765.6	21 32639.8	109 12299.9	23 18320.4
Musakhail	77 24631.1	107 18758.4	115 9626.8	77 18320.1	93 7305.6
Nasirabad	114 14875.8	103 19358.1	109 15051.3	22 28773.4	106 2192.8

Noshki	63 27755.4	74 25316.7	92 19389.5	56 21988.1	
Panjgur			104 16229.2	35 26419.8	45 12681.7
Pishin	66 26835.3	59 27578.6	14 34855.3	26 27836.1	33 14285.1
Quetta	28 39860.8	11 47357.7	4 46078.2	7 36815.5	4 40535.2
Sherani	89 21960.3	71 25703.5	5 42637		
Sibi	68 26744	22 40031.3	13 35746.1	43 23846.1	55 11306
Sohbatpur					
Washuk	83 23131	94 21585.4	62 23108.6	90 17073.4	
Zhob	72 25915.6	61 27327.4	88 19803.5	58 21366.5	88 7684.9
Ziarat	99 19747.8	51 29770.5	34 28367.7	9 36374.5	32 14630.6
Khyber Pakhtunkhwa					
Abbottabad	24 40617.8	13 45610.3	42 26055.7	53 22207.8	20 20183.1
Bannu	56 29146.9	75 25118.5	52 24584.2	63 20635.5	35 13919.3
Battagram	74 25061.3	56 28824	86 20004.8	83 17825	81 8580.2
Buner	100 19626.8	96 21342.7	113 12964.1	101 14191.4	95 6738.8
Charsadda	59 28696.9	25 39091.6	67 22738	49 23190.6	37 13763.6
Chitral	22 40789.6	54 28964.5	51 24766.1	27 27634	27 15177.4
Dera Ismail Khan	87 22611.7	92 21971.2	82 20697.1	76 18384.4	91 7501.5
Hangu	65 26850.1	76 24740.4	64 22950.6	79 18260.6	76 9062.1
Haripur	14 46205.3	23 39580.3	30 29598.3	37 25462.9	36 13831.1
Karak	55 29233.5	57 28168	114 11637.5	112 8793.6	83 8354.7
Kohat	40 34276.5	48 30383.3	79 21428.6	80 18202	42 12970.6
Kohistan	76 24742.8	113 15601.3	111 14472.8	104 13944.6	90 7510.3
Lakki Marwat	75 24977.1	82 23882.7	57 23731	93 16805.3	72 9834
Lower Dir	45 31478.5	55 28921	93 19255.1	81 18155.7	60 10949
Malakand	26 40151.2	19 41968	48 25349.4	48 23240.6	38 13735.7
Mansehra	52 29795.4	27 38058.2	73 21924.6	40 23977.7	51 11909.3
Mardan	53	53	65	71	44

	29701.1	29233.9	22807.7	19273.8	12788.5
Noshera	43 32665.4	38 33380.7	63 23012.7	28 27486.5	24 18240.9
Peshawar	15 45785.4	12 47023.4	8 38490.8	5 40127.2	7 26185.4
Shangla	62 27894.4	77 24657.3	76 21578.1	94 16723	47 12357.8
Swabi	42 33242.2	47 30469.9	70 22534.3	78 18268.1	46 12542.5
Swat	60 28240.5	35 35411.7	94 19208.3	95 16495.1	29 14811.3
Tank	96 20342.9	106 18764	98 18619.9	84 17785.6	69 10117.5
Tor Ghar	98 20119.6	114 15100.9	74 21924.6	41 23977.7	52 11909.3
Upper Dir	112 16892.9	102 19412.1	95 19041.7	99 14643.8	102 5053
Punjab					
Attock	7 55265.6	17 43365	38 27352	45 23693	19 20220.1
Bahawalnagar	46 31471.1	41 33177.9	58 23419.1	60 20932.7	66 10266.9
Bahawalpur	69 26614.1	39 33343.6	41 26188.7	70 19324.2	53 11557.5
Bhakkar	48 30836.4	50 29789.2	59 23335.5	66 19786.3	58 11008.6
Chakwal	6 55550.8	7 53098.8	32 29125.4	34 26546.1	6 29616.6
Chiniot	21 40853.1	9 49546.4	16 33607.2		
Dera Ghazi Khan	70 26503.6	69 25754.5	83 20613.4	91 17010.7	68 10136.9
Faisalabad	10 49026.4	5 53900.6	7 38604.8	8 36814.6	8 26020.5
Gujranwala	18 43516.6	18 42353.7	15 33675.2	6 38462.3	9 25604.3
Gujrat	8 49816.3	10 48135.7	43 25977.4	24 28162.9	21 20025.9
Hafizabad	27 40008.5	32 35823.1	20 32776.2	10 34647.7	34 14165.9
Jhang	11 47483.5	14 44112	29 29770.1	23 28191.1	61 10937
Jhelum	5 61916.9	6 53752.3	46 25620	14 33574	17 20365.1
Kasur	51 30271.4	63 27166.1	24 31988.5	15 32943.6	25 17491.2
Khanewal	38 36363.3	44 31463.7	36 27787	39 24071.2	48 12356.1
Khushab	35 37171.5	30 36749.1	33 28442.9	47 23392.1	31 14633.9
Lahore	4 62173.4	4 63632.3	3 56688.7	3 58999.2	3 49877.7
Layyah	23	34	37	32	63

