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(A CHARTERED UNIVERSITY)
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PRC's 1st Virtual Panel Discussion/Academic Conference on

OPPORTUNITIES AND THREATS: POPULATION GROWTH AND THE WAY AHEAD

2022

Population Research Center

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Our mission is to impart, create and disseminate knowledge and to develop informed, ethical and responsible citizens who are prepared and committed to learn, lead and serve; people who exemplify the FCCU motto,

"By love serve one another".

FORMAN CHRISTIAN COLLEGE
(A CHARTERED UNIVERSITY)

Population Research Center

Population Research Center (PRC) at the Forman Christian College (A Chartered University) was established in 2019 to conduct, promote, and strengthen inter-disciplinary population studies research and teaching in Pakistan. PRC is an independent Center that was collaboratively created by the Departments of Economics, Geography, Statistics and Sociology and is part of the Faculty of Social Sciences.

In unison with the motto of FCCU "by love serve one another", the mission of PRC is to serve the people in the true spirit of inclusion and democracy as the premier teaching and research institute of Population Studies in Pakistan. The main purpose of the Center includes providing advanced training to students in Population Studies, generating and disseminating research on population growth and its impact, spreading awareness on population related issues and evaluating existing policies and initiatives to counter the population problem in Pakistan and collaborating with national and international institutions for training and research.

Website: https://www.fccollege.edu.pk/population-research-center/

Declaration

The authors' findings, interpretations, and conclusions presented at PRC's first virtual academic conference are solely their own and should not be ascribed to the Population Research Center, Forman Christian College (A Chartered University), Lahore in any way. The Editorial Board cannot guarantee the correctness of the data in this publication and cannot be held liable for any repercussions of its usage.

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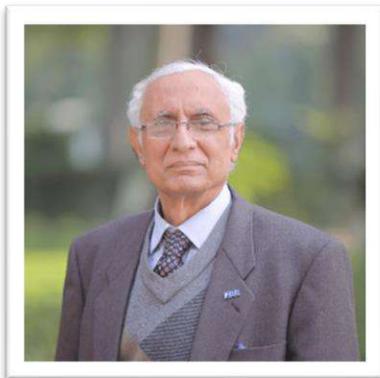
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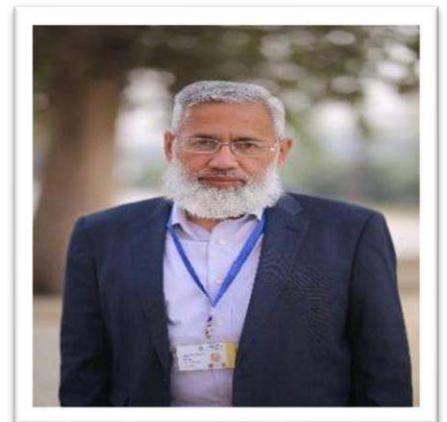
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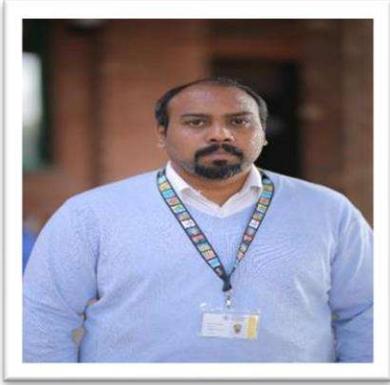
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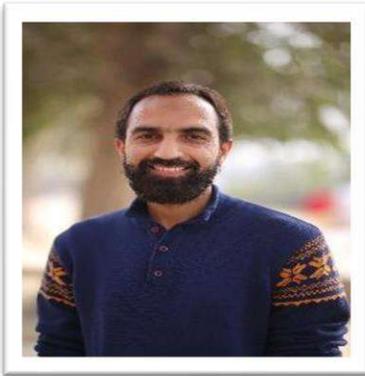
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Population Research Center (PRC), FCCU

International Virtual Panel Discussion/Academic Conference

On

Opportunities and Threats: Population Growth and the Way Ahead

Patron: Dr. Jonathan S. Addleton

Academic Conference Review & Editorial Board

Dr. Sikandar Hayat

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Dr. Sharoon Hanook

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Dr. Sara Rizvi Jafri

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Mr. Jawad Tariq

Ms. Samia Ayub

About the Panel Discussion/Academic Conference

Pakistan remains one of the few countries in the world with a population growth rate of above 2% while the globe enters a phase of substantially slower population growth. Rapid population increase is widely acknowledged as a barrier to Pakistan's long-term human and economic development. The challenges the country is facing include poverty, healthcare, urbanization and migration, gender inequality, aging and education etc. Hence, there is a dire need to work on quality of education, skills, female education and labor force participation rates as these are the roots to enhance female autonomy and overall human development index.

Pakistan also lags behind other relevant nations in important development indicators such as fertility, infant and under-five mortality which are double that of Bangladesh and India and triple that of Indonesia and Egypt. Another important key indicator that adds to population control is an effective family planning program. Pakistan seems to have the oldest yet weakest family planning program, in which more effort and input is needed in case of accountability, data, equity and quality. The focus should also be on Public health policy and disease control.

The high population growth rate is deeply linked with urbanization and migration. The lack of jobs and resources urges a significant number of people to migrate from one part of the country (inter-province, intra-province, district level) and to other countries i.e. Middle East, Europe, etc. However, the patterns of domestic and international migration are quite different from each other.

In this regard, the PRC's Panel Discussion/Academic Conference discussed and evaluated the ongoing challenges on population growth and explosion by exploring dynamic and forward-looking themes in the Pakistan-Asian-Global landscape. This virtual event brought a large number of participants i.e. government and higher education/academia officials, researchers, policymakers and students together and provided them an opportunity to discuss, explore and suggest principal solutions for the challenges Pakistan is facing.

The preliminary session was based on the panel discussion comprising speakers around the globe. The themes discussed in this preliminary session explored main population challenges; i.e. population explosion, migration among East and Southeast Asian economies, internal migration patterns and its implications for socio-economic development, international labor

migration, public health policy and disease control, issues of population, education and workforce and reproductive behavior in Pakistan.

While discussing the themes and addressing issues related to population growth, the second session of the event provided a foremost opportunity to the participants to present their research papers. This session was chaired by the esteemed faculty members of FCCU.

Panel Discussion/Academic Conference Program

OPENING SESSION - 9:00 – 9:30	
Introduction & Greetings: Dr. Mohammad Vaqas Ali, Director Population Research Center (PRC), Forman Christian College (A Chartered University) **Welcome Address:** Dr. Sikandar Hayat, Chair, Advisory Board & Dean, Social Sciences, Forman Christian College (A Chartered University) **Inaugural address:** Dr. Jonathan Addleton, Rector, Forman Christian College (A Chartered University)	
PANEL DISCUSSION: SESSION I **9:30 – 11:45** **Chair: Dr. Zeba Sathar (Senior Associate & Pakistan Country Director, Population Council, Pakistan)**	
1. Dr. Zeba Sathar - Chair Panelist (Senior Associate & Pakistan Country Director, PC)	Opportunities and Threats: Population Growth and the Way Ahead
2. Dr. Gavin Jones (Emeritus Professor, Australian National University)	Main population challenges facing Pakistan
3. Professor Eric Fong (Chair and Head, Department of Sociology, The University of Hong Kong)	Opportunities and Challenges: Migration among East and Southeast Asian Economies
4. Dr. Ghulam M. Arif (President, Population Association of Pakistan)	Internal Migration Patterns in Pakistan : Implications for Socio-Economic Development
5. Dr. Minhaj Qidwai (Founder CEO Unet Consultants, Center for Healthcare Innovation and Transformation and Sindh Healthcare Commission	Public Health Policy and Disease Control
Discussion & Q/A Session	
BREAK 11:45 – 12:00	

PANEL DISCUSSION: SESSION II 12:00 – 15:00 **Chair: Dr. Ali Mohammad Mir (Senior Programme Director, Population Council, Pakistan)**	
6. Dr. Farid Midhet (Professor and Chair of Public Health Department at Iqra University Karachi)	Pakistan's population explosion - its causes and consequences
7. Dr. Nasra Shah (Professor, Lahore School of Economics, Pakistan)	International Labor Migration from Pakistan: A Safety Valve or a Slippery Slope?
8. Ms. Shahnaz Wazir Ali (President, SZABIST)	Issues of Population, education and workforce
9. Mr. Muqadar Shah Program Analyst (Population & Development) United Nations Population Fund (UNFPA)	High population growth rate and its linkages with development sectors including economy, climate change and women empowerment
10. Dr. Saima Bashir (Senior Research Demographer, PIDE)	Reproductive Behavior in Pakistan: Incorporating Men and Couples to Understand Change over Time
11. Dr. Ali Mohammad Mir, MBBS, MPH (Senior Programme Director, Population Council Pakistan)	Concluding Remarks
13. Dr. M. Vaqas Ali (Director, PRC)	Thank You Note
CONFERENCE PAPER PRESENTATIONS	
Panel I 15:30 – 16:30 **Chair(s)** Dr. Sara Rizvi Jafree (Chairperson & Associate Professor, Department of Sociology)	Panel II 15:30 – 16:30 **Chair(s)** Dr. Muhammad Ali Bhatti (Chairperson & Associate Professor, Department of Economics)

Dr. Khadija Shakrullah (Associate Professor, Department of Geography)	Mr. Jawad Tariq (Assistant Professor, Department of Sociology)
Topic: A Comparative study of the Determinants of Socio-Economic and Demographic Factors of the Child malnutrition in South Asian Countries Presenter: Dr. Alamgir (Associate Professor, Department of Statistics, University of Peshawar)	Topic: Population Growth and Demographic Dividend in South Asia Presenter: Jamal Abdul Nasir (Chairperson, Statistics Department, Government College University, Lahore)
Topic: Environmental Challenges and Green economy; A Case Study of South Asia Presenter: Dr. Iram Naseer Ahmad (Assistant Professor, Department of History & Pak Studies, Forman Christian College University)	Topic: Toward Economic Growth without Emissions Growth: The Role of Urbanization & Industrialization in Pakistan Presenter: Mr. Sher Khan (M.Phil. ,Quaid-i-Azam University, Islamabad)
Q/A Session **Concluding Remarks by Chair(s)**	

Dr. Sikandar Hayat

Distinguished Professor of History and Public Policy &
Dean, Faculty of Social Sciences, FCCU

Bio: Dr. Sikandar Hayat is a Distinguished Professor of History and Public Policy and Dean, Faculty of Social Sciences at Forman Christian College (A Chartered University). From 2014-17, he was Chair of the History Department. Earlier, from 2006-12, he was Directing Staff (Research) at the National Management College (formerly Pakistan Administrative Staff College) and Dean, National Institute of Public Policy at the National School of Public Policy, Lahore. During 1973-2006, he was faculty at the Quaid-i-Azam University, Islamabad, and, after serving for more than three decades, first at the Department of Pakistan Studies (founding faculty, till 1983) and later at the Department of History, he retired as Meritorious Professor and Chair of the Department of History. During this period of 1991-1995, he was Education Counselor (Head of Education Division) at the Embassy of Pakistan in Washington DC, United States of America (USA).

Welcome Address:Opportunities and Threats:

Population Growth and the Way Ahead

Empirical evidence:

"The world population of 7.9 billion is growing faster at about 1.05 % a year. The growth of population is not the same in different parts of the world; especially the rate of population growth in the global south is consistently higher compared to the countries in the global north. Pakistan being the fifth-most populous country in the world is facing many serious challenges related to overpopulation. Conversely, almost 66 percent of the population is between the ages of 15 and 33 years and the country has immense potential for leveraging this demographic dividend, provided the development agenda of the country is aligned with the SDGs and a greater emphasis is placed on human capital development.

According to UNDP, Pakistan ranks 154th out of a total of 189 countries on the UN's Human Development Index. Overpopulation exacerbated by a high population growth rate and inadequate human resource development, exposes Pakistan to many challenges related to

poverty, education, healthcare, gender inequality, urbanization and migration, and food and water insecurity, to name a few.

In 2020, Pakistan's GDP declined by 0.38%, the first negative annual growth rate recorded in the last 68 years. According to ADP, the percentage of people living in Pakistan below poverty line ($3.20 /day) was estimated to be almost 22.8 % before the Covid-19 Pandemic which has now reached an estimated 40.9% (ADB, 2020). Pakistan has lost close to 30,000 lives during the COVID 19 pandemic and according to Pakistan Bureau of Statistics an estimated total of 20.6 million people (out of a total workforce of 55.74 million people) have lost their jobs during this time while 6.7 million people experienced a decrease in monthly income. Rapid urbanization is another challenge that Pakistan is facing due to overpopulation as recent estimates show that the rate of urbanization is 3 % per annum. It is expected that in the aftermath of the pandemic this rate is likely to increase. According to the United Nations Population Division, half of the country's population will be living in urban areas by 2025. The question is, are we aware of the adverse effects of this migration? (Najam, 2021).

Rural-to-urban migration creates economic, political and developmental challenges for a country. A rapid increase in the urban population in countries like Pakistan (with a literacy rate of only 62 percent), overburdens the job market due to a greater demand for low-income employment in urban areas (Kugelman, 2013). The situation is likely to worsen when one considers that almost one third of the children in Pakistan between the ages of 5 - 16 years are out of school. Furthermore, due to a country-wide lockdown in 2020 almost 8 % of school going children dropped out (PBS, 2020). According to State Bank of Pakistan a total of 1.8 million people currently enter the job market every year and the country needs an annual growth rate between 6 to 7 percent to absorb these people into the workforce; which is a far cry from the existing average growth rate of 3.94 % (in 2020). When the so-called "youth bulge" hits the job market the demand for low income employment is likely to further increase creating more pressure on an economy that already has a dwindling growth rate.

While analyzing the impact of the low literacy and high unemployment rate in Pakistan, the gender-based disparities simply cannot be ignored. According to the Global Gender Gap report (2021), Pakistan is ranked 153rd out of a total of 156 countries on the gender gap index. 54.5% of women are illiterate in Pakistan while approximately only 16 % of men are illiterate. Similarly, almost 85 percent of males of working age are employed while only 22.7 % women in the country are employed.

The gender gap evident in women's access to education and the workforce is heavily influenced by prevalence of aggressive gender norms in the country. A household survey on "factors associated with differences in gender norms'' showed that 43% of men think that women should not be allowed to work. Similarly, according to PSLM – 2019, fewer than 10% of households think women have the ability for autonomous decision making. Women face multiple barriers when entering the labor market which include safe transportation, female facilities at the workplace and time constraints due to household duties (Minardi et al., 2021). Policymakers should address this gender gap by not only providing equal opportunities to both men and women but formulating and implementing policies that challenge social and cultural norms which constrain women's access to opportunities at the household and community level. Here we should acknowledge the efforts of organizations like the United Nations Population Fund (UNFPA) in strengthening the capacity of the public sector and the civil society in Pakistan for working towards achieving gender parity in Pakistan (UNFPA, 2021).

Aging population also represents a marginalized group that is growing in size due to demographic transition and resultantly is becoming increasingly vulnerable. An estimate shows that 7% of the population is above 60 years of age which is expected to reach 12.9% by 2050. Some of the major challenges that the aging population in Pakistan is facing include poverty and a deficient old age benefits and pension system, emotional and physical abuse of the elderly and health insecurity (Abdullah, 2021). The government of Pakistan has been making efforts to improve the situation of the aging population in Pakistan. Under the Senior Citizen Act of 2014, a Senior Citizen Welfare Council was established and was given the responsibility of improving access to financial and healthcare resources for the elderly. The National Programme for the Health Care for the Elderly (NPHCE) was also established by the Ministry of Health to "increase the provision of preventive, curative and rehabilitative services" (Helpage, 2021) to the aging population in Pakistan.

These are just a few of the many threats and challenges that Pakistan is likely to face due to overpopulation. To meet these challenges, there is a need to launch multi sectoral nationwide campaigns that are guided by research-driven policy initiatives specifically focusing on de-escalating the population growth rate, protecting vulnerable population groups, and leveraging the population dividend. Concurrently, these multisectoral campaigns and policy initiatives must also work towards conserving our natural resources and protecting the environment. I am sure colleagues that are joining us from Lahore and

Karachi have first-hand experience of the smog resulting from environmental pollution in the major urban centers of Pakistan.

In this regard, Population Research Center (PRC), FC College in collaboration with the Population Council (PC), Pakistan, United Nations Population Fund (UNFPA), Higher Education Commission (HEC) and Office of Research, Innovation and Commercialization (ORIC) has organized this virtual Panel discussion/Academic conference on "Population growth and the way ahead." We are fortunate that we will have been able to gather leading local and global experts in the field of demography and population studies to share their research, thoughts and wisdom on this emergent issue. Thank you!"

Dr. Jonathan S. Addleton

Rector, FCCU

Bio: Born and raised in Pakistan, Dr. Jonathan Addleton is a graduate of Murree Christian School. He has a Ph.D. in International Relations from Tufts University (Medford, MA) and a BSc in Journalism from Northwestern University (Evanston, IL). A five-time USAID Mission Director, he also served as US Ambassador to Mongolia and USAID Representative to the European Union. As USAID Mission Director in Islamabad during 2006-2007, he headed the USAID-funded reconstruction effort in northern Pakistan following the devastating earthquake there in October 2005. Prior to joining the US Foreign Service in March 1984, he also worked for the Macon Telegraph, World Bank, and Carnegie Endowment for International Peace.