	40789.4	35420.8	27586.6	26780.7	10644.5
Lodhran	41 34212.9	36 35364.6	55 23833	38 24499.8	62 10873.5
Mandi Bahauddin	12 47159.5	8 52201.3	19 33174.9	12 34358.5	30 14663.1
Mianwali	39 36211.9	37 33883.9	97 18712.6	59 20987.4	22 19453.8
Multan	30 38829	40 33336.3	31 29322.3	19 29504.2	12 21676.7
Muzaffargarh	84 23018	67 25940.5	84 20561	68 19587.2	65 10477
Nankana SAINCb	20 41878	24 39290	12 36308.7	21 29369.1	
Narowal	61 28169.5	65 26686.7	106 16074	107 13356.9	89 7609.8
Okara	34 37813.9	29 37676.3	18 33517	30 27290	57 11092.3
Pakpattan	29 39024.1	31 36259.7	28 30126.6	18 29604.2	67 10232.4
Rahim Yar Khan	50 30561.2	95 21512.2	78 21470.8	100 14480.6	84 8178.8
Rajanpur	80 23569	81 24006.1	61 23175.9	87 17283.1	104 4263.8
Rawalpindi	3 65116.6	3 64397	11 37043.7	4 42511.8	5 37193.3
Chakwal	19 43227.9	16 43369.1	22 32052.8	44 23809.5	43 12935.8
Sargodha	32 37958.6	26 38874.4	40 26479.7	36 25619.7	26 16564.2
Sheikhupura	37 36581.9	28 37974.7	9 37171.2	13 33628.3	18 20329.7
Sialkot	17 43569.7	21 41101.2	45 25692.5	29 27348.1	16 20905.3
Toba Tek Singh	9 49551.7	15 43717.2	6 38704.7	17 30940.3	39 13527
Vehari	31 38446.4	52 29483.9	56 23807.1	50 23162.5	49 12234.5
Sindh					
Badin	92 21338.9	99 20434.4	100 18277.2	67 19775	101 5449.4
Dadu	57 29101	60 27495	23 32001	16 32700.4	71 9933.3
Ghotki	73 25679	89 22558.2	66 22785.5	92 16860.6	96 6678.6
Hyderabad	25 40157.6	20 41854	10 37074.3	11 34621	13 21424.3
Jacobabad	79 24008.7	93 21958.3	96 18731.4	98 14955.9	99 5589.3
Jamshoro	64 26927.2	78 24485.2	60 23245.1	61 20828.5	
Kamber Shahdadkot	91 21413.5	84 23395.6	89 19586.9	86 17496	77 8952.7
Karachi Central	2	2	2	2	2

	68624.7	72515.1	62975.8	64118	61443
Karachi East					
Karachi South					
Karachi West					
Korangi					
Malir Cantonment					
Kashmore	94 21328.2	112 16921.1	80 20919.8	57 21967.7	
Khairpur	93 21337	80 24224.4	75 21613.2	73 18815.9	82 8511.2
Larkana	36 36868.7	45 30939.1	50 25003.2	52 22803.1	78 8952.7
Matiari	78 24313.7	58 27990.3	54 24264.6	62 20827.9	
Mirpurkhas	104 19295.4	108 18544.9	71 22367	51 23054.3	86 7875.5
Naushero Feroze	47 31234.3	85 23363.7	27 31037.2	20 29463.5	40 13190.2
Nawabshah/Shahheed Benazirabad	58 28812.6	79 24437.1	68 22694.9	89 17174.2	79 8911.9
Sanghar	81 23461.1	66 26303.2	53 24308.1	72 19011	80 8663.9
Shikarpur	82 23135.9	68 25797.7	87 19804.4	75 18489.7	97 6344.1
Skkur	44 32609.5	43 31883.1	39 27024.9	55 22087.7	28 14830.8
Sujawal	101 19485.6				
Tando Allahyar	88 22024.4	87 22795.8	77 21531.1	74 18725.1	14 21424.3
Tando Muhammad Khan	103 19320.6	90 22164.1	101 18101.6	69 19455.2	15 21424.3
Tharparker	105 18872	100 20323.6	110 14694.7	97 15043.5	98 6084.9
Thatta	85 22998	98 20576.3	72 22169.8	46 23651.1	64 10512.7
Umerkot	114 15614.9	111 17538.3	99 18520.8		