Following his retirement from the Foreign Service in January 2017, Dr. Addleton served as an Adjunct Professor at Mercer University in his hometown of Macon, GA while also serving as Executive Director of the American Center for Mongolian Studies. He has written and published numerous articles and several books including "Undermining the Center: The Gulf Migration and Pakistan" (Oxford University Press); "Some Far and Distant Place" (University of Georgia Press); "Mongolia and the United States: A Diplomatic History (Hong Kong University Press); and "The Dust of Kandahar: A Diplomat among Warriors in Afghanistan" (Naval Institute Press).

Inaugural address

"Thank you for the opportunity to open this International Virtual Conference on Population Growth with a few remarks. In addition, let me thank Dr. Muhammad Vaqas Ali for extending the invitation to me in the first place; and let me also thank everyone else from Pakistan and abroad who are participating, whether as speakers, panelists, participants or attendees. From my perspective, it is certainly an impressive event. I also appreciate the fact that FCCU and its Population Research Center have the honor of being sponsors, along with the Population Council of Pakistan, UNFPA, HEC and ORIC.

As some of you may know, my PhD dissertation -- written back in the 1980s -- touched on a number of the same themes covered at this conference, especially related to international and to some extent domestic migration. The book version of this dissertation -- titled Undermining the Center: The Gulf Migration and Pakistan -- was later published by Oxford University Press. Among other things, it provided an early look and detailed assessment of a phenomenon that was becoming increasingly important to Pakistan and would gather even more momentum in the years ahead. Thus, while I have a professional interest in the subject at hand, I also have a personal interest, given the many familiar names on the participant list dating back to that time, not only from Forman Christian College (A Chartered University), but also beyond. For example, I have never actually met Dr. Gavin Jones. However, I am familiar with his work. I also have tremendous respect for Dr. Zeba Sathar and her many contributions to research and discussion on this topic.

While realizing that I will inevitably miss mentioning some of the other people who should also be recognized, let me quickly also give a shout out to Dr. Nasra Shah from the Lahore School of Economics (LSE) and, previously, Kuwait University and the Population Institute at the East West Center in Hawaii. Probably she does not remember it -- but during the early 1980s, when I was a young PhD student at Tufts University, she extended an invitation for me to fly from Boston to Honolulu to present a paper on labor migration from Pakistan to the Middle East. If I am not mistaken, this was the first academic paper I ever presented. And, as you can imagine, at a personal level it was a very big deal to receive this invitation, seemingly out of nowhere. The invitation as well as the airline ticket and accommodation at the East-West Center that came with it meant a lot. So, again, let me thank Nasra Shah for her kindness all those years ago!

Then, of course, there are the participants from the many institutions that are here today, demonstrating the importance of drawing on Pakistan as well as the experience of Pakistan to inform research in this important area. Those institutions include the Pakistan Institute of Development Economics where I later conducted my own PhD research; UNFPA; Population Council of Pakistan PC); Population Association of Pakistan (PAP); Gates Foundation; Aga Khan University; University of Peshawar; University of Karachi; Quaid-i-Azam University; Lahore School of Economics (LSE); Lahore Collegefor Women University; Government College; and, of course, FCCU. My apologies if I have inadvertently left anyone off this list. However, in my view one of the great things about this Zoom era is to have the opportunity to bring many people together from around Pakistan and beyond to an event like this.

Of course, the topic of discussion for today is especially timely. Looking back, it is sobering to realize that the population of Pakistan when I was born in Murree in 1957 was estimated at approximately 42 million. By the time I left Pakistan to embark on my university education in the US eighteen years later, Pakistan's population had reached 66 million. Returning to Pakistan a decade later to start my career as a junior USAID officer in 1985, Pakistan's population was placed at 92 million. And now, some 35 years later, it is approaching 220 million. Another startling statistic is that East Pakistan in 1971, then about to become the independent nation of Bangladesh, had a population that exceeded that of West Pakistan by some five million. Now, all these years later, Pakistanis outnumber Bangladeshis by tens of millions of people. Against that backdrop, it is perhaps worth also noting that seemingly modest policy changes -- in the case of Bangladesh, those changes include launching an effective family planning program combined with strong support for female education -- can make a big difference. Put another way, the policy decisions made by one generation can and do have a positive impact on the prospects available for subsequent generations. Academic research is of course essential for effective policy decision-making, having the potential to dramatically change the trajectories of individual nations as well as the citizens who live within them with the passage of time.

Given these dramatic changes in the demographics of Pakistan, it is no wonder that "population explosion" is the phrase used in the titles of some of the presentations that we will hear later today. And, interestingly enough, the continued use of this phrase with reference to Pakistan sets this country apart from certain other countries in the region that seem to have embarked on their own demographic transitions, moving toward a situation that is quite different than the one that Pakistan is now experiencing. For India, the transition toward zero population is already underway; in fact, zero population growth has already been achieved in certain regions of that country, especially in the southern part of it.

Indeed, last week the National Family Health Survey undertaken by India's Ministry of Health suggested that the country's total fertility rate has dropped to two, below replacement level. While India is still projected to overtake China as the most populous country in the world relatively soon, it will now take longer than expected. India's population, now at 1.4 billion, is expected to stabilize at 1.6 billion by 2050. Contraceptive prevalence in India now stands at 65 percent and the percentage of women who want to use contraceptives but are unable to access them continues to decline. Put another way, it seems that India no longer faces a population "explosion".

As for China, that country's birth rates continue to hit record lows. In fact, with 8.5 births per 1000, China's birth rate is lower than it has ever been since at least the Chinese Revolution in the late 1940s. Approximately 12 million babies were born in China in 2020, an 18.5 percent decline from the 14.6 million babies born in 2019. Looking ahead to this year, the number of babies born in China will likely be on the order of 10 million, marking the continuation of a seemingly never-ending decline. In fact, China's current fertility rate of 1.3 per female is among the lowest in the world, even lower than Japan despite the fact that China's per capita income is less than a fourth that of Japan. Again, if a symposium like this were being held in China today the focus would not be on a "population explosion," rather it would emphasize the significant new challenges facing large countries when their populations begin to decline. For example, recent projections indicate that some 200 million Chinese workers will retire in the coming years, even as the workforce which must support these retirees is expected to decline by 200 million.

Returning to Pakistan for a moment, these examples make it clear that Pakistan faces its own set of challenges, challenges which are different in important respects to those faced by both India and China, not to mention Bangladesh. Of course, this should not be surprising: every country is different and every country must take into account its own unique social, cultural, political and economic circumstances. In fact, it is those differences that make today's discussion all the more relevant, especially in light of the fact that Pakistan represents the increasingly unusual case of a country whose population continues to grow rapidly.

Clearly, this continued rapid growth places enormous and continuing stress on Pakistan's social and economic system, sometimes in ways that seem overwhelming. At the same time, it perhaps should also be mentioned that continued population growth at a reduced level might also bring with it certain advantages, among other things providing opportunities to learn from the experience of others while also mapping out approaches aimed at benefiting from the "demographic dividend" which a younger population profile often provides, especially if Pakistan is able to make the kind of policy changes that reap the most benefits from that dividend. Here again, effective research aimed at informing impactful policies is vital.

Once again, thank you for the opportunity to participate in this opening session. I look forward to the high quality of the presentations and discussions that will follow. I also wish you the best as you continue to research this hugely important topic. We here at Forman Christian College (A Chartered University) very much appreciate your willingness to contribute to this discussion and sincerely thank you for your participation".

Dr. Zeba Sathar (Tamgha-i-Imtiaz)

Senior Associate & Country Director, Population Council, Pakistan

Bio: Dr. Zeba Sathar is a senior associate and directs the Population Council's office in Islamabad, Pakistan, overseeing technical assistance and capacity building, social science research, and population and demographic dividend research that informs national policy discussions and developments. Her expertise includes cross-national comparative research, advocacy for policy change, analysis of demographic trends and patterns, and evaluations of health service delivery systems. Dr. Sathar has a Ph.D. in medical demography from the London School of Hygiene and Tropical Medicine. She received the Tamgha-i-Imtiaz award by the President of Pakistan in recognition of her public service to the development sector in Pakistan in 2006.

Chair Panelist Address

"Today brings back lots of memories and it's a pleasure to see such familiar faces after a long time. It also reminds us that we still need to focus on the huge challenges of population and development which remain almost similar to 30 or 40 years ago. I want to acknowledge that FCCU was selected from a long list when the Population Council was tasked by UNFPA to set up a population research center. It was at the top of the selection, mainly because it possessed all the qualities of research potential for population, development and population growth. The FCCU has already made important linkages and this was really the basis of that selection. Since then, UNFPA and Population Council, Pakistan have also included Peshawar University and IBA. I hope in the next event that we can actually have a combined seminar.

I am delighted to see such a galaxy of stars here today from many of the disciplines. The fact that Dr. Sikandar Hayat, a colleague who I met when I was at PIDE and he was at Quaid-e-Azam University, while both researchers were returning with PhDs. As he mentioned, the linkages of population and development are so broad with migration, health, gender all

featuring. I would like to add malnutrition, the green economy, and of course, aging, which perhaps we don't worry about enough"

Dr. Sathar welcomed all the panelists including the panelists from the first session of panel discussion; Dr. Gavin Jones, Professor Eric Fong, Dr. Ghulam M. Arif and Dr. Minhaj Qidwai.

"As the world enters a phase of much slower population growth, Pakistan continues amongst very few countries in the world who still have a growth rate of over 2%. We see multiple threats facing us from the economy to national stability. All nations will converge eventually to low fertility and low mortality from high fertility and mortality and experience replacement fertility and indeed stabilization. While this happened in Latin America in the 70s and 80s, in South Asia, this change began to happen in the late 80s and most countries have completed their DT by 2000 or so.

What is so different, puzzling and challenging about Pakistan is that, though we began our fertility decline back in the 90s, it has been slow since it has staggered? We were really actually quite shocked with the intercensal growth rate from 1998 - 2017 being as high as 2.4% and the fact that our fertility is still so high. What we would like to see is more analysis going forward by young researchers about what are the dominant explanations for slow progress?

We have Pakistan's intercensal growth rate perhaps the actual annual increase is probably more like 2% but contrast it to the 1% we talked about in the rest of the region particularly India and Bangladesh. . When we analyze what is similar and what is different about the DT, everything is different in Pakistan from other South Asian countries. Unfortunately, I did not really include Sri Lanka in many of the slides because Sri Lanka is so advanced in its fertility transition. However, we do find that our desired family size did decline from earlier 1970s, but it is just leveled at four children.

The rest of South Asian countries have about the desired family size of two children. We have the lowest demand for contraception (only 55%) whereas; other countries have around 70%. Our contraceptive usage is 35% leveling off since 2013 and that is the troubling part. Nepal, which is the poor country of South Asia, is catching up very fast.

Age at marriage is much higher too. Therefore, only about 18% of young women (aged 20-24) are married by the age of 18 in Pakistan as compared to 51% in Bangladesh. All kinds of anomalies underlie this. Let's explore what the explanations are. Is it that we're poorer? Is our economy not growing fast enough?. We were at a huge advantage as Dr. Addleton talked

about the 80s particularly because of remittances, boom and growth, oil prices etc. So, we did experience a huge rise in our economic growth till about 2000. We are still growing but not at such a rapid speed and after 2015. Our GDP was not lower about 20 years ago but it's not that our GDP is very far behind but Bangladesh which had a lower GDP has surpassed ours. One of reasons is important changes in policy, export led growth, but a huge reason is the decline and rapid population growth rates.

Is it that we lack infrastructure? Not really, I think we are pretty good in terms of infrastructure. Sanitation and electrification is one of the highest key development indicators in South Asia. We are the most (or were at least), one of the most urbanized with Bangladesh. India is also catching up now with levels of urbanization and as it was particularly mentioned by Dr. Sikandar Hayat, we may be under counting urban levels. In the 80's and 90's you would expect Pakistan, a highly urbanizing country with rapid internal migration from rural to urban areas to experience a rapid fertility decline. But in fact, that has not happened.

This is another puzzle that I wish young scholars would really take a look at the links between urbanization, migration, and reproductive behavior.

When we start looking at human development, that's where the answers start coming out. Human Development indeed has been slow. The Human Development Index, of course comprises three measures of education, GDP per capita and health. Childhood mortality, I think another clue lies in the fact that whereas mortality decline, overall mortality decline, the childhood mortality rates, particularly the neonatal mortality rate in Pakistan has really been stubborn to change. It is one of the keys to why parents and the demand for children may not have changed because they do experience high levels of loss of children at early ages even as young as one month especially.

I would like to emphasize that one thing that would drive a lot of the others is really women's autonomy. I was shocked when I compared this World Bank data that Pakistan scores at 35.8 than the levels of Afghanistan which is 32.6 in women's autonomy. This is another clue that women in Pakistan have just not achieved autonomy and one of the measures is really mobility. This is something that strikes a lot of people when they come to facts on limited mobility of Pakistani women and girls.

Female education and labor force participation rate are roots to increasing women's autonomy. Literacy rates are much lower. The labor force participation is generally low in South Asia, with the exception of Nepal. Even India has only a 21% labor force, and

Pakistan's is slightly higher. We cannot talk about demographic dividends without this figure being higher. Women have to participate more in the labor force. But there are more structural than cultural reasons for lower participation.

In terms of family planning programs, we claim to be one of the oldest programs, but I would also say now we claim one of the weakest programs. There are more structural reasons as we need a population welfare department as almost every country in the world works through health. It is a question of the fact that we spend barely 35 cents, which is about less than 80 rupees per person in Pakistan, on planning services alone. Therefore, if you spend a little or poor level of effort in all the areas of data, quality, accountability, equity, of course, you don't get the results. We may have policies but implementation is really weak.

Globally, I don't think that we found that GDP is particularly a driver of demographic change. To me, the key lies in women's empowerment. I've already focused on that and on improving the family planning efforts more broadly through health, better campaigns, more services, the private sector and particularly the departments of health and through better financing. These factors can change the trajectory for Pakistan's fertility.

I think in Pakistan's pathway, we are becoming more divergent than convergent, in terms of comparison with other South Asian countries' fertility. But we may actually be converging more with West Asia. In terms of our own predictions, Casterline and Sathar (2001), we really thought we were on our way towards catching up in terms of fertility transition, but it did not happen. We expected a downward trend in demand for children and an upward trend in expansion in services, which didn't happen either. I think a breakthrough in terms of current trends would be immediately possible if we have game changing programs. We have many pilots that raise the demand for girl's education. There is a demand for female employment that is untapped, as there is a demand for fertility transition".

Panelists Presentations

Dr. Gavin Jones

Emeritus Professor, School of Demography-
Australian National University (ANU)

Bio: Dr. Gavin Jones is Emeritus Professor at the Australian National University. He completed his Ph.D. degree in demography from Australian National University in 1966. Professor Jones has conducted research on varied subjects in the field of demography and human development, in recent years focusing especially on low fertility regimes in Asia, delayed and non-marriage, urbanization issues, and equity aspects of educational development. He has served as consultant to many international agencies, and has published about 30 books and monographs and some 170 refereed journal articles and book chapters.

Presentation topic: Main population challenges facing Pakistan

"Good Morning everybody and thank you so much to Dr. Zeba Sathar for your very kind words. It is always an honor and pleasure to participate in discussions on population policy issues in Pakistan. I really look forward to the possibility of presenting a few thoughts today. Of course, twenty minutes are not very long and there is a lot to discuss but happily, Dr. Sathar has already presented some important information, which can shorten the presentations by myself and others.

I think it is very striking that there has been a major change in attitudes towards population at the senior levels of government in Pakistan. Some years ago, nobody in the highest positions of power was willing to say that rapid population growth is a major issue. But the population issue is now considered very important. It is agreed that rapid population growth is an obstacle to achieving Pakistan's goals of sustained human and economic development. It is recognized that lowered fertility will lead to slower population growth and beneficial changes in age structure, generally referred to as the demographic dividend. I am not going to say much about the demographic dividend in my presentation, as other speakers will be covering that. So I will leave it to them.

Just to mention that the national task force, appointed at the highest level of government, has an action plan which aims to reduce the population growth rate from 2.4% to 1.5% per annum by 2024 and 1.1% per annum by 2030. The mechanism is a contraceptive prevalence rate raised from 34% to 50%, and then to 60% by 2030. The outcome is expected to be a total fertility rate lowered from 3.6% to 2.8% by 2025, and 2.2% by 2030. The target of 2.2% by 2030 is a very optimistic one. It is important to reach it as the population growth rate in Pakistan is extremely rapid, as already mentioned by Dr. Sathar. Pakistan is really an outlier in this respect, which does not have good implications for Pakistan's future. Compared to relevant countries, Pakistan lags in key development indicators - the under-five mortality rate, the infant mortality rate and the early child mortality rate, which is double that of Bangladesh and India and triple those of Indonesia and Egypt. This undoubtedly affects people's thinking about the need to have more children. There is an uncertainty of survival, which is still very important in Pakistan.

Another key indicator is the net enrolment rate in secondary education which is almost half that of Bangladesh, and less than half that of Indonesia and Egypt. We stress girls' education, and that is extremely important. However, I think it is also worth mentioning that in Pakistan, boys' education is also lagging badly at the secondary level. While it is very important to raise girls' education, it is also important to raise boys' education at the same time. With regard to the female labor force participation rate, Pakistan is not so low as compared to India, but India also has a very low rate, which has fallen in recent years. Pakistan's participation rate is well below that of Bangladesh and far below countries like China, Indonesia and Southeast Asian countries generally.