Source: Author's work

Appendix A3: The rank of the district according to the score of SW³ social welfare index

District Name	SW ³ 2014-15	SW ³ 2012-13	SW ³ 2010-11	SW ³ 2008-09	SW ³ 2006-07
Islamabad Capital Territory					
Islamabad	1 69092.4	1 139473.5	1 79956.4	1 90970.7	1 63639.8
Balochistan					
Awaran	44 28483.9	109 14358.7	10 23101.8	92 14191.7	62 10817.6
Barkhan	77 23235.6	101 16739	92 12639.3	108 10267.8	88 8535.5
Bolan/Kachhi	109 18856.5	82 21746.9	60 20215.7	106 10722.3	72 10149
Chaghi	101 20447.8	94 17750.3	73 13447.8	84 15474.3	44 12365.9
Dera Bugti	110 18793.2	112 13266.1	100 9426.8	105 10797.3	30 14558.2
Gwadar	45 28447	43 30743.8	29 21952.1	29 25349.1	6 25086.2
Harnai	88 21963.7	80 21944	6 26290.4	48 21076	
Jaffarabad	108 18995.9	104 16381.5	77 15617.3	101 11917.3	101 5598.1
Jhal Magsi	93 21502.1	108 15166.2	110 11345	100 12121.8	95 7289.9
Kalat	7 43974.2	62 25081	22 20776.4	104 10984.8	53 11518.5
Kech/ Turbat		59 26116.3	36 17099.5	42 22783.7	7 24545.1
Kharan	94 21304.6	92 18822.5	70 15788.6	80 15812.7	28 15041.3
Khuzdar	17 35684.4	72 23148.2	28 20932.5	91 14369.8	58 11213.9
Killa Abdullah	80 22836.8	98 17362	11 24863.4	111 8323.3	31 14536.4
Killa Safullah	54 26407.4	96 17458.6	8 25613.5	68 17661.1	79 9533.6
Kohlu	73 23651.7	111 13499.6	69 12774.5	54 20080.1	100 6027.8
Lasbela	83 22406.6	74 22804	52 17088.3	89 14480.5	37 13230.3
Loralai	39 28979.7	77 22436.5	104 13079.9	109 9573.6	74 9966.6
Mastung	6 44053.1	47 29470.3	12 28032.6	107 10291.3	15 17977.4
Musakhail	64 25019.3	110 13951.9	114 6594.2	94 13410.7	70 10231.8
Nazeerabad	114 16098.2	103 16540.9	107 12062.5	37 23224	103 3621.5
Noshki	56 26180.2	83 21502.5	59 15978.6	63 18528.9	
Panjugur			83 13001.1	44 22287.4	26 15549.1
Pishin	58 25835.9	63 24917.1	7 33618.3	31 24825.4	24 15791.6
Quetta	24	13	4	6	4

	32836.7	46146.8	46070.9	37378.4	33677
Sherani	72 23726.3	76 22645.8	3 34373		
Sibi	57 26124.2	24 38723	9 33983.1	49 21076	43 12368.5
Sohbatpur/Jaffarabad					
Wazhuk	61 25339.2	106 15672.9	45 17108	99 12346	
Zhob	47 27253.4	69 23699.5	72 16876	60 19103.8	84 8858
Ziarat	89 21954.6	60 25954.8	16 25352.1	17 29374.2	20 16392.5
Khyber Pakhtunkhwa					
Abbottabad	31 31781.9	12 47150.4	65 26031.2	45 22178.6	17 17392.4
Bannu	62 25255.3	66 24079.7	46 23508.7	57 19552.1	34 13608
Battagram	76 23360.8	55 26968.7	99 18882.7	76 16918.5	83 9004.6
Buner	111 17933.6	91 20105.7	111 11561.2	95 13299.2	97 6860.6
Charsadda	81 22560.3	27 37031.5	87 20950.8	56 19812	33 13704.4
Chitral	21 33485.9	44 29897.5	57 25026.5	22 28141.4	35 13525.6
Dera Ismail Khan	95 21304	88 20649.9	68 18054.9	77 16717.4	89 8371
Hangu	78 23177.3	70 23639.2	64 21415.4	74 17174.8	86 8771.3
haripur	15 36220.6	23 38930	49 29655.2	30 24875	45 12352.2
Karak	63 25164.1	57 26840.7	113 10503.5	110 8345.3	90 8220.5
Kohat	40 28761	45 29848.8	89 21119.2	71 17378.4	48 12056.3
Kohistan	42 28605.9	114 12210.2	101 10880.8	103 10997.7	71 10195.7
Lakki Marwat	84 22343.8	79 22099.3	106 23843.8	86 15165.6	69 10264.5
Lower Dir	50 26757.5	54 27058.7	103 18407.7	79 16233.4	60 11019.9
Malakand	22 33016.5	20 40198.7	43 23852.9	46 21503.2	39 13059.1
Mansehra	65 24603.3	28 36806.1	75 20841.5	39 22850.9	50 11700.1
Mardan	71 23801.9	51 28612.3	90 21907.7	64 18431	55 11469.3
Noshera	55 26293.3	38 33028.2	80 21844	25 26779.1	25 15684.1
Peshawar	16 35743	11 47934			
Shangla	48 27084.4	81 21863.8	71 19428.5	90 14422.2	38 13191.7

Swabi	46 27723.6	50 28639.3	98 21270.4	73 17353.9	49 12012.8
Swat	69 24090.8	37 33591.4	108 18001.4	88 14972.4	36 13437.8
Tank	105 19740.4	97 17429.3	97 16201.4	83 15533.7	63 10806.5
Tor Ghar	85 22296.9	113 12224.6	76 20841.5	40 22850.9	51 11700.1
Upper Dir	112 17151.5	100 16866.7	96 16999.9	98 12496.2	99 6289.7
Punjab					
Attock	9 42073.9	15 43846.9	54 25739.1	36 23253.4	21 16210.5
Bahawalnagar	49 26952.3	39 32659.1	66 21958.8	53 20272	77 9661.1
Bahawalpur	82 22513.2	35 33640.6	50 24650	61 18946.8	64 10802.1
Bhakkar	53 26457	49 28875.9	62 21858.9	65 18146.6	61 10946.6
Chakwal	8 42167.3	7 52922.8	47 29071.8	27 26374.4	8 23829.7
Chiniot	19 34021.1	9 49235.4	17 31599.5		
Dera Ghazi Khan	67 24436.6	68 23961.8	61 18838.8	85 15412.9	68 10483.2
Faisalabad	14 37354.9	6 54436.1	14 38074.1	7 35814.7	9 21223.1
Gujranwala	20 33514.9	17 42611.7	27 33539.8	5 38118.4	10 20558.3
Gujrat	12 37655.7	10 48858.9	74 25391.2	24 27711	23 16083.6
Hafizabad	27 32282.2	32 35121.3	32 32398	11 33318.3	41 12825.2
Jhang	10 39195.9	14 44328.7	39 27972.6	20 28909.9	67 10537.4
Jhelum	4 45844.8	5 54908.3	88 24771.1	12 33317.9	22 16124
Kasur	70 24078.7	56 26966.2	31 31032.9	13 32565.5	27 15426.2
Khanewal	38 29506.6	41 31364.2	35 26314.9	34 23542.1	54 11501.4
Khushab	37 30169.9	30 35998.9	42 27793.3	33 23621.6	40 13017.5
Lahore	5 44766.7	3 67197.4	5 59271.1	3 61814.1	3 37753.1
Layyah	25 32554.5	33 34982.6	34 26101.1	28 25745.2	75 9757.4
Lodhran	43 28567.7	31 35659.7	55 21953.9	38 23016.1	10901