It is now agreed that there is an urgent need to lower fertility in Pakistan. The national narrative on population growth issued by the Government of Pakistan states that Pakistan must lose no further time in achieving a rate of population growth that is sustainable. This will have to be much slower than the growth rate of 2.4% over the period 1998 to 2017. In considering how to proceed, we need to take a broad perspective on the issues. Many factors must be considered. For example, why has human development lagged in Pakistan? Certainly, not because of any lack of potential among Pakistan's young people, but because young people are not being given the opportunity to fulfill their potential. Then there is the issue of elite capture of institutions, stressed in government documents and by the World Bank, which continues to hinder Pakistan's efforts to achieve more rapid economic and social development. Elite capture is the control of institutions to serve the narrow interests of the powerful interest groups while failing to provide universal opportunities for socio-economic development to the large, disadvantaged groups. Good governance should focus

policy on human development and poverty alleviation as the key to achieving the goals of population policy. Inadequate attention has been paid to the basic needs of healthcare and education. If we look at government budgets, for example, the share of government revenues going into education and health is low and is much lower than it should be. That is why Pakistan is trailing so many other countries in these respects, aside from the issue of the rapid growth in the population.

Pakistanis continue to prefer families of three or four children which is another broad concern and must be taken into account in a rights-based approach to population and family planning issues. While comparing the data from different Demographic and Health Surveys of Pakistan with those conducted in neighboring countries (Table 1), two-thirds or more of women with 2 children don't want any more children in Indonesia, Nepal, and Bangladesh, whereas in Pakistan, only 20% of such women do not want any more children. There are enormous differences between these shares in Pakistan and other countries. Admittedly, in Pakistan, there is a large group of women who give a "don't know" answer to that question. Therefore, the number who do not want more might be higher than mentioned above – but not by enough to greatly narrow the gap between the figure for Pakistan and for neighboring countries.

Table 1: Comparison of Demographic and Health Surveys

	Number of living children				Mean ideal no. of children
	1	2	3	4	
Pakistan 2017-18	5	20	48	67	3.9
Indonesia 2017	13	61	73	76	2.7
Nepal 2016	31	67	55	57	2.1
Bangladesh 2017-18	11	72	77	78	2.3

Of course, the consensus of the international population community, in the United Nations and other documents, is that you must respect people's rights to have the number of children they want. You should not be interfering with that. So, what, then, should be the approach to the agreed need to lower fertility in Pakistan? The following four-pronged approach, which is totally in line with a rights-based approach to family planning is what needs to be followed. First, lower the infant and early childhood mortality rate. Second, raise the education levels of both boys and girls. Third, focus on countering gender inequality and opening wider employment opportunities for Pakistan's increasingly well-educated women. I believe these three strategies are likely to lead to a lower desired family size. Finally, meet

the unmet need for family planning because although many people want to continue having more children, there is a substantial unmet need for family planning, that is, those who do not want more children and are not using family planning, which needs to be met.

These four prongs have many beneficial results, aside from their role in lowering fertility, and are in line with state and national development goals. For example, increased female labor force participation will not only make a clear contribution to economic growth but will also help to slow population growth through backward and forward linkages. The key assumption is that bringing about a situation where the majority of women have good educational and employment opportunities will lead to a decline in desired family size because it broadens women's opportunities beyond the traditional role of bearing and rearing children, and will lead to a desire to give better opportunities to fewer children. This is the typical result of such developments in many countries. The point is that mass education changes society, not just its individual members. It can lead to ideational changes in society as a whole, moving society toward an industrial urbanized monetized economy with lower community childbearing norms. It also leads to higher age at marriage for women and greater female autonomy.

It is essential for contraceptive prevalence to be raised. We need to look at both the demand and supply sides of this issue. The prevalence rate of modern methods in Pakistan is less than half that in Bangladesh, Indonesia or Egypt. That is an extraordinary difference. The contraceptive prevalence rate in Pakistan is really surprisingly low. Although as already noted, the desired family size remains quite high in Pakistan, there is a substantial unmet need for family planning. The demand will increase further if the four-pronged approach mentioned earlier is followed. On the supply side, we have obstacles to raising the prevalence of contraception. There are many issues but I will just mention a couple of them as the people participating in this conference are well aware of the issues involved. There is the issue of the roles of the public and private sectors; the private sector has not been engaged to the extent that it needs to be in the provision of family planning services. Then there is the issue of the need for more effective coordination between the Department of Health and the Department of Population Welfare. The Department of Health has many more outlets and resources for the provision of family planning services than the Department of Population Welfare, but it has not given enough priority to this provision in its overall view of its role in providing health services, and that needs to change. Another important issue is the need to ensure effective utilization of Lady Health workers (LHWs) in provision of family planning advice and services. LHWs had a major role in the past in providing family planning advice and services and then this was somewhat diluted because they were

given additional responsibilities. There is a clear need to refocus on family planning as a key element of their work. Finally, every opportunity must be seized to provide family planning information and to provide services to women in their encounters with the health system. Women have many kinds of encounters with the health system and studies show that there is not very much use being made of these encounters to provide them with information about family planning.

Policies advocated in the four-pronged approach will be mutually reinforcing, lowering the average number of children couples want and enabling them to raise their children without contending with unintended pregnancies. Examples of interactions include; (i) raising the levels of female education will contribute to lowering infant and early childhood mortality, (ii) making family planning services readily available will lower unwanted fertility and facilitate birth spacing, and hence lower the high rates of infant and child mortality related to frequent and unwanted births and (iii) lowered child mortality and ill health will free up mothers' time for other things, including better caring for other children and joining the workforce.

In summary, while it is easy to take a pessimistic view of Pakistan's prospects, I would prefer to take a positive view of these prospects, particularly for achieving the population policy goals, while recognizing that the obstacles are very great. If the demographic transition can be accelerated, this will yield the potential demographic dividend. Achieving the SDGs will be closely linked to achieving these population goals, and happily the Pakistani Government has given considerable attention to achieving the SDGs. These are interrelated; success will be reinforcing, and will facilitate the deceleration of population growth. The Ehsaas program also has the potential to improve the circumstances of the most disadvantaged sections of the community.

Population policy must have a multi-sectoral approach fully integrated within comprehensive socio-economic development plans. It should focus on efficient investments in education especially at the secondary level, health and skills development, ensure equitable distribution of socio-economic opportunities, and promote export-led growth backed by private and public sector investment in the manufacturing sector to produce quality jobs demanding middle and higher skills. Effective population policy will achieve desired outcomes including higher contraceptive uptake and low fertility rate. Finally, it cannot be stressed enough that achieving these outcomes will depend on concurrent adoption of economic and social policies that reduce the exclusion of the marginalized population from socio-economic opportunities. Thank you"

Dr. Ghulam Muhammad Arif

President, Population Association of Pakistan (PAP)

Bio: Dr. Ghulam Muhammad Arif is the president of Population Association of Pakistan (PAP). He has completed his Ph.D. and M.A degree from Australian National University, Canberra in the subject of Demography. He is a Former Joint Director of Pakistan Institute of Development Economics (PIDE). He has also served as Dean of Research, Senior Research Demographer, Research Demographer, Staff Economist, Associate Staff Economist and Research Associate at PIDE.

Presentation topic: Internal Migration Patterns in Pakistan:

Implications for Socio-Economic Development

"Thank you very much Dr. Zeba Sathar. Thanks to the PRC, FC College University Lahore for giving me this opportunity to share my views on internal migration in Pakistan. It is really a great honor for me to be here in the presence of Professor Gavin Jones, Dr. Zeba Sathar, Dr. Nasra Shah, Professor Sikandar Hayat and Professor Vaqas. During my PhD, I benefited from the book of Dr. Addleton, who wrote an analytical and informative book on the socio-political impact of Pakistani workers' emigration to the Middle East on society. I congratulate PRC for the choice of topics for this panel discussion; ranging from demographic factors such as fertility and mortality to South Asian and East Asian migration and now we are talking about the internal migration experience in Pakistan.

My discussion will be on two or three things concerning internal migration particularly the incidence and patterns of internal migration and some of the implications of this mobility. More recently, three data-sets - PDHS, PSLM and LFS - have given the opportunity to analyze the internal migration.

One recent article has shown that the internal migration is almost four times of the overseas migration from Pakistan. But the former is neglected in the migration and development debate in Pakistan, and I think, in other parts of the region as well. But it is an important

issue and we need to understand the dynamics of internal migration. It is very much related to the socio-economic development as well as demographic, economic and social concerns or issues of Pakistan.

In both the population censuses and household surveys, the concept of lifetime migration is used for reporting the movement of population from one place to other, and inter-district movement of the population is considered as the change of residence or internal migration. These two concepts in fact underestimate the incidence of internal migration which is quite low in Pakistan compared with the other countries of the region particularly when we consider the Indian definition of internal migration, which includes the intra-district movement of population. A district is a quite large geographical entity in Pakistan, and a lot of mobility takes place within the district. But, in every survey and census we don't include this intra-district mobility. Similarly, the lifetime migration concept ignores all moves between the birth of a person and his or her last move to the current residence. However, despite these limitations, it is encouraging that three different data sources have recently collected information on internal migration. The first one is Pakistan Demographic and Health Survey (PDHS 2017-18). Second we have a migration module in the PSLM (2019-20). Third, the Pakistan Labour Force Survey has also started collecting information on internal migration during its recent rounds of the surveys. But unfortunately the 2017 population Census does not provide the statistics on internal migration. In an earlier census 1998, the previous residence of a migrant was not classified by rural-urban areas, so, it was not possible to examine the direction of mobility e.g. from rural to urban areas. With this background and data limitations, I will focus primarily on the recent data sets to see the patterns of internal migration.

At the national level, the incidence of internal migration, according to the 2017-18 PDHS is about 11%. But the PSLM gives about half of this incidence at 6%. In the labor force survey which collects data for the population of age 10 years and more shows, the incidence of internal migration is reported as 13%. It is very difficult based on these statistics (Table 1) to say what the real incidence of internal migration is in Pakistan. The PSLM data was quite a large data set with more than 200,000 households and the same module, which was used in the PDHS, was also replicated in the PSLM. But we have witnessed different migration rates or incidence of migration.

Table 1: Incidence of internal migration

Province	2017-18 PDHS	2019-20 PSLM	2018-19 LFS(10+)

National	10.7	6.3	12-13%
Punjab	13.4	7.5	-
Sindh	8.0	5.7	-
KP	6.7	4.4	-
Balochistan	6.1	3.5	-

Punjab has the highest incidence of migration, about 13%, according to the PDHS. The incidence for Sindh is at 8%, followed by KP and Balochistan. I think if we go 20 or 30 years back, the situation was slightly different in terms of the provincial situation. But now, it appears that the mobility in Punjab is quite high when compared with other provinces of the country.

We usually capture the phenomena of internal migration through in-migration statistics. The PDHS and PSLM give us information on out-migration as well - out-migration within the country (Table 2). About 14% of households at the national level reported that they have at least one member who is living at some other place or other district of the country when the PDHS was carried out and it is considerably higher in rural areas than in urban areas. Punjab is at the top in terms of this out-migration followed by KP, and the highest out-migration is reported from AJK and GB. In GB (Gilgit Baltistan) 28% of households have a person living/working within the country. In AJK the corresponding percentage is 25%. Most of these out-migrants moved out to other districts for economic reasons.

Table 2: Out-migration: % of households with at least one out-migrant within Pakistan during last 10 years, PDHS 2017/18

Provinces/regions	Total	Rural	Urban
National	14.3	16.4	11.0
Punjab	18.2	20.6	14.2
Sindh	5.7	5.5	5.9
KP	15.7	12.0	16.7
Balochistan	5.2	4.9	6.1
AJK	25.4	17.6	27.1
GB	28.0	-	-
ICT	12.2	-	-
FATA	21.2	-	-

In terms of the patterns of internal migration, it has been reported in many studies that migration within the province (intra-province) has increased over time. The situation of the 70s and 60s used to be different when the share of inter-province migration was quite large. Now, the dynamics of internal migration are quite different and a lot of migration is taking place within the province. The PDHS shows (Table 3) that 90% of internal migration in Punjab is within the province and the rest is across the province (inter-province). Same is the case in KP, but in Sindh and Balochistan, the situation is rather different. In Sindh, close to 40% of migrants moved from other provinces (inter-province). What this suggests is that, in Sindh, people are going from other provinces, but in the other three provinces, particularly KP and Punjab, the mobility is mainly within the province. Karachi and Quetta are the destinations for inter-province migration.

Table 3: Patterns of internal migration: inter- and intra-province migration

Provinces	Inter-province migration		Intra-province migration	
	2017-18 PDHS	2019-20 PSLM	2017-18 PDHS	2019-20 PSLM
Punjab	10.9	17.0	89.1	83.0
Sindh	42.9	41.0	57.2	59.0
KP	57.8	9.0	42.2	91.0
Balochistan	51.4	41.0	48.6	59.0

In inter-province migration (migration between provinces) the share of Sindh and KP is substantially higher than other Punjab and Balochistan, but in intra-province migration, almost three-quarters of migrants are from Punjab (Table 4).

Table 4: Percentage distribution of inter-province and intra-province migration across provinces (LFS 2018-19)

Province	Inter-province migration	Intra-province migration
All	100	100
Punjab	45.0	71.0
Sindh	33.0	17.0
KP	21.0	12.0
Balochistan	1.0	<1.0

In district level migration (Table 5), in Punjab, the high migration districts are Rawalpindi, Lahore, Gujranwala, Sheikhupura, Toba Tek Singh and Faisalabad. Here you can see a very

interesting phenomena that except Rawalpindi all other districts including the provincial capital Lahore, migration is from within the province. People have moved from the same province to Lahore or other cities from the surrounding areas (districts). But in Rawalpindi, almost half of the migrants came from other provinces, mainly because of its proximity with Islamabad, and also being the headquarter of armed forces. In district Karachi East, migrants are from within the province (intra-province), but in Karachi West as well as Karachi Central, migrants are mainly from other provinces. Mirpurkhas is the next important district of Sindh for attracting internal migrants. In KP, all high-migration districts attracted migrants mainly from within the province. In Balochistan, inter-province migration dominates particularly in Quetta and Loralai than in other districts of the province. These dynamics of internal migration show that Karachi and Quetta have attracted migrants from other provinces in addition to intra-province migrants. But in Lahore and Peshawar, people have moved from within the provinces. Rawalpindi is also getting migrants from other provinces.

Table 5: Incidence of migration in high migration districts

Districts	Incidence of overall migration	Incidence of intra-province migration
Punjab		
Rawalpindi	15.04	7.39
Lahore	14.95	13.24
Gujranwala	10.59	9.53
Sheikupura	10.08	9.15
T.T. Singh	8.61	7.52
Faisalabad	8.19	7.19
Sindh		
Karachi East	19.10	10.76
Karachi West	11.39	2.61
Karachi Central	10.27	4.52
Mirpurkhas	10.98	10.51
Sukker	5.89	5.07
Khyber Pakhtunkhwa		
Peshawar	12.37	11.51
Kohat	9.34	8.94

Haripur	8.09	5.56
Nowshera	8.02	7.29
Hangu	6.35	6.30
Mardan	6.65	5.28
Balochistan		
Quetta	11.68	6.48
Loralai	4.11	1.84
Washuk	3.14	3.05
Nushki	3.03	3.03

The duration of residence of migrants (Table 6) is another important aspect of internal migration. The bulk of internal migrants moved to their current place of residence more than 10 years ago. Many studies have linked the year-wise data with economic growth. Although in Pakistan, it is very difficult to say how much mobility is linked with the economic growth, high GDP growth creates more opportunities for employment, thus attracting migrants towards cities. It is true to some extent that during the period when economic growth was high in Pakistan, the incidence of internal migration was higher as well. But this is the area which needs some more serious research.