Mandi Bahauddin	13 37651.4	8 51965.7	19 31982.1	9 33890.5	42 12444.4
Mianwali	34 30680.4	34 34000.9	109 17649.2	52 20624.8	16 17596.5
Multan	33 31090.7	36 33593.9	33 28690.6	18 29036.2	11 19488.9
Muzaffargarh	99 20603.7	61 25180.7	78 18445.7	62 18681.3	52 11527.3
Nankana Sahib	23 32866.4	21 39564	20 35908.8	21 28895.5	
Narowal	87 22154.1	52 27321.6	112 15945.2	97 13108.3	96 7067.9
Okara	35 30597.1	26 37937.7	26 32941.1	26 26576.5	65 10746.5
Pakpattan	26 32386.3	29 36264.9	30 27860.4	19 29007.8	76 9666.5
Rahimyar Khan	52 26462.4	87 21207.3	94 20593.9	93 13891.4	91 8100.4
Rajanpur	90 21895.1	78 22184.4	37 20547.9	87 15131.4	102 5360.8
Rawalpindi	3 47040.3	4 66222.4	24 37603.8	4 43079.1	5 27823.7
Sahiwal	18 34892.5	16 43643.4	23 30646	35 23390.7	57 11419.9
Sargodha	36 30227.8	22 38941.6	51 25420.7	32 24727	29 15033.9
Sheikhupura	41 28683	25 38175.3	18 37229.8	10 33634.6	18 17162.9
Sialkot	28 32182.8	19 41305.7	81 26123.3	23 27787.4	19 17102.9
Toba Tek Singh	11 38508	40 31567.8	21 38628.5	14 31406.4	56 11454.7
Vehari	30 31947.3	46 29569.2	79 21993.6	41 22809.2	59 11201.9
Sindh					
Badin	92 21641.5	95 17520.7	84 15622.5	75 17142.3	98 6758.6
dadu	66 24480.1	58 26638.9	15 29840.3	15 31211.7	66 10671.5
Ghotki	68 24106.5	86 21210.9	58 20899.2	81 15658	92 7626.1
Hyderabad	29 32037.9	18 42539.4	13 36783	8 35035.3	12 18461.9
Jacobabad	75 23455.7	90 20192.5	91 15586	96 13203.4	93 7401.4

Jamshoro	74 23602.2	71 23244.1	40 21294.9	59 19171.1	
Kamber Shahdadkot	102 20417.6	84 21390.7	95 17476.7	78 16418.3	80 9352.3
Karachi	2 50224.2	2 76790.9	2 66247.3	2 67424	2 46028.8
Kashmore	98 20716.2	107 15209.4	67 18529.5	58 19364.3	58
Khairpur	107 19153.8	75 22658.8	85 19646.8	66 17780.8	85 8837
Larkana	32 31526.8	48 29027.6	53 22966.2	43 22403.5	81 9352.3
Matari	91 21671.2	53 27106.2	48 22584.8	55 19988.8	55
Mirpurkhas	106 19412	93 17916.7	82 18888.3	50 20691.6	73 9992
Naushero Feroze	60 25738.2	73 22909.1	25 29001.7	16 29488.9	46 12278.5
Nawabshah/Shahheed Benazirabad	59 25770.7	67 24043.8	63 20912.1	82 15534.2	78 9583.3
Sanghar	86 22217.3	64 24848.3	41 21566.9	70 17411.5	82 9300.3
Shikarpur	97 21067.2	65 24113.6	93 18018.5	72 17360.6	94 7338.5
Sukkur	51 26632.2	42 31030.1	38 25575.9	47 21487.2	32 13938
Sujawal	100 20530				
Tando Allahyar	103 20217.6	85 21358.6	56 19405	67 17774.7	13 18461.9
Tando Muhammad Khan	104 19985.9	89 20404.5	86 15475.3	69 17588.6	14 18461.9
Tharparker	96 21248.9	102 16627.4	105 11604	102 11707.3	87 8561.3
Thatta	79 22932.3	99 17358.5	44 18880.3	51 20681.9	47 12215.5
Umerkot	113 16947.2	105 15922.7	102 16749.2		

Appendix A4: The rank of the district according to the score of the Gini coefficient

District Name	2019-20	2014-15	2012-13	2010-11	2008-09	2006-07
Islamabad Capital Territory						
Islamabad	116 0.56	114 0.56	114 0.54	114 0.49	111 0.55	61 0.57
Balochistan						
Awaran	2 0.26	1 0.24	7 0.26	3 0.26	4 0.28	28 0.51
Barkhan	34 0.4	11 0.31	5 0.25	8 0.3	5 0.28	56 0.56
Bolan/Kachhi	29 0.39	40 0.38	6 0.25	111 0.48	1 0.25	97 0.68
Chaghi		24 0.35	9 0.29	21 0.32	28 0.35	42 0.53
Dera Bugti	114 0.54	34 0.37	11 0.29	2 0.26	14 0.31	4 0.43
Gwadar	7 0.31	4 0.27	12 0.29	17 0.32	43 0.36	1 0.36
Harnai	35 0.4	9 0.3	15 0.31	26 0.33	19 0.32	54
Jaffarabad	62 0.44	84 0.44	31 0.37	36 0.36	13 0.3	99 0.69
Jhal Magsi		113 0.52	91 0.45	22 0.33	11 0.3	81 0.62
Kalat	18 0.36	46 0.39	4 0.24	1 0.23	27 0.35	104 0.71
Kech/ Turbat	4 0.29		14 0.31	9 0.3	16 0.31	2 0.4
Kharan	10 0.33	5 0.28	8 0.28	30 0.35	2 0.26	7 0.45
Khuzdar	1 0.25	8 0.3	19 0.34	6 0.27	31 0.35	80 0.62
Killa Abdullah	106 0.51	23 0.35	13 0.3	7 0.28	72 0.4	36 0.52
Killa Safullah	63 0.44	57 0.41	2 0.2	25 0.33	3 0.27	82 0.62
Kohlu	5 0.3	12 0.32	1 0.18	5 0.27	7 0.28	93 0.65
Lasbela	6 0.3	36 0.37	53 0.39	10 0.3	9 0.29	12 0.48
Loralai	30 0.39	27 0.36	30 0.37	81 0.42	58 0.39	43 0.54
Mastung	38 0.41	31 0.37	17 0.33	4 0.26	54 0.38	45 0.54
Musakhail		87 0.44	20 0.34	94 0.44	8 0.28	95 0.66

Nazeerabad	89 0.47	108 0.48	105 0.48	23 0.33	10 0.29	106 0.8
Noshki	20 0.37	15 0.34	3 0.24	20 0.32	21 0.33	
Panjgur				12 0.3	6 0.28	3 0.42
Pishin	39 0.41	39 0.38	76 0.43	14 0.31	56 0.38	8 0.46
Quetta	101 0.5	25 0.36	25 0.35	13 0.31	89 0.43	18 0.49
Sherani	3 0.28	16 0.34	23 0.35	54 0.39		
Sibi	44 0.42	105 0.47	78 0.43	16 0.32	20 0.32	55 0.56
Sohbatpur/Jaffarabad	23 0.38					
Wazhuk	24 0.38	3 0.27	24 0.35	50 0.38	23 0.33	
Zhob		2 0.27	16 0.32	72 0.4	71 0.4	60 0.57
Ziarat	72 0.45	38 0.38	10 0.29	45 0.37	17 0.32	34 0.52
Khyber Pakhtunkhwa						
Abbottabad	28 0.38011	106 0.48	107 0.49	95 0.44	86 0.42	65 0.57
Bannu	50 0.42804	67 0.42	61 0.41	85 0.42	79 0.41	37 0.53
Battagram	17 0.35244	14 0.33	18 0.33	38 0.36	36 0.35	9 0.47
Buner	80 0.45675	22 0.35	39 0.38	19 0.32	25 0.34	78 0.6
Charsadda	88 0.46738	78 0.43	21 0.34	75 0.41	37 0.36	48 0.54
Chitral	9 0.32966	51 0.4	48 0.39	74 0.4	62 0.39	13 0.48
Dera Ismail Khan	61 0.43354	63 0.42	77 0.43	56 0.39	91 0.43	59 0.57
Hangu	11 0.33	20 0.35	46 0.39	70 0.4	88 0.42	63 0.57
haripur	51 0.43	30 0.37	51 0.39	89 0.44	40 0.36	67 0.58
Karak	81 0.46	74 0.42	38 0.38	103 0.45	106 0.49	52 0.56
Kohat	45 0.42	70 0.42	58 0.4	57 0.39	92 0.44	62 0.57