Table 6: Duration of residence by province/region

Province	≤ 5 years 2012/13 to 2017/18	6-9 years 2007/08 to 2011/12	≥ 10 years Before 2007/08
National	26.6	14.4	57.1
Punjab	26.6	12.6	58.6
Sindh	21.6	12.7	64.1
KP	24.4	30.5	44.7
Balochistan	44.2	11.6	42.8
ICT - Islamabad	37.2	16.2	46.3

While the literature on internal migration suggests that migrants are generally selective. In the case of Pakistan, it looks that migrants are selective or selectivity is there. The first selection is by gender (Figure 1); females are more likely to move than males, mainly for marriage purposes. Age selectivity is there as well (Figure 2). Migrants are also selective by education (Figure 3) - higher the level of education the higher the probability of people moving to other places of the country. Selectivity also holds in terms of the wealth status

(Figure 4). So migrants in Pakistan are selective in gender, age, education and wealth status. This is a little bit different from the Indian case, where recently a couple of studies have shown that the poorest people have been moving; the movers are primarily unskilled workers. We need some more studies to see how selectivity works in the region – Bangladesh, India, and Pakistan.
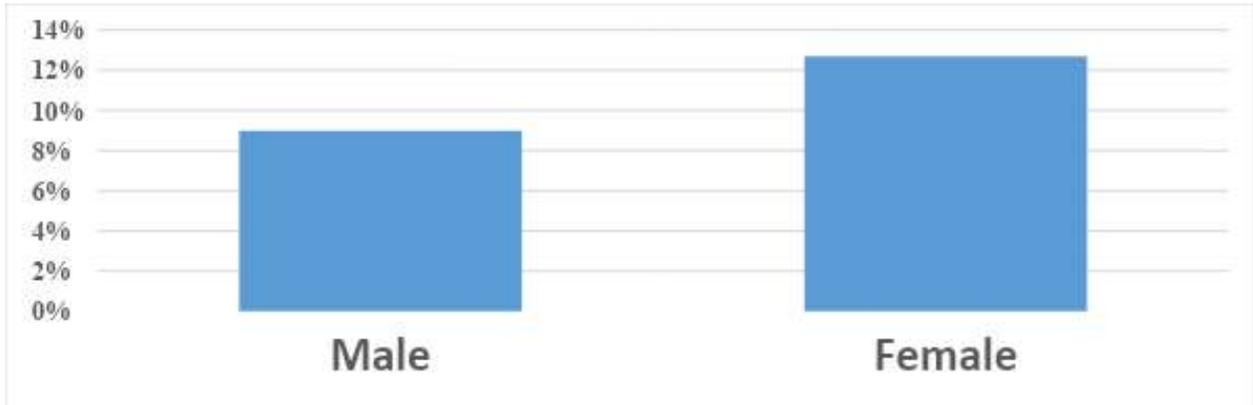
Figure 1: Incidence of migration by gender, PDHS 2017-18
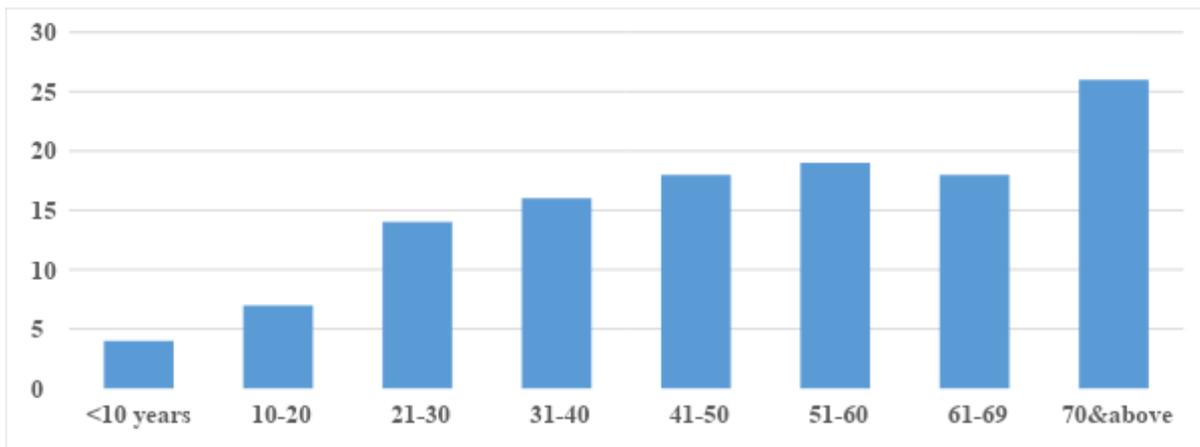
Figure 2: Incidence of migration by age, PDHS 2017-18
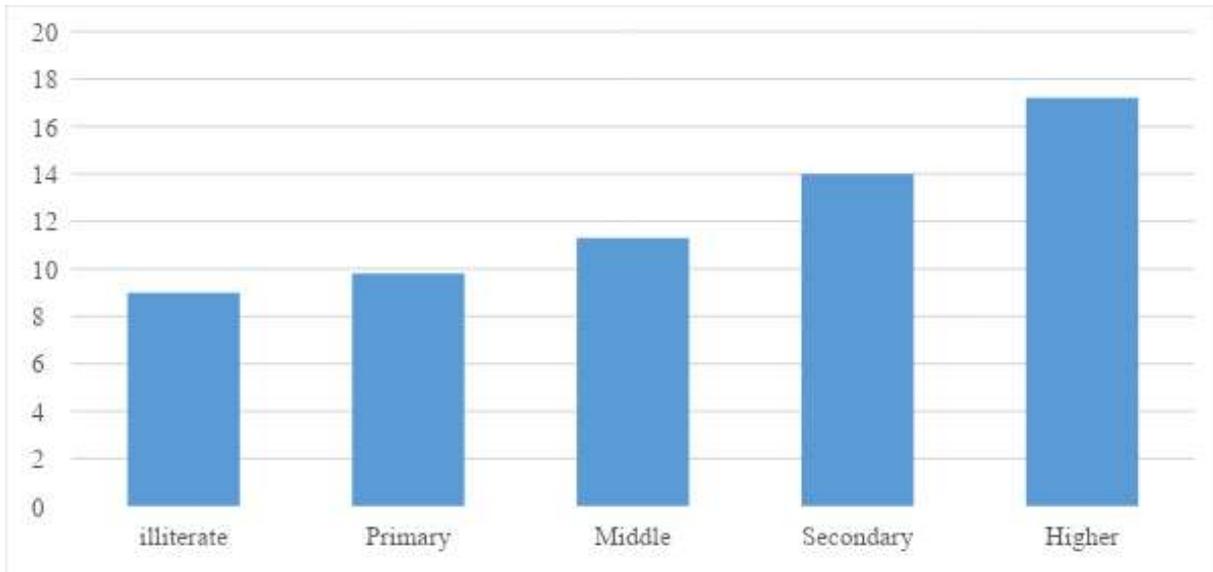
Figure 3: Incidence of migration by educational attainment
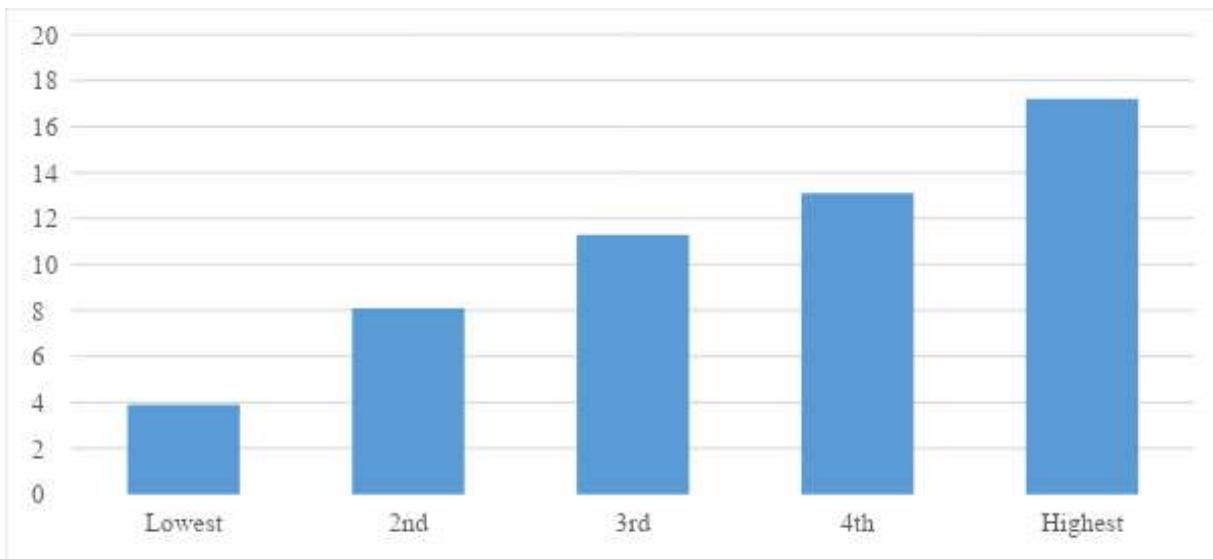
Figure 4: Incidence of migration by quintile

Regarding the socio-economic implications of internal migration (Table 7), let me go through it quickly as Dr. Zeba Sathar and Dr. Sikandar Hayat have also mentioned that internal migration's one implication is urbanization. According to the recent work at the Population Council by Dr. Zeba Sathar, if you see the EU classification, then urbanization level in Pakistan is close to 50%. But the 2017 census data shows the urbanization level as 36%. In

my own work done in 2003 almost 16 or 17 years back, the level of urbanization in 1998 was about 39%, much higher than the level given in the 1998 census (32%).

Table 7: Socio-economic implications of internal migration

Census year	% Urban	Growth rates		
		Total	Rural	Urban
1981	28.3	3.1	2.4	4.3
1998	32.5 (39)	2.7	2.3	3.5
2017	36.4	2.4	2.1	3.0
2017 Density	42.0	-	-	-
2017 EU classification	49.1	-	-	-

The data suggest that the natural increase (births-deaths) is the main factor for urban growth in Pakistan, and the contribution of internal migration, mainly from rural to urban areas, is about 20%.

Based on these simple statistics on internal migration and urbanization, I argue that the urban system is maturing in Pakistan. Maturing in a way that these are not only large cities, which are growing, rather the whole city network of about 600 towns, and cities is growing, and they are connected well with each other. The urban system is also transforming the rural areas of the country. Because of this internal mobility we can see a lot of changes. There is a need to work more to examine how the urban system and city network is working in Pakistan, particularly in connecting the rural areas with urban centers as well as connectivity among the urban centers. I remember Professor Nizamuddin mentioned some time ago that the three-districts triangular consisting of Sialkot, Gujranwala, and Gujrat, which is hub for small industries, is connected well to meet their industrial needs. Raza Ali in his excellent work has discussed the emerging characteristics of the urban system in Pakistan. The findings of Arif Hassan's excellent field research are supportive to the growing urban system as well. With the growing maturity of the urban system in Pakistan, a transformation is taking place. However, as Dr. Sikandar Hayat mentioned, there is a pressure on urban labor markets of the country.

Let me conclude that this pattern of internal migration in Pakistan has three or four particular implications. The first implication is for the urban system and the second

implication is for the labor market. The third implication is for the wellbeing (poverty) of people. Urban poverty is much lower than rural poverty.

Finally, we need regular information and data on internal as well as international migration. Migration modules included in three data sources - labor force survey, PSLM and PDHS – may be improved and continued in their future rounds. These sources for data generation should be consistent with each other. So, we can compare the results over the time and to see the trends in internal migration as well. As the final word, I have been engaged in migration phenomena for many years. I think the future of the country is in urban areas, not in rural areas. We need to see this population mobility very positively to make cities friendly for migrants rather than thinking the other way round. I think "urban" is the future of the country".
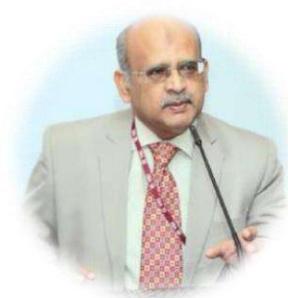
Dr. Minhaj A. Qidwai

Founder CEO Unet Consultants, Center for Healthcare Innovation and Transformation and Sindh Healthcare Commission

Bio: Dr. Minhaj is the founder CEO Unet Consultants, Center for Healthcare Innovation and Transformation and Sindh Healthcare Commission. He is also a Research Consultant at the Department of Community Health Sciences-Aga Khan University and faculty member a faculty Member at American Institute of Healthcare Quality since 2015. Dr. Qidwai has more than three decades of International Experience in Healthcare Management, Research, Human Capacity Building and Academics. He has expertise in Healthcare Planning, Regulation, Quality Management, Academics and Curriculum Development.

Dr. Minhaj has laid the foundation of a Healthcare Regulatory Body in Sindh Healthcare Commission as Chief Executive Officer (2017-2020) and Hospital Management Program at Institute of Business administration as a Program Director and Faculty member (2014-2017). He has also collaborated with WHO, UNICEF, USAID, JHPIEGO, OPM and several other donor agencies on various projects.

He converted the Diploma Program in Healthcare Systems Management into a Master's Program at the College of Physicians and Surgeons Pakistan as the Program Director (2013-2014).

Dr. Minhaj is also an author of Book "A2Z of Healthcare Quality" (2020-2021) and currently Working on a book titled "4S" Therapy for Public Health and Social Sciences.

Presentation topic: Public Health Policy and Disease Control

"Thank you very much and I am thankful to FC College for providing this opportunity to me. It feels pleasure to be a part of such an academic group. I would like to focus my presentation mostly on the policy aspect and the holistic aspect of public health policy and disease control. It will revolve around my "4S" Model-Self, Society, State and Systems; which are the four main pillars for managing any project from a strategic perspective. There are three parts to the Presentation-Public Health, Public Health Policy and Disease Control.

A. Public Health:

Public health is defined as the art and science of preventing disease, prolonging life and promoting health through the organized efforts of Society. The State develops policies for welfare of people. The System revolves around People, Institution and Resources. People need accessible and affordable quality healthcare; Institutions focus on health promotion, disease prevention, research, innovations, policy development and human capital development; whereas, Resources are provided by the Self, State and Society to run the System.

The core activities of public health are; preventing the injuries, epidemics and the spread of disease, protecting against environmental hazards, responding to disasters, promoting healthy behaviors, assuring affordable, accessible and quality of services, monitoring the health status of population, mobilizing community action, reaching out to link high-risk and hard-to-reach people, researching to develop new insights and innovative solutions and leading to the development of sound health policy and planning.

The ten essential public health services that are a part of this whole process. These are divided into three main categories with centrality of conducting research and data review for Systems Management:

1. Assessment: This includes monitoring of health, diagnosing and investigating, informing, educating to empower the community;
2. Policy Development: Mobilization of community to develop policies with the input of all the stakeholders.
3. Assurance: Law enforcement, regulations, link to the services, assuring competent workforce availability and evaluation.

Therefore, research and data management is essential for systems management; as if you do not have data through research, you will not be able to manage. So, while we're dealing with the public health policy aspects; data collection and its utilization for policy and systems development and overall management is important.

So, all revolves around the systems. Health system is the totality of social-cultural beliefs and practices, policies, programs, structural arrangements and institutions involved in production and distribution of goods and services meant to promote health, prevent illness and prolong life. Health systems should deal in the context of complete well-being of the individual and the community. The public policy basically deals with ensuring that the system is in place in order to deal with the community and ensure that the community is taken care of.

From public health policy, considering the epidemiological perspective, the determinants of health are the social environment, the physical environment and the biological environment. Social environment includes income and social status, social support, health practices, coping skills and culture. While the physical environment deals with education and literacy, employment, working conditions, housing and health services. The biologic environment deals with the healthy child development, biology and genetic endowment and gender.

Determinants of Health

Social Environment	1. Income and Social status 2. Social support 3. Health practices 4. Coping skills 5. Culture
Physical Environment	1. Education and literacy 2. Employment 3. Working conditions 4. Housing 5. Health services
Biological Environment	1. Healthy child development 2. Biology and genetic endowment 3. Gender

These are basically the determinants of health from the epidemiological perspective. But when we talk about the health policy perspective, the determinants of health have to be considered in terms of the 4S-Self (individuals or the people), State, Society and the Systems.

The factors included in self are income/social status, education, employment status, housing and basic amenities, health practices, coping skills, healthy child development, biology and genetic endowment and gender. The State has to deal with the leadership, responsible for developing policies focused on the requirements of the country, food provision, education, economy, safety and security; with rules and regulations for governance. While the Society has to deal with social inclusion, environment and culture. The Systems have to develop the institutions for quality service delivery, technology, research, effective and efficient utilization of resources, with their equitable distribution; and the people have to be provided with affordable, accessible, and available healthcare, security and protection, information, employment, products and justice. So, we need to differentiate between the determinants of health from the epidemiological perspective and the determinants of health that we have to consider while we are developing policy from the 4S Perspective-Self, State, Society and Systems.

Determinants of Health

SELF	STATE	SOCIETY	SYSTEMS
1.Income/Social status 2.Education 3.Employment Status 4.Housing and Basic Amenities 5.Health practices 6.Coping skills 7.Healthy child development 8.Biology and genetic endowment 9.Gender	1.Leadership 2.Policies 3.Food Provision 4.Education 5.Economy 6.Safety and Security	1.Social Inclusion 2.Environment 3.Culture	1.Institutions-Quality Services/Research 2.Resource utilization-Effective and Efficient 3.People-Affordability Accessibility/Availability Security/Protection Information, Human Resource, Products and Technology Management

https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1:

B. Public Health Policy:

The public health policy is defined as consisting of the laws, regulations, actions, and decisions implemented by the state, within a society, to establish systems ensuring a balance and to meet specific health goals with focus on community. The objective is to create the conditions for good and equitable health among the entire population and to end avoidable health inequalities and the strategies have to be built accordingly.

Public Health Policy cannot be developed without the involvement of the stakeholders. So, who are the stakeholders in public health policy? These are the institutions and organizations, development partners, regulatory bodies, media, academia, judiciary, opinion leaders, the government, the patients/clients who are being served are the end users, the healthcare providers, the healthcare establishments, the healthcare providers, and all dealing to ensure the quality of care for all. Basically, health policy deals with the access, interventions and quality of service delivery to all. The dimensions are to reduce the physiological, biological and social risk factors to improve health outcomes, providing financial protection with inter-sectoral collaboration and well engaged stakeholders.