Kohistan	8 0.31	33 0.37	33 0.37	27 0.33	15 0.31	58 0.57
Lakki Marwat	36 0.4	88 0.44	72 0.42	116 0.69	38 0.36	26 0.51
Lower Dir	25 0.38	19 0.35	22 0.34	46 0.37	32 0.35	32 0.52
Malakand	15 0.35	112 0.5	56 0.4	33 0.35	45 0.37	6 0.45
Mansehra	31 0.39	85 0.44	73 0.42	39 0.36	66 0.4	75 0.59
Mardan	73 0.45	37 0.38	54 0.39	88 0.43	57 0.38	10 0.48
Noshera	64 0.44	35 0.37	63 0.41	42 0.36	78 0.41	49 0.55
Peshawar	98 0.48	77 0.43	99 0.46	112 0.49	94 0.44	41 0.53
Shangla	52 0.43	13 0.33	42 0.38	71 0.4	12 0.3	5 0.44
Swabi	102 0.5	48 0.4	90 0.45	105 0.46	85 0.42	35 0.52
Swat	21 0.37	28 0.36	103 0.48	87 0.43	47 0.37	20 0.5
Tank	46 0.42	80 0.43	88 0.45	77 0.41	49 0.37	17 0.49
Tor Ghar	12 0.34	6 0.28	62 0.41	40 0.36	67 0.4	76 0.59
Upper Dir	53 0.43	26 0.36	43 0.38	66 0.4	22 0.33	91 0.64
Punjab						
Attock	22 0.37	97 0.45	93 0.46	63 0.39	65 0.4	31 0.51
Bahawalnagar	103 0.5	100 0.46	86 0.45	65 0.4	97 0.45	84 0.62
Bahawalpur	90 0.47	56 0.41	102 0.47	90 0.44	96 0.45	46 0.54
Bhakkar	82 0.46	95 0.45	71 0.42	100 0.44	70 0.4	74 0.59
Chakwal	91 0.47	89 0.44	27 0.36	59 0.39	48 0.37	21 0.5
Chiniot	54 0.43	72 0.42	87 0.45	69 0.4		
Dera Ghazi Khan	74 0.45	82 0.43	49 0.39	78 0.41	55 0.38	89 0.64
Faisalabad	75 0.45	44 0.39	69 0.41	82 0.42	77 0.41	14 0.49
Gujranwala	83 0.46	94 0.45	67 0.41	62 0.39	60 0.39	15 0.49
Gujrat	37 0.4	45 0.39	65 0.41	68 0.4	24 0.34	51 0.56
Hafizabad	47	90	50	110	95	57

	0.42	0.45	0.39	0.48	0.44	0.56
Jhang	99 0.48	104 0.47	113 0.52	104 0.46	112 0.6	72 0.59
Jhelum	92 0.47	65 0.42	79 0.44	73 0.4	51 0.37	16 0.49
Kasur	76 0.45	71 0.42	70 0.42	99 0.44	90 0.43	29 0.51
Khanewal	65 0.44	75 0.42	85 0.44	67 0.4	81 0.41	33 0.52
Khushab	93 0.47	93 0.45	80 0.44	91 0.44	110 0.51	53 0.56
Lahore	107 0.51	91 0.45	111 0.5	115 0.5	107 0.49	19 0.5
Layyah	26 0.38	59 0.41	29 0.37	52 0.38	74 0.41	87 0.63
Lodhran	55 0.43	66 0.42	110 0.5	58 0.39	30 0.35	66 0.57
Mandi Bahauddin	77 0.45	60 0.42	47 0.39	34 0.36	93 0.44	47 0.54
Mianwali	66 0.44	96 0.45	101 0.47	79 0.42	109 0.5	25 0.51
Multan	94 0.47	73 0.42	75 0.43	86 0.42	98 0.45	23 0.5
Muzaffargarh	56 0.43	92 0.45	81 0.44	64 0.4	87 0.42	70 0.58
Nankana Sahib	40 0.41	69 0.42	34 0.37	96 0.44	33 0.35	
Narowal	84 0.46	107 0.48	104 0.48	106 0.46	99 0.45	96 0.67
Okara	85 0.46	81 0.43	106 0.48	109 0.48	68 0.4	73 0.59
Pakpattan	67 0.44	68 0.42	108 0.49	108 0.47	108 0.5	71 0.58
Rahimyar Khan	95 0.47	101 0.46	96 0.46	102 0.45	80 0.41	68 0.58
Rajanpur	41 0.41	43 0.39	40 0.38	41 0.36	53 0.38	98 0.69
Rawalpindi	86 0.46	76 0.42	89 0.45	92 0.44	76 0.41	24 0.51
Sahiwal	110 0.52	109 0.48	100 0.47	55 0.39	82 0.41	69 0.58
Sargodha	96 0.47	83 0.44	95 0.46	80 0.42	75 0.41	64 0.57
Sheikhupura	68 0.44	64 0.42	59 0.4	98 0.44	84 0.42	30 0.51
Sialkot	69 0.44	54 0.4	44 0.38	84 0.42	102 0.45	22 0.5
Toba Tek Singh	87 0.46	103 0.46	68 0.41	113 0.49	100 0.45	77 0.6
Vehari	32 0.39	52 0.4	57 0.4	76 0.41	101 0.45	50 0.55
Sindh						
Badin	78 0.45	86 0.44	32 0.37	29 0.33	39 0.36	101 0.7
dadu	79 0.45	18 0.35	37 0.38	43 0.37	42 0.36	79 0.61
Ghotki	42 0.41	98 0.45	26 0.36	48 0.38	69 0.4	100 0.7
Hyderabad	57	79	84	35	59	38