The aims of the Public Health Policy are to provide a system which can provide the security protection from health hazards; identifying and preparing for public health challenges; preparing for responding to public health emergencies; and improving health by managing, sharing information/expertise. System-engage institutions and provide resources for the health needs of the people. The systems contract out and provide quality care through accessible and affordable healthcare for the benefit of people. So, when we talk about systems and public health policies, systems can be developed when we have a structured stewardship or the leadership, which is focused on the goals or the ultimate impact to be

created. For developing Systems, one needs to have the right inputs which are processed, giving outputs for the desired outcomes and ultimately leading to the impact.

SYSTEMS AND PUBLIC HEALTH POLICY

STEWARDSHIP

INPUT   PROCESS   OUTPUT   OUTCOME   IMPACT

GOALS
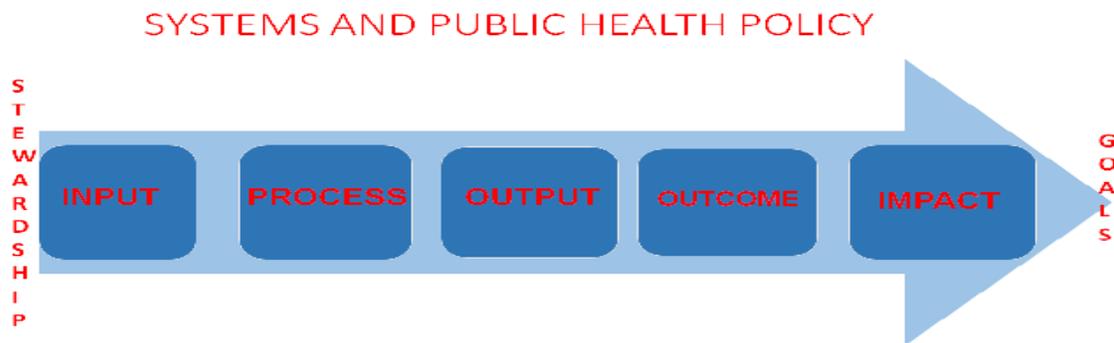
For example, when we are dealing with the security and protection from public health challenges, we have to focus on the impact which is the security and protection from public health challenges. The inputs which are required are planning for the assessment and then the processes to research and data generation, collection through the surveillance, epidemiology, and leading towards the outputs for the desired outcome for policy development to ensure the impact of security and protection from public health challenges. However, if the desired outcomes are not achieved from the outputs, feedback is given for reviewing the inputs for a new process to be initiated. The focus again comes to the development of the system where we have the people, institutions and the resources that need to develop for developing the system.

So, for the public health policy development, the system is focused on the Self or the People or the entire population; developing policy oriented goals focused on serving the community; the people involved in the State develop policies with the involvement of stakeholders; while the resources are provided by the State and Society (if needed) for the development of the Systems.

PEOPLE (SELF, SOCIETY, STATE)

SYSTEMS

INSTITUTION   RESOURCES
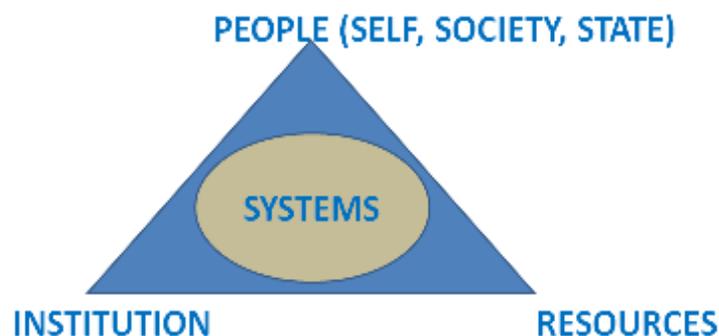
The institutions play a vital role in research, stakeholder engagement, and provide strategic guidelines for the policy development by the State.

C. Disease Control:

The principles and strategies to reduce the disease are developing policies focused on addressing the incidence and prevalence, morbidity and mortality of the particular disease. The strategies are to undertake the assessment-surveillance and epidemiology, application to the public health research and the actions for programs and policies developed; with systems development for management.

The levels of prevention are five-primordial, primary, secondary, tertiary and quaternary. Primordial deals with the actions to minimize the future health hazards, inhibits the establishment of factors which are known to increase the risk of disease, addresses broad health determinants rather than preventing personal exposure to risk factors and policy development focused on the determinants of health. The primary level basically deals with the prevention at the onset of specific diseases, risk reduction by altering behavior and enhancing resistance to the effects of exposure. While the community is considered as a part of primary care, there is a need for it to be considered at an independent level for focused approaches towards health promotion and disease prevention. These can be implemented through community engagement, screening and health education through community health workers; and interventions through midwives, traditional birth attendants, lady health visitors and workers, community nurses and integrated family for their role.

In Pakistan, focus is more on building hospitals rather on the five levels of care specified. These levels need to be stressed while developing public health policy. At the Primordial level, policies need to be developed focusing on determinants of health considering the S4 model specified earlier focusing on the concept of "do no harm"; Primary level prevention is targeted towards the onset of disease, risk reduction, enhancing resistance, with engagement of community and empowering them. The Secondary level of prevention deals with detection, treatment and control disease progression and screening procedures. The Tertiary level deals with softening the impact of disease on a patient's function, longevity and quality of life, reducing prevalence and rehabilitation. While another level which I want to introduce and could be such the topic for discussion is "quaternary" where "first, do no harm" should be the main principle of the prevention and actions taken to identify patients at risk of over medicalization and to suggest interventions ethically acceptable. While we are dealing with the patient's disease, mongering and commercialization of disease also takes place. So, the institution's involvement for protection and prevention is important, self-willing for restraint, being critical for our work, judicious use of limited public resources. Theoretically, these are the ideal five levels, however, from practical purposes, Pakistan is yet to incorporate them for disease control from a policy perspective. After the 18th amendment healthcare was transferred to provinces in 2011 and a decade has passed that the authority is yet to be delegated to the communities. This makes the 18th amendment questionable. In most of the countries health and education are considered as a fundamental right of the citizens. For Pakistan, it appears not to be the case. Even our constitution does not give us those rights. Health and education need to be considered as security threats for nations. Therefore, they should fall under the federal domain as they are security risks to be dealt.

For disease control, we need to allocate resources as per the priority of disease and consider the cost. We need to see exactly what amount of resources are available, how judiciously they could be utilized and what are the priorities that need to be handled first and the social costs resulting from the medical decisions. So, it is important that we focus more on the conceptualization of the "first, do no harm" to the patient, to the society, to the risks and the resources available should be utilized effectively and efficiently. So, again, summarizing the levels of prevention, we have the primordial; where the policies are developed, primary prevention for risk of the onset of diseases, secondary; detection, treatment and control this progression, tertiary; soften the impact of disease, improve quality of life and rehabilitation, and quaternary; first do no harm, which has to deal with the collective role of the 4S-Self, Society, State and the Systems. It cannot be done alone and we have to raise the noise level

in terms of the policymakers for ensuring the collective involvement of the individual, society, state and systems to ensure that patients should be provided the quality of care.

So, the example of the disease control we have seen is COVID-19 which has been a paradigm shift. There are problems which can be dealt with either with a fixed mindset, or growth mindset or innovation mindset. Researching for innovative models is the key. The 4S model can be cited for disease control in terms of COVID-19 with the Self, Society, State and System's application.

In dealing with the COVID-19, we have issues related to 4S-self, state, systems and society; to be handled. Considering the levels of prevention, we have the primordial state level policies with limited lockdown, development of disease control and isolation centers etc.; primary prevention for COVID-19; Society level application ensured social distancing, usage of PPEs as the secondary prevention. Further, tertiary care includes physical therapy, mental health management, continuing preventive measures and rehabilitation. The quaternary care includes "first do no harm" as the main principle for consideration of the 4S-State, Self, Society and the Systems. Considering these in terms of COVID-19, debate erupted for State on lock downs and vaccination; Self were debating on vaccination, Society showed reluctance on wearing masks and social distancing, while the System tried to cope with the establishment of isolation centers, quarantine, providing ventilators to the hospitals etc. The commercialization of disease was also considered for COVID with risks minimization with travel ban, vaccination etc. to make sure that people are not subjected to the harm. However, we are still not in a post COVID-19 era. We still have to "FACE COVID":

F. FEAR FROM DEATH. DEATH CANNOT BE DENIED. SO WE NEED NOT TO FEAR.

A. ATTITUDE CHANGE WILL BE THE GAME CHANGER.

C. COVID IS A REALITY AND NOT GONE

E. EXPECT RESURGENCY.

C. CONTROL DISEASE USING 4S-SELF, SOCIETY, STATE AND SYSTEMS

O. OPPORTUNITIES TO BE EMBRACED

V. VACCINATION

I. IMMUNITY BOOSTING MEASURES

D. DISINFECTION WITH DISEASE MORBIDITY AND MORTALITY MANAGEMENT

So, COVID-19 needs to be considered as a part of life. In order to manage, Public health essential elements-assessment, policy development, assurance, system in developing research, implementation policy and disease control; need combined effort of the 4S-Self, System, Society and State; with an innovative mindset.

To summarize, in our Public Health Policy, the System lacks focus on the 5 levels of care identified. Lack of delegation of powers at the grass root levels prevents community engagement and empowerment. The gap between the public and private sector is present. Obviously, the private sector will focus more on building labs. and hospitals for profit making. There is a huge burden on the common man due to the rise in healthcare management costs. The SehatSahulat card is a ray of hope for the introduction of a health assurance system; however, due to political reasons, Sindh is still deprived of this service. The teachings in the medical colleges are more focused on "Sick Care" rather than Community Care or Public Health. "We smoke, knowingly that it is an honorable way for suicide". "For disease control, Public Health policies need to focus on all five levels of prevention, which is cost-effective and better than treating disease".

Dr. Farid Midhet

Professor and Chair of Public Health Department at Iqra University Karachi

Bio: Dr. Farid is currently working as Professor and Chair of Public Health Department at Iqra University Karachi. Dr. Farid is a medical doctor (MBBS), having advanced training in public health (Master of Public Health from Columbia University) and demography (Doctor of Public Health from Johns Hopkins University). He started his career as a rural medical officer in Gwadar, Balochistan. He has since then worked as a population and health expert at Aga Khan University Karachi, Asia Foundation, Population Council, and Jhpiego, as well as at Qassim University Saudi Arabia. In 2000, he founded the Safe Motherhood Alliance Pakistan, which helped in developing the national strategy of maternal, neonatal and child health (MNCH) and the country's first national MNCH Program. He also served as Advisor for Pakistan's first national survey to estimate maternal mortality (Pakistan Maternal Mortality Survey 2019).

Presentation topic: Pakistan's population explosion- its causes and consequences.

"I think I will not repeat most of the things which were said this morning, it was a very rich session. A lot of new information was there and the different aspects of the population growth, which I would rather call population overgrowth in Pakistan. What I would like to do is to focus mostly on the things that are on the surface, what are the major issues with population program and population control and the family planning program in Pakistan. I would also like to highlight some of the reasons about what is happening right now and what we can expect in the future?

I think everybody has been talking about population explosion this morning and it is not really such a new word, at least in this group. But has it occurred in Pakistan? I think it has,

and I will try to show you and convince you that it has. Why has this happened? We have talked about this in the morning also; I would like to highlight some of the less discussed issues. Finally, what is next for Pakistan? We are not assuming that this particular phase, which we have, is going to go away because it is not going away.

In terms of population explosion, I think many of you probably have read Paul Ehrlich, who used population bomb term to describe a sudden, large and catastrophic increase in population and it was criticized rightly so. Remember two things: one is that population explosion is generally not catastrophic and dramatic, as it is shown in movies like Inferno. It is very subtle, but it destroys the society in many ways, as it leads to wars, famine, poverty, increasing unemployment, increasing suicidal rates, and many other disasters that can be related to population overgrowth.

Unfortunately, in our society, we have 'the haves' and 'the haves not'. Population explosion will actually affect 'haves not' more, and far less 'the haves' to which we all belong, fortunately. We probably do not feel the blow or the explosion, and that is what I would like you to remember.

This is the story and I think maybe somebody has shown it before, so, from 1951 to 2017, the population has been increasing very steadily and very rapidly unlike most of the countries of the region and the world. The population has doubled twice in less than 50 years after independence (Figure 1). Actually, our population has increased by six times, to what it was at the time of independence in 1947. Right now, the last census told us that it is almost 208 million. Although our estimates and as most of the demographer experts had estimated that it would be probably around 200 million, it actually turned out to be more than that. This is the story also the part which the government has been hiding, I mean, different governments have been hiding. Consistently, we have been told that population growth rate in Pakistan was around 1.5. One time, I remember the government officially saying it was 1.3%. In reality, never in the six censuses is the average intercensal annual population growth rate recorded as below 2.3% which is a very large rate of population growth. So that is not going to change. I do not have any reason to see where it is going to change in the future.
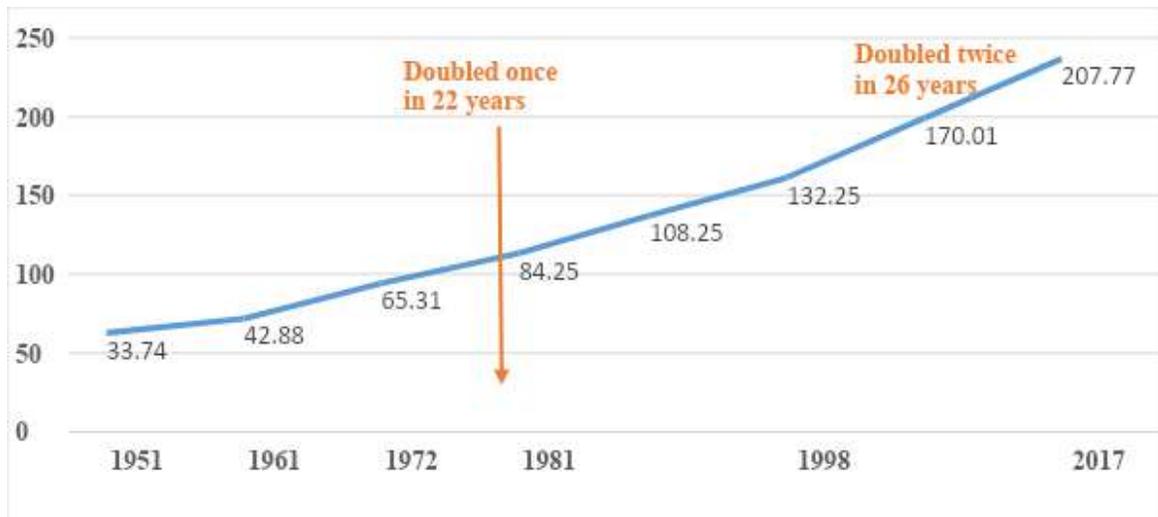
Figure 1: Pakistan's population doubling times (millions)

So what will happen in the future 100 years after Pakistan independence or partition? If we do not change our ways, the population will certainly cross 400 million. If we try very hard and something extraordinary happens in the next 28 years or so, maybe we will settle at about 345 million. I do not think of any reason to believe that we can do better than this. Basically, most of the experts have been working on different kinds of regression models. I saw one last week and 350 million is probably something which we can say. Younger people in this room will be around and although we will not be around, at least some of us, but our children will be and this will be a very difficult stage and phase. Next is a comparison (Figure 2) of the total fertility rate and just so that we do not look very bad, I have included Afghanistan here. All the other countries of the region are at the replacement fertility level or below actually. Sri Lanka is probably at 1.8. Sri Lanka is certainly at or below replacement level fertility, which is 2.1. India has announced recently in its national family health survey that their total fertility rate overall in the nation is 2.0. This comparison with female literacy rate actually makes sense. It has worked also with other indicators of education as some of the speakers have told us this morning like secondary school education, enrollment ratio and secondary school completion rate. I have tried to compare countries across the same and different income groups with regard to secondary school enrolment ratio between male and female. That is a very powerful indicator and if we have any hopes, I think we have more hope if we can educate our young women and empower them.

Figure 2: TRF and female literacy rate (South Asia)

We have talked about the demographic transition, and that it has not taken place in Pakistan unfortunately. It will take place when the birth rate comes down to touch the death rate, and the difference between the two rates becomes close to zero. That is not going to happen in Pakistan in the near future. The demographic transition has stalled in Pakistan. So, if you see (Figure 3) that in the 1960s, the birth rate was 44 per 1000 population and the death rate was about 21, the difference was about 23. If you see in 2019, this is also World Bank data, and that the birth rate is about 28 and the death rate is seven, the difference is about 21. So, it's not really that we are going to start demographic transition as most of the other countries of the world have at least in our income groups and in our region. This is the reason because if you try to look at 1990, it was the year when our population program was already in practice for more than 20 or 25 years. It was at that time that we were expecting our demographic transition to kick in; unfortunately, that did not happen.
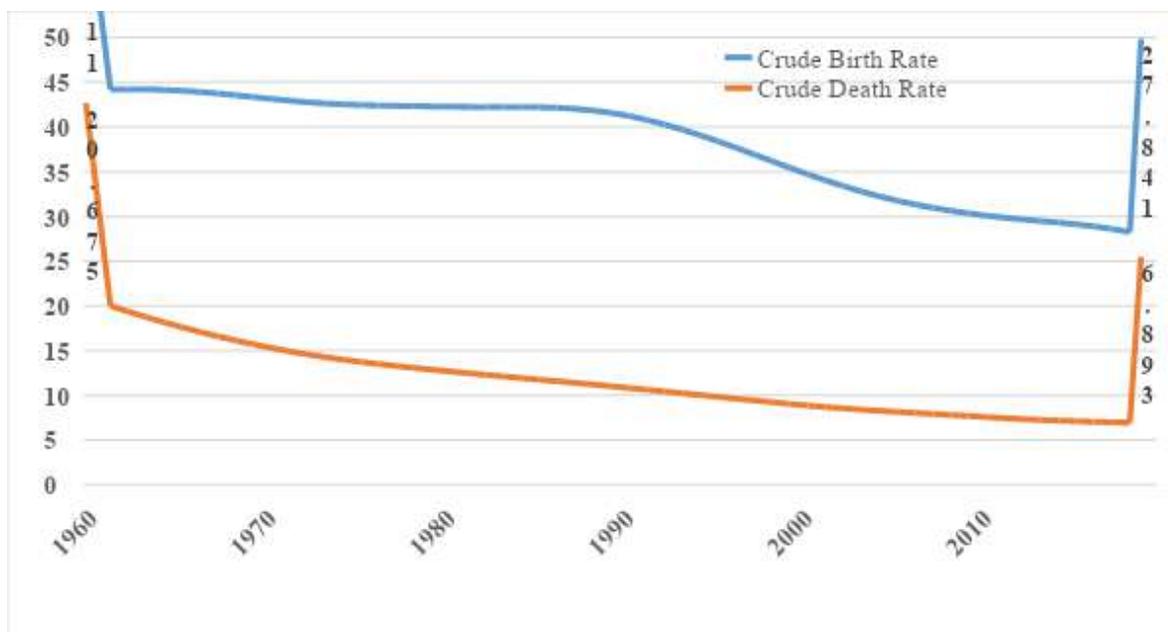
Figure 3: Crude birth and death rates (per 1000 population)

When in 1974, roughly a decade after the start of our first national family planning program, the first world fertility survey was done, Pakistan actually increased its fertility level rather than decreasing. In 1990, the modern CPR (MCPR) was only 9% and it actually increased very slowly until 2013. The first jump was shown in the 2007 Demographic and Health Survey, but then it slowed down. Since 2013, the MCPR has completely stalled and is not going up at all. Even though we have very open heartedly committed to the world in ICPD (2019), that we will increase our CPR to 55%, it is not likely as things are at this stage.

Next is a comparison of four DHS surveys which have happened in Pakistan. If you look at (Figure 4) the first two methods, female sterilization and condom use, these are the only which are the highest and have increased slightly and significantly as at least they have jumped between 1991 and 2007. But the rest of the methods like injectable, pill and IUD, have a slight increase between 1991 and 2007, but not showing any real increase after that. What is wrong with female sterilization? It typically happens when a woman already has five plus children. In 1991, the median parity at female sterilization was 6.5 children and in 2007, it came down to 5.5. It has slightly decreased but it has no significant demographic impact because the woman is already almost past her reproductive age. Condoms on the other hand can be good if they are used properly, but their method failure rates are very high and they are not always available. So if a woman tells a survey interviewer that she and her husband use a condom, it does not mean that they use it every time they have sexual intercourse. Basically, this is also a very unreliable method for Pakistan because of

availability and the quality. The only hope we have actually was with injectables and implants, and implants have not taken off in Pakistan.
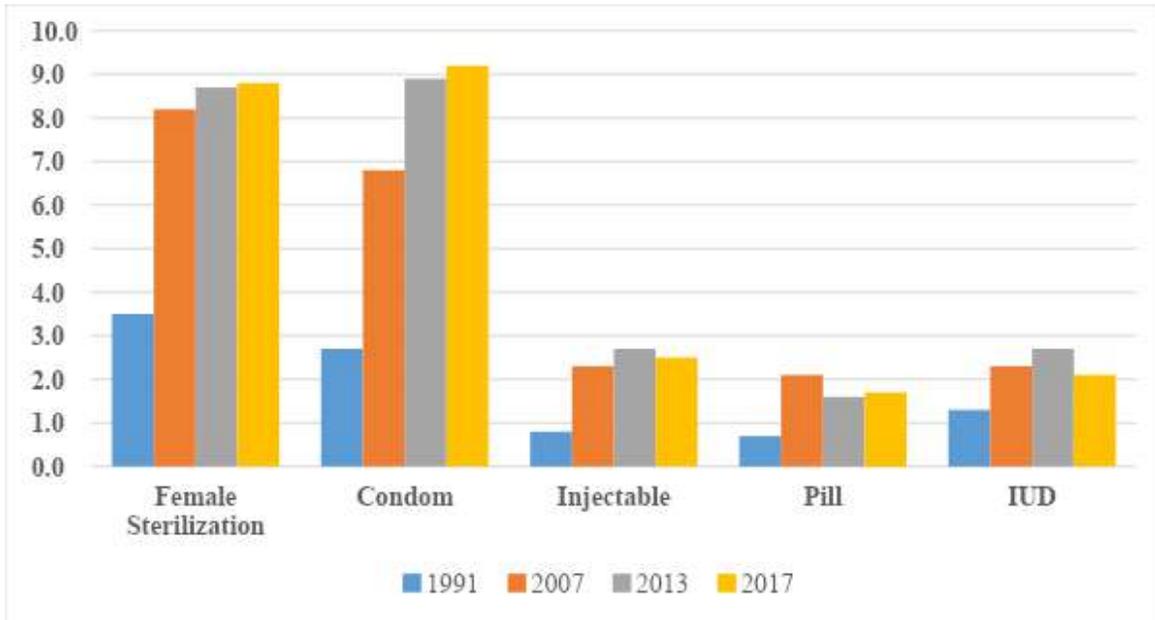
Figure 4: CPR (modern methods) - % women 15-49 years

I have tried to compare what is the global transit in Figure 5, global means this actually includes all countries of the world. So from 100 Women who are using any family planning method, a majority of them in Pakistan are using traditional methods, second is condom, third is female sterilization, IUD implant and pills are very low. Male sterilization does not exist in Pakistan, unlike the rest of the world; our family planning program emphasizes IUDs, pills, injectables and condoms but in reality the bulk of modern CPR is dependent upon female sterilization. There should be more emphasis on the short term temporary methods, which are easy to sell to the population and easy to manage.
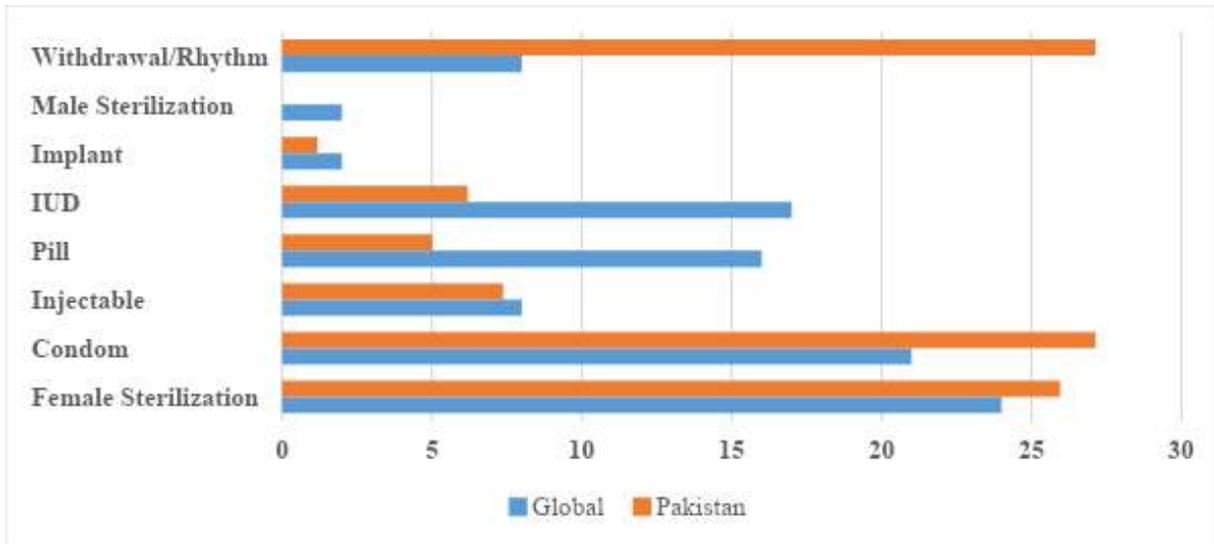
Figure 5: Family planning comparison of Pakistan with global trends

Next is a comparison of the sources of the methods (Figure 6) from DHS 2017 that asked 'what was your source of your last method, recent method, any modern method including sterilization, IUD, condoms, pills and injection. The majority of them went to the public sector because if you include the lady health workers and the government health facility, it comes to about 43%. The NGOs are the social marketing agencies and they count about 15%.
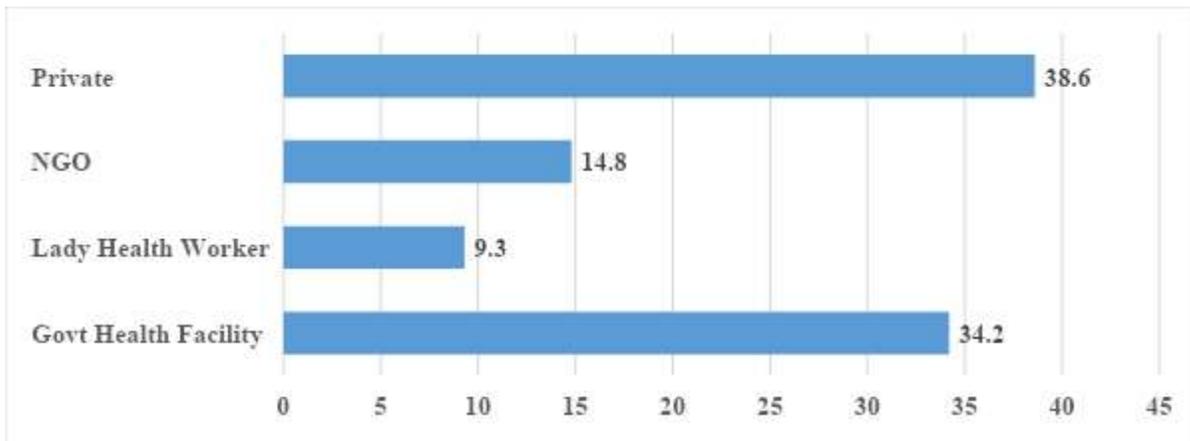
Figure 6: Sources of any modern method (%) – PDHS 2017

What is the source of condoms? Most of the private sector is busy in providing condoms and lady health workers are also very successful and reasonable sources of condoms. Comparing the injections and pills, the private sector provides a lot of pills and some injections. Lady health workers are also providing pills and injections and the government health facility is

providing more injections. If you look at the sterilization and IUD, the public sector health facilities are providing most of the bulk of these two methods as 56.8% of the sterilization and 62% of the IUD private sector is not really doing that much in the sense.

What are the consequences of population overgrowth? I would say these are very obvious as the increase is in poverty rates and increase in crimes especially in urban areas as those of us who live in Lahore and Karachi know well. There is a real and far reaching damage to our social fabric. The families are divided; the male members of the family must either go to the urban centers or abroad to the Middle East for earning. There is always political unrest associated with the major civic problems as well as the most obvious polarization, which we see in Pakistan today every sector is showing. There are extremes in religious and ethnic opinions and there is very little tolerance. We are witnessing political polarization right now and then there is social polarization. Pakistan's health and nutrition indicators have been miserable, and they are not improving. This morning, I think somebody mentioned the neonatal mortality rate during a time period when Pakistan had probably the strongest research on neonatal mortality. Our neonatal mortality rate has stalled for about 20 years at a very high level. There is also unemployment and these are just the sort of tip of the iceberg consequences of population over growth.

Population density is another result of rapid population growth; we should understand what population density is. You would know if you have lived in any of the newly constructed housing societies around Islamabad, which I think probably most of them are illegal. You have probably witnessed that the farming land has reduced and the wildlife has been severely disturbed. The people living previously in those areas including whole villages have been displaced. So, the population is increasing at a very high rate and if you see (Figure 7) from 38 persons per square kilometer in 1951 is now 261 persons per square kilometer. Most of the population is in urban centers and around it. The urban centers have kept on increasing, for example Karachi and Hyderabad are now almost touching each other. Because population growth has been so much. There are two huge housing projects going on between Karachi and Hyderabad, the defense housing authority (DHA) and the Bahria town Karachi, famous settlement has displaced many villagers.
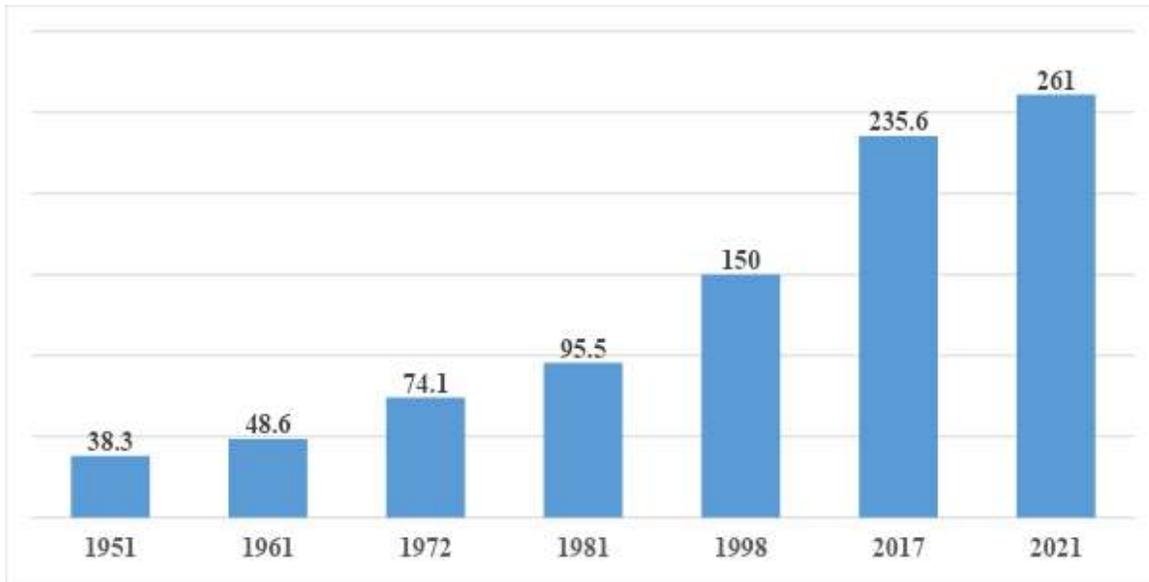
Figure 7: Population density, Pakistan (persons per KM2)

This is the story of Karachi, Lahore and other urban centers and the increase has been very, very fast. It is a very rapid increase for Karachi. The last census count reached 15 million which was controversial and people say it is much more than Karachi's population. It has increased very fast and I will show you the consequences of the effects of urbanization. For example, this is called conurbation, which is essentially, when large cities actually expand to touch and merge with each other. Lahore is at number two here (Figure 8), Sheikhupura, Kasur and Hafizabad is about as well up to Sargodha is basically one city is converted, so it's a conurbation. Multiple cities are merging together. When the cities are reaching out, expanding outwards and touching each other, a lot of other things are happening. The locals in that area are being displaced, the environment is being destroyed and we have witnessed that in this particular area.
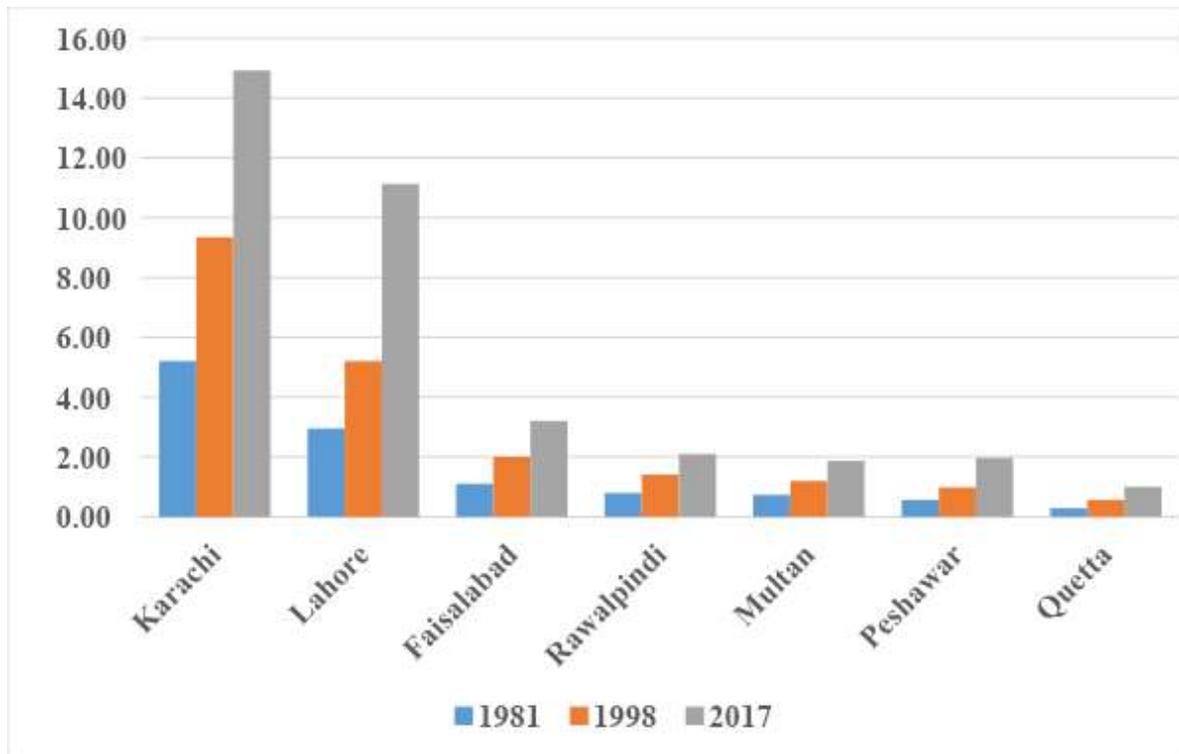
Figure 8: Population of major urban centers (millions)

Another example of urbanization is the mega city, which is Karachi and I would say most people including experts believe that the population of Karachi is more than 25 million today and maybe even more than that which is increasing at the rate of about 6% per year. The population density in Karachi is on the average about 24,000 persons per square kilometer. If you have been to Karachi lately, you know that this is something that is very visible; traffic jams are very common. The shanty towns if you visit them are like lower-middle to lowest income areas, you will see that the population is really a problem everywhere. Karachi was three or four years ago designated as the world's fifth largest city. That is one city with a very high population is expanding geographically, in the form of DHA and the Bahria towns around it. There are so many other housing societies, but there are also shanty towns emerging and the old villages are converted into slum areas because of the population overgrowth.