	0.43	0.43	0.44	0.36	0.39	0.53
Jacobabad	115 0.54	55 0.41	28 0.37	11 0.3	64 0.39	102 0.7
Jamshoro	48 0.42	17 0.34	55 0.39	31 0.35	83 0.42	
Kamber Shahdadkot	70 0.44	21 0.35	60 0.41	51 0.38	63 0.39	85 0.63
Karachi	58 0.43	110 0.49	109 0.5	107 0.46	105 0.48	11 0.48
Karachi	71 0.44					
Karachi	97 0.47					
Karachi	16 0.35					
Karachi	13 0.34					
Karachi	14 0.34					
Kashmore	100 0.48	58 0.41	45 0.38	44 0.37	18 0.32	
Khairpur	112 0.53	102 0.46	98 0.46	60 0.39	73 0.41	94 0.66
Larkana	49 0.42	99 0.45	41 0.38	61 0.39	61 0.39	86 0.63
Matiari	59 0.43	50 0.4	82 0.44	49 0.38	26 0.34	
Mirpurkhas	104 0.5	111 0.5	97 0.46	93 0.44	104 0.47	105 0.71
Naushero Feroze	27 0.38	32 0.37	92 0.45	97 0.44	44 0.36	44 0.54
Nawabshah/ Shaheed Benazirabad	111 0.52	42 0.39	112 0.5	83 0.42	50 0.37	90 0.64
Sanghar	108 0.51	53 0.4	83 0.44	24 0.33	52 0.37	88 0.64
Shikarpur	117 0.61	29 0.36	66 0.41	47 0.37	46 0.37	103 0.71
Skkur	105 0.5	7 0.29	74 0.43	53 0.38	103 0.46	83 0.62
Sujawal	43 0.41	47 0.39				
Tando Allahyar	60 0.43	41 0.38	35 0.38	18 0.32	29 0.35	39 0.53
Tando Muhammad Khan	109 0.51	61 0.42	64 0.41	15 0.31	35 0.35	40 0.53
Tharparker	19 0.36	49 0.4	36 0.38	32 0.35	34 0.35	92 0.65
Thatta	33 0.39	10 0.31	52 0.39	37 0.36	41 0.36	27 0.51
Umerkot	62 0.53	94 0.42	101 0.46	0.45		104

Source: Author's work

Appendix B: Ranks of the district According to the Frequency of Terrorism Incidents

District Name	Rank	District Name	Rank	District Name	Rank	District Name	Rank
Karachi	1	Gwadar	26	Larkana	51	Jhang	76
Peshawar	2	Kohlu	27	Jamshoro	52	Rajanpur	77
Quetta	3	Lakki Marwat	28	Jhal Magsi	53	SAINCwal	78
Dera Bugti	4	Lower Dir	29	Sanghar	54	Mirpurkhas	79
Swat	5	Hyderabad	30	Shikarpur	55	Jaffarabad	80
Bannu	6	Lasbela	31	Zhob	56	Abbottabad	81
Charsadda	7	Upper Dir	32	Washuk	57	Tor Ghar	82
Hangu	8	Kharan	33	RAINCmyar Khan	58	Attock	83
Kech/ Turbat	9	Awaran	34	Sargodha	59	Khushab	84
Nasirabad	10	Sibi	35	Siaikot	60	Layyah	85
Dera Ismail Khan	11	Multan	36	Lehri	61	Mandi Bahauddin	86
Khuzdar	12	Buner	37	Naushero Feroze	62	Thatta	87
Mardan	13	Noshki	38	Sukkur	63	Musakhail	88
Swabi	14	Loralai	39	Harnai	64	Sohbatpur	89
Panjgur	15	Chaghi	40	Ziarat	65	Kohistan	90
Kohat	16	Barkhan	41	Chitral	66	Dera Ghazi Khan	91
Lahore	17	Karak	42	Okara	67	Faisalabad	92
Rawalpindi	18	Jacobabad	43	Dadu	68	Khanewal	93
Bolan/Kachhi	19	Pishin	44	Kamber Shahdadkot	69	Nankana SAINCb	94
Kalat	20	Shangla	45	Killa Saifullah	70	Vehari	95
Mastung	21	Mansehra	46	Battagram	71	Badin	96
Noshera	22	Kashmore	47	Haripur	72	Matiari	97
Tank	23	Khairpur	48	Muzaffargarh	73	Sherani	98
Killa Abdullah	24	Shaheed Benazirabad	49	Sheikhupura	74	Bahawalpur	99
Islamabad	25	Malakand	50	Ghotki	75	Gujranwala	100