There is one way to look at what consequences has the population had, and that is the "what if" approach. What if Pakistan had worked on population and development during the 1950s and 1960s when there was political turmoil and the dictators did not focus on these things? There are four things which I would say if in 1950s, 1960s and 1970s, family planning program was thoroughly and efficiently implemented, education was made compulsory and

available to all citizens in urban and rural areas to that 100% population, higher education, skills trainings were made accessible at minimum expenses, and technological advancement of that time were incorporated into the education.

I was a child going to school during that time and I do remember that there was a lot of talk about all these things like skills and training was a thing and the newspapers were shouting about how good the government was doing about it. There was also bringing in family planning and all that. Unfortunately, the problem is that, in our country, we do not do what we say. We say a lot of things and we believe we are doing a lot of things better but we are not actually doing them. If that had happened in reality, Pakistan would now have achieved 1% or less population growth rate or actually less than 1% (this is from a regression model). Today, the population would have been around 120 million almost stabilized because we have had like 30 to 35 years till one generation basically for family planning and population improvement. If our education had worked, we would have had a 100% secondary school education rate that would have changed a lot of things and about 50% of our young population would have had some higher education, skills and training. This is exactly what has happened in other countries like Thailand, South Korea and Indonesia. That has changed those countries that have actually transformed those countries. We would have been ahead of South Korea, Thailand, Indonesia, and India if we had the means to use our demographic dividend. A demographic dividend is when the fertility rate goes down and there are not many older people in the population while the proportion of young children (who are dependent) also decreases. There is a bulge in the working age population, which is young and energetic and ready to contribute to the country's development. It is exactly what happened in 10 South-east Asian countries including Thailand, South Korea and Indonesia etc. This could have happened also in Pakistan. Unfortunately, our education levels are so low that we really do not have any use for this bulge of the younger population.

Quickly some possible solutions that are pragmatic and addressing the issues. I am not talking about bringing education or something, which will take years and decades. What we can do immediately is, we can shift our policy from passive to aggressive, which is simple. Basically, we have been talking a lot about family planning in the last two years and I have seen much more activity than any time in the past. That activity was at the highest level of the government and the President, the Prime Minister of Pakistan and even the Supreme Court of Pakistan have been talking about population and family planning. But that has not translated into bridging the gap in the supply chain of the family planning methods in the public sector, or into improving the service delivery of family planning at the public sector

health facilities. Second thing which we could do is to increase emphasis on rural areas that have been neglected as family planning programs actually do not exist there except for wherever they were lady health workers. Unfortunately, that program is also deteriorating very fast. Enlisting men and religious leaders has not worked before in Pakistan, probably not because of many problematic faults. I think there is still potential there. If something is done properly and engaging the religious leaders and men into the family planning consciousness, that might work. There is the need for market research. What does the public want? Do we know exactly what women and couples prefer to use for family planning? When they want family planning? Do they have that information? I am not sure if the information from DHS has been properly analyzed so far. Maybe we can look at whatever we have and maybe do some more research.

I think promotion of vasectomy does have potential. People say that in Pakistan it may not be possible. I think if it once catches up, it might have a potential and it may be a game changer. The availability of emergency contraceptives should be very easily available to everyone. We should invest in that because method failure and not availability of the method at the right time is very common. Last but not the least, the complete integration of family planning into health.

With apologies to my friends who are here from the Population Welfare Department, PWD has contributed less than 3% according to the last DHS in modern methods usage in Pakistan. I think there is really no use having a separate department for service delivery of family planning. Family planning service delivery should be integrated into health services in a proper way so that the Health Department takes it over.

I just thought I would bring this quote to you from Cohen's book, 'The Future of Pakistan', which was published by Brooking Institution Press 2011, 'half of all Pakistanis are below the age of 20 and two thirds of those have yet to reach their 13th birthday. Birth rate remains high, even by regional standards. The population has tripled in less than 50 years. Pakistan's demographic transition from high to low mortality and fertility has stalled'. [which is obvious].

I will leave you with this picture which looks like our country!: treacherous, not following any safety rules, just trying to reach from one place to another, oblivious to the dangers that may result in a disaster. They will probably reach their destination Inshallah, hopefully they will. But if they hit something it will be a disaster. I think our country is like that. So leave you with that thought. Thank you very much"

Dr. Nasra Shah

Professor, Lahore School of Economics, Pakistan

Bio: Dr. Nasra Shah is a Professor of Migration and Development. Prior to returning to her homeland, she was Professor of Demography at the Department of Community Medicine and Behavioral Sciences at the Faculty of Medicine, Kuwait University for about 30 years. Dr. Shah received her doctoral degree in Population Dynamics from the Johns Hopkins University, School of Public Health, Baltimore, USA, in 1974. Before joining Kuwait University, she worked in Hawaii, USA at the East-West Population Institute and at the Pakistan Institute of Development Economics, Islamabad. Besides international migration, her research has focused on various themes including the role of social factors in infant and child mortality; predictors of fertility and contraceptive use; women's role and status; utilization of health services; and psychosocial and physical health of older persons. Her many publications include books on Asian Labor Migration: Pipeline to the Middle East; Pakistani Women; Basic Needs, Women and Development; Population of Kuwait: Structure and Dynamics; Skillful Survivals: Irregular Migration to the Gulf; and Migration to the Gulf: Policies in Sending and Receiving Countries.

Presentation topic: International Labor Migration from Pakistan: A Safety Valve or a Slippery Slope

"Thank you very much! First, I would like to thank FCCU for arranging this conference and Dr. Addleton for reminding me of those good days in Honolulu. This afternoon, the topic that I am going to deal with is international labor migration from Pakistan. I am going to deal with this by raising a question. Is it the safety valve, or is it a slippery slope? I am going to do this by looking at two main areas. I am going to look at the trends and patterns of outflows, outflows of labor migration from the country and patterns related to that. Secondly, the trends in remittances. Then, I am going to try to answer the question that I raised by looking at these two main areas.

If we look at the last decade or a little more (Figure 1), the numbers of labor migrants, and when I say labor migrants, I do not mean just laborers. This is worker migrants going after registering with the government. These are registered workers leaving the country between 2008 and 2021. These yearly numbers are not steady numbers, it is not an upward line or downward, but there is lots of fluctuation. Particularly after COVID, they were 625203 in 2019. So more than 600,000 people left the country in 2019, that suddenly then declined by about a third and COVID was the main reason for that.
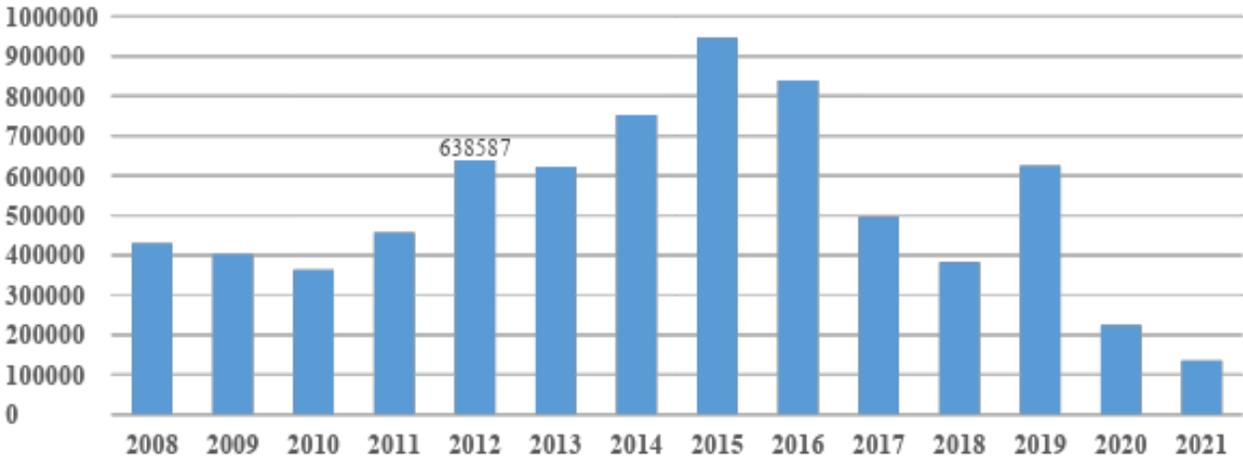
Figure 1: Labor Migration Annual Outflows, 2008-2021 (Until August)

Source: BEOE, various years

So, some of the key points are that there are major yearly fluctuations. Recently, what we have seen is major downtrends, which are not unexpected, because economies everywhere are slowing down and so the demand for foreign workers is declining, particularly in the Gulf where most of the workers go. In 2015, the number was as high as about 1 million and then big declines after that. So the future is full of uncertainty. There are many, many factors for this; including economic and non-economic factors. Among the non-economic factors, some of the ones that I would like to highlight are the systems of governance in the host country, attitudes towards migrant inflows that are changing and becoming more hostile. These are among some of the non-economic factors that are going to impact the future.

In terms of destinations, where do the Pakistani migrant workers go? If we look at the last decade and if we go even further back, the picture is pretty much the same (Figure 2). The two countries that really stand out as recipients of Pakistani labor migrants are Saudi Arabia, and the UAE. In the last year (2020), more than 61% of all migrants went to Saudi Arabia

and 24% to the UAE. So between the two of them that is the major story of where people go and where they send back remittances from. This means that Pakistan has been trying to diversify and you will hear this when people are talking of international migration, that Pakistan has policies to diversify the destinations. There's a feeling and a perception that lots of people are going to Malaysia. But, when you look at the data (in terms of the percentage in 2020), that's only around 1%. The majority are going to Saudi Arabia and the UAE. Japan is one of the new countries. Again, the numbers going there are very small.

Figure 1.2: Centrality of Saudi Arabia and the U.A.E. as a destination for Pakistani labour migrants, 2011-2019
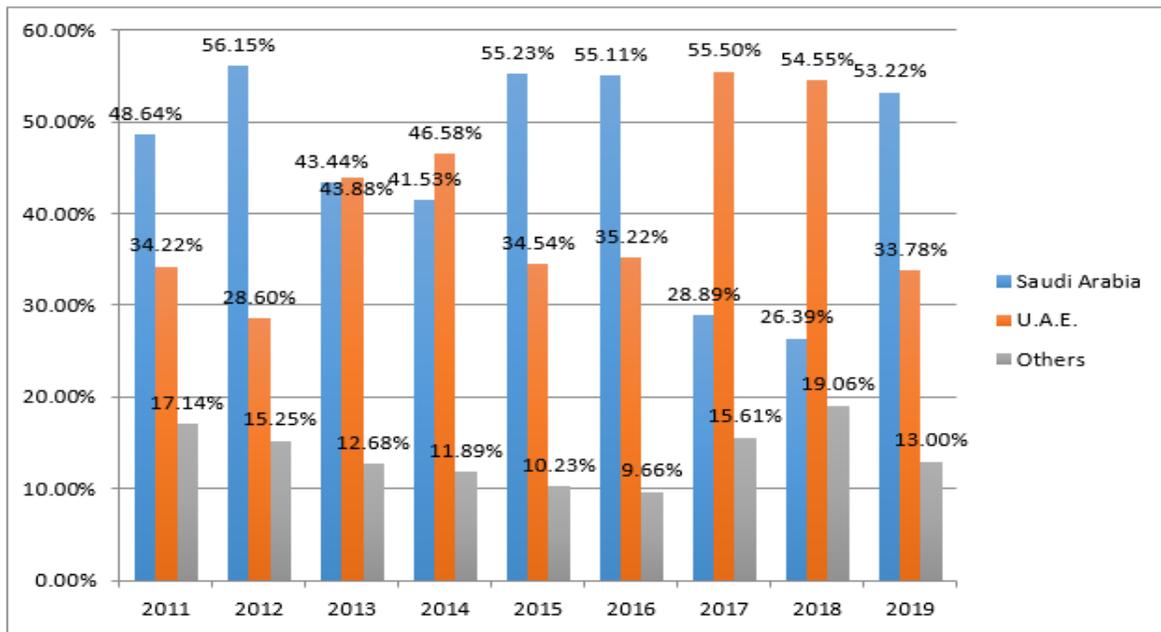
Source: BEOE database, various years.

Figure 2: 85 – 90 % Headed to Saudi Arabia and the UAE, 2011 – 2019

Source: BEOE, various years

So the key points that I want to make, in terms of destination, is that there is extreme dependence on just two countries, which is fairly risky with Saudi Arabia as the largest recipient. However, it is interesting to note that we have bilateral agreements with the six Gulf Cooperation Council countries. We have bilateral agreements with five of them; the only one that we do not have an agreement with is Saudi Arabia.

Another thing worth noticing is that of all the deportees (who came back in 2017), the majority of them were from Saudi Arabia. When I talk about risk, this kind is one aspect of that risk. As new destinations are getting a relatively small percentage of all the outflow.

Next, I want to look at the skill level as Dr. Farid Midhet has also mentioned. So let us look at what is the skill level of the migrants who go out. Here, you have three groups; highly skilled/qualified, skilled and Semi-skilled/unskilled. The data is from the government on the basis of the registration data for people who go through the government. If you focus on 2019, the percentage of unskilled was about half and then some kind of skilled was 45%. While, the highly qualified/skilled were generally less than 10 % and more like 5%. In 2020, half of them (50.3%) are unskilled and only about 4% are skilled. The two main occupations are Laborers and drivers.

Regarding skill level, the skill level of migrants has not improved over the last several decades. Now, why is that important? They are sending back remittances just like everybody else. So why should I worry about that? It is important because lower-skilled workers are more likely to face contract violations and are faced with poorer working and living conditions. In terms of migrant protection, it is harder to regulate, manage, and govern the lower-skilled migration. The migration of relatively better skilled persons who earn better wages. Therefore, in terms of remittances, probably, they can contribute more.

In terms of place of origin, all parts of the country send migrants. Punjab being the largest district sends the largest percentage. KPK is unusual because compared to the proportion of population that lives in KPK; it sends a larger percentage of workers than other regions.

In terms of gender, the labor migrants who go primarily to the gulf, more than 99.5% of them are men. Historically, the government has not published data on this. It is for the first time that they published some tables in their last annual report. That is where I got this. There were 1,727 women in 2020. Even though the numbers had gone down quite a lot, we still sent about close to 200,000. Women are a very, very, very small percentage of that outflow.

So back to my question, how much of a safety valve are annual outflows? In order to answer this, I could look at what percent of the population are migrants. As the percent of the male population, out migrants constituted only 0.43%. In FATA, this percentage was higher. In KPK, the percentage was higher than the rest of the country. Like I had shown you earlier, KPK would get impacted more when things change as they were sending larger percentages.

In terms of percent of the labor force, in 2017, total labor migrants constituted only 0.7% of the total. When we say that this is going to make a big contribution to taking the load of the labor force, then we have to keep this number in mind.

When we look at from July 2019 to July 2021 (Figure 3), the outflows had really started going down but the remittances did not follow, the remittances kept on going up. That has been a real lifesaver because remittances constitute about 7.2% of the GDP. As the percent of the GDP, that percentage has gone up when you look at this in a historical perspective, from FY90 – FY19.
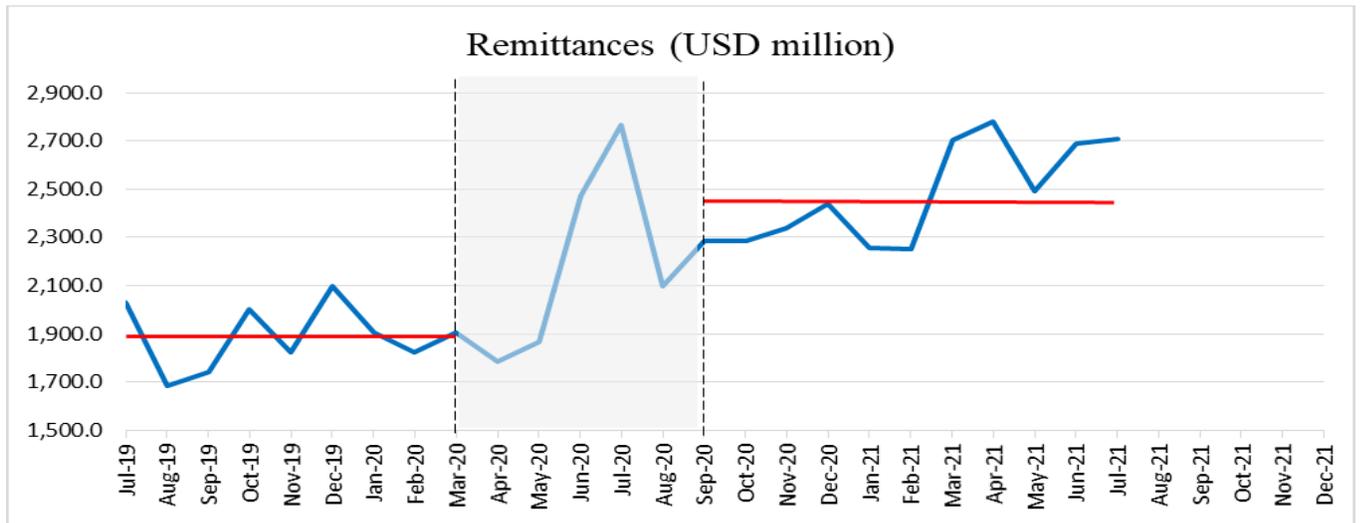
Figure 3: Monthly Remittance Inflows, July 2019 – July 2021

Source: State Bank of Pakistan (SBP)

Coming back to my question; "is labor migration a safety valve? Or is it a slippery slope?" My short answer to that is that it is really, both of those. The declining trend in worker outflows is indeed worrisome, but understandable. The big question is how quickly this is going to recover. How quickly this is going to go back to the 600,000 or maybe even 1 million mark. Well, time will tell but I am skeptical that we are going to see those numbers again. The lack of skill improvement is a big concern. Even though we have all of these facilities, which are being added to in terms of the training and vocational training centers in all the provinces, etc. This is still not making very much of an impact on the annual outflows and that needs to happen. Like I said before, the rise in remittances is a lifesaver. One of the reasons for the rise in remittances is that we have been able to capture a larger percentage of the remittances through official channels probably because people were unable to send through hundi and hawala. Finally, the future will be determined by many economic as well as non-economic factors. Some of which I mentioned earlier. So, let me stop there and I will be happy to take questions in the Q/A. Thank you!"

Ms. Shahnaz Wazir Ali (Sitara-e-Imtiaz)

President – SZABIST

Bio: Ms. Shahnaz is the president of SZABIST and also holds the honorary position of Provincial Coordinator for the Government of Sindh Oversight Committee on Primary Health Care and Family Planning. She is also a member of the Chief Minister of Sindh's Task Force on Polio. Ms. Shanaz holds a Master's Degree in Education from the University of Arkansas, USA and also a certificate in Education Administration from Trenton College, New Jersey, USA.

She has an illustrious career spanning 40 years as an educationist, social sector and development policy specialist, a member of the Pakistan People's Party twice elected to National Assembly of Pakistan, twice Special Assistant to the Prime Minister on Social Sector. She is a well-known women's rights activist. She served as a Senior Education Specialist on the World Bank; held the position of Minister of State for Education, Govt. of Pakistan; and is on the Board of a number of prestigious national and international organizations, trusts, advisory councils, educational boards, including IBA, Sindh HEC and Higher Education Commission, Islamabad. She is recognized for her significant contributions in the Health sector, which include the concept, design, planning and implementation of Pakistan's largest primary health care initiative Prime Minister's Family Planning and Primary Health Care Program.

Presentation topic: Issues of Population, education and workforce

"National and global economies need highly skilled workers. Pakistan's workforce is largely semi-skilled or unskilled. Our population is estimated by the World Bank to be 225 million while our census puts it at 215 million. We have not been able to change our demographic profile and strike a balance between population size and our resources. About 65% of our population is under the age of 30. Of this, 0-4 year cohort constitutes 13% of the total population and age 5 to 14 comes to 23% of total population. This population of 36% covers infancy, preschool, primary and secondary school. An alarming fact is that a significant

number of them are out of school children (OOSC). A recent estimate puts OOSC at about 23 million.

National data sources claim that poverty has declined from 24.3% to 21.9% in pre-COVID times. Some estimates indicate that more than 2 million people in Pakistan have fallen below the poverty line ($1.9 per day). These numbers translate into poor families with young children in need of adequate nutrition and access to school. OOSC and poverty levels are indicators of the inability of our economic system to provide schooling jobs, upward financial mobility and opportunities which move people out of poverty. The current Ehsaas Program which initially was the Benazir Income Support Program (BISP) is too small to have any poverty reduction impact.

Majority of state schools across the country do not provide early childhood programs. In response to the demand for Early Childhood Education & Development (ECED), private sector provision partly fills this very critical gap in Pakistan's education system. Secondary and post-secondary age entry into skills and technical programs along with learning, nurturing environments for our youth are really sparsely provided. Children in school are actually not achieving the learning levels as per their age cohorts in other countries nor does the school curriculum meet the needs of the students. Other deficits exist in the education sector such as lack of competent, trained teachers, physical facilities and education enrichment programs.

Addressing poverty is central to all efforts aimed at improving human development indicators. Household incomes impact decisions about education, work, size of families and demand for family planning and health services. Every behavioral indicator of families living under the poverty line reflects that the families are in a state of crisis. The economy is certainly not providing opportunities through investment or generating enough jobs for the working age population. The social protection programs have limited and temporary impact and cannot lift people out of a particular band of poverty.

Poverty also affects the GER (gross enrollment rates) which is the total number of students registered of that age group in classes & NER (net enrollment rate) means the children in the appropriate age group who should be going to that level of schooling. The GER at primary level (grade 1-5) is 84% but it drops to 57% at secondary level. Similarly, the NER at primary level is 64% which drops to 27% at secondary level. These percentages also reflect the high attrition rate of children as they move from primary to secondary. More girls dropout than boys. Retention is a very major problem in public sector schools. There are multiple reasons

for why it is high and why students drop out. These reasons are cross sectoral and need to be addressed by concerted and timely actions, strategies and policy interventions.

Poverty has impacted enrollments, attrition and retention in schools, cognitive development (the ability of students to learn) and continuation. Physical malnutrition in our young population, which is a consequence of poverty, impacts dramatically on how children learn. The ASER survey conducted regularly shows learning disparity of children in class three and five as they cannot either do mathematics, language skills or any of the other subjects at the level of their own grade. The achievement levels are two to three grade levels lower. These figures are stark and painful, they show the learning poverty of poorly functioning state systems as well as many private school systems. It means the state system schools are not achieving what they are actually meant to. They are meant to educate and to provide students with the necessary knowledge and skills. There are about 22.8 million to 23.7 million out of school children. This is a staggering number of children out of school. For the large cohort of these OOSC as well as those who are in school will not be able to handle decision making when they are young adults.

The poor learning levels of children in primary schools is a reflection of learning poverty. For a long time many of us have been advocating to look at achievement outcomes as the relevant indicator not just at enrollment levels or even retention levels. We need to ascertain that learning does vary acquisition in terms of knowledge and skills of Pakistani children compared to all other countries in our region, is at the bottom of the list.

So let's connect some of these links now. We really need to move very rapidly towards awareness of life skills. The number of young people seeking employment has increased which shows that the economy is not generating the jobs for these at all. The economy needs to generate jobs in all sectors; industries, services, including trade, logistics, agriculture, construction and IT. The market needs certain types of skills, which are not widely available among young people who are seeking jobs. We have just not been able to make a dent in this mismatch of graduates from the education or technical training programs and skills for various types of jobs that the market requires. This mismatch is becoming more acute by the day and unemployability rates are disturbingly high.

When we talk about skilling our labor force and labor force participation, we must also keep in mind migrant labor that is going abroad, which is semi-educated and not highly skilled, resulting in working at lower end jobs of laborers and drivers.

The rural to urban shift is very dramatic across Pakistan. Cities are the magnets where people think they can get better livelihoods. A large number of families shift to cities and this huge internal migration from rural to urban areas occurs regardless of the reality that urban living conditions are far worse than in many rural areas. The working age population is 94.1 million in rural areas and 59.3 million in urban areas. 20 years ago about 20% of the population lived in urban cities in Pakistan and 80% was in the rural areas. Now the demographic data shows 38 or 39% are in urban areas, peri-urban or semi.

The working age population is approximately 153 million. The total labor force is 68.75 million in the age of 15 to 64, of which 64.03 million are employed and 4.71 million are unemployed. The question arises why are they unemployed? Because they do not have the skills the market needs nor do they have access to credit to enable them to start their own businesses. They continue to be unemployed. There is high urban unemployment. Female unemployment is the highest. Average monthly wages are alarmingly low in Pakistan. Recently, the government has increased the minimum wage to 20,000 for wage workers and provincial governments are finding it hard to provide for that increase.

The sector breakdown of employment shows that 39.2% persons are employed in agriculture, 37.8% in services and 23% in industry. Though the spine of Pakistan is agriculture, its share in GDP is shrinking and the fastest growing sector in Pakistan today is IT.

Formal economy employment includes 27.6% and the informal economy 72.4%. Now, what do many of these numbers indicate in terms of decision making related to household income? When we translate these into husband and wife decision-making, we see that unless the family/household income earner is well skilled, well-educated and has access to credit, is relevant to the job market, they cannot take the decisions for their family including family size, health and nutrition.

Can we continue to do the same things and have the same approaches and strategy for family planning to address population issues? There is a multiplicity of factors that affect the decisions that are made about family planning and reproductive health. It is not just a supply side problem. It has a great deal to do with women empowerment, women entering the workforce, women having the ability to make decisions about the size of family and other household decisions, women marrying at a later age and women having children. It can only be actualized with legal, political, social and financial empowerment. Evidence shows that secondary schooling of girls enhances their empowerment in terms of age of marriage, family size and job options.

We recognize that there are cultural barriers to women's empowerment; however, it lies at the heart of behavior change of family planning decisions and practices. Bangladesh has brought about a big change by inducting large numbers of women into the workforce. Indonesia and Malaysia did that much earlier. Japan and Korea adopted the technical skills approach and promoted equal access to technical training programs (TTP) through linking TT with the Income generation program (IGP)

In Pakistan, we have to design and implement strategies that reach out to women in particular, to empower them with skill sets, a knowledge base and workforce opportunities. The government needs to lead on the development side and the investment side for opening up jobs for women. Once they are empowered, they will make decisions about their families, which should be more in line with creating a balanced demographic profile of Pakistan"

Mr. Muqadar Shah

Program Analyst (Population & Development) United Nations Population Fund (UNFPA)

Bio: Mr. Muqaddar Shah is currently working with the United Nations Population Fund (UNFPA) as Program Analyst in the area of Population and Development. He has over 20 years of diverse experience in project management, planning and implementation, Population & Development, Statistics, data collection, analysis & projection, M & E, protection, gender issues and policy analysis. Previously he worked with the International Rescue Committee as a Protection Manager and with United Nations High Commission for Refugees (UNHCR) as an In-charge of the Border sub-office". He joined UNFPA in 2008 as a Census Coordinator and played a key role in coordinating with the development partners, UN agencies and Government of Pakistan in mobilizing resources for the sixth national census of Pakistan. Since 2013, he has been leading the Population and Development section of the UNFPA.

Presentation: High population growth rate and its linkages with development sectors including economy, climate change and women empowerment

"Thank you very much Dr. Ali Mir for the invitation and the brief introduction. First of all, I would like to extend our heartiest congratulations to the Population Research Center, the organizers, and the whole team for organizing this wonderful virtual seminar and connecting experts across Pakistan and internationally as well. PRC is moving forward successfully with their set goals and these are the milestones that UNFPA wanted to see in terms of growing. It is also required in terms of sustainability and knowledge sharing in the best interest of addressing population issues in the country.

My presentation is mainly from the population situation analysis that was undertaken in 2020 in collaboration with the ministry of planning, development and special initiatives. A number of international and national experts were part of this huge exercise. This includes Professor Gavin Jones who is also part of this conference, Dr. Hussein Sayed from Cairo University, Prof. David Canning, Dr. Iqbal Shah from Harvard University, Dr. Arif, who is the president of PAP at the moment and along with other national experts.

Firstly, I would like to highlight some of the opportunities. At the highest level, it has been recognized that rapid population growth is an obstacle to achieving Pakistan's goals of sustained human and economic development. The national task force has formulated an action plan with the objectives of reducing the population growth rates from 2.4% per annum to 1.5% per annum by 2024 and 1.1% per annum by 2030. How can this be done? The mechanism is to raise the contraceptive prevalence rate 15% by 2025 and 60% by 2030 leading to a lowering of total fertility rate 2.8% by 2025 and 2.2% by 2030. This has been agreed in the task force on Population and Development.

The first to accelerate the demographic transition, which is more important by reducing both mortality and fatality rates, and thus yielding a potential demographic dividend. This can be facilitated by Pakistan's emphasis on poverty alleviation and social equity with respect to sustainable development goals and the Ehsaas program. The Sustainable Development Goals are all inter-related, and success in achieving the SDGs will facilitate the deceleration of the population growth. As far as the Ehsaas program, it has the potential to improve the circumstances of the most disadvantaged sections of the community. These are the groups in the society with the highest infant mortality rate, the highest fertility rates, the earliest child marriage and the poorest level of education. Through Ehsaas, the circumstances can be improved as this will encounter the social disadvantage and make it more likely that their living levels will be improved.

The population growth rate is remaining very rapid. There has been an enormous population increase since 1981. If you look at 1981, 1998 and 2017 (Figure 1), the population of Pakistan in those years and the rate of growth remained very high. The fact is that Pakistan is an outlier in Asia and the Islamic world in its higher rate of population growth.
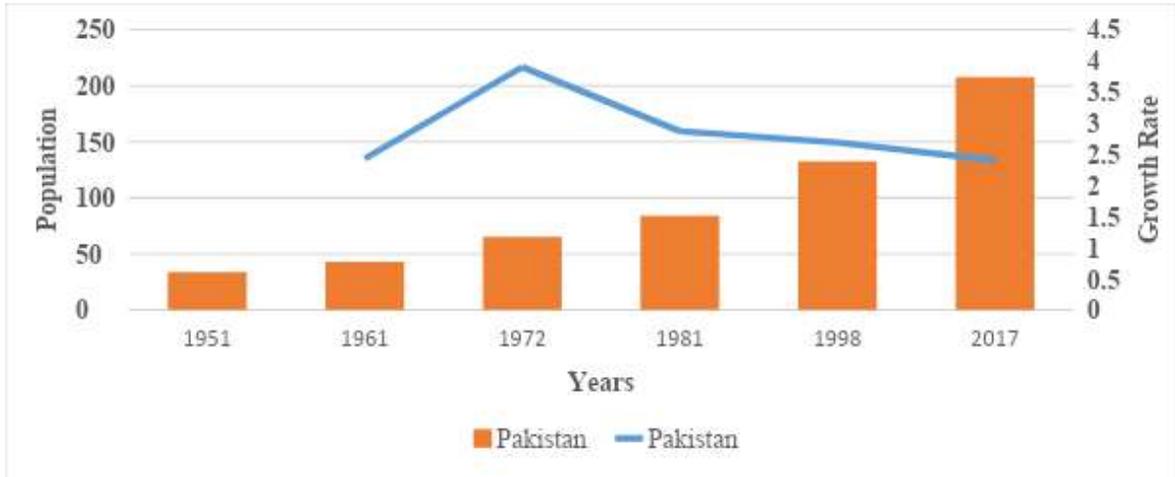
Figure 1: Changes in Pakistan's Population Size and Intercensal Growth Rates, 1951 - 2017

Next is the finding from population situation analysis. Over the next 20 years, Pakistan is projected to add more than half of its current population. This is almost twice the increase projected for Bangladesh and Iran and it is three times the increase in Sri Lanka and Egypt and eight times the increase in Turkey and Tunisia. There is a need to lower the fertility rate rapidly, while fully respecting couple rights to choose how many children to have. Lower fertility will lead to slow population growth and beneficial changes in the age structure leading to so-called a demographic dividend.

The question is how can fertility be low? There is a demand side and supply side aspect of this. On the demand side, we have to recognize that Pakistan is still having an ideal family size of four children. Those with a secondary and higher education have low fertility and lower desired family size but not as low as needed to achieve the displacement level of the fertility. So we need to consider what can be done to ensure that Pakistani couples move to an objective of having fewer children and providing well for their needs. We believe that the key challenge in moving the situation is to lower the infant and child mortality rates. Then there is a need to rapidly increase educational enrolment ratios especially for girls and to improve the quality of education and the need to widen opportunities for women's full participation in the economy and more generally to counter gender inequalities. These developments have wide implications for societal change and are likely to lead to lowered desired family size.

The female labor force participation rate in Pakistan as compared to India, Bangladesh and Sri Lanka, remained very low (Figure 2). It is actually now much the same as in India. In India, it has dropped in recent years, but both of them are far below from Bangladesh and Sri Lanka and even further below countries such as Indonesia where more than half of the women are in the workforce compared with 20% in Pakistan.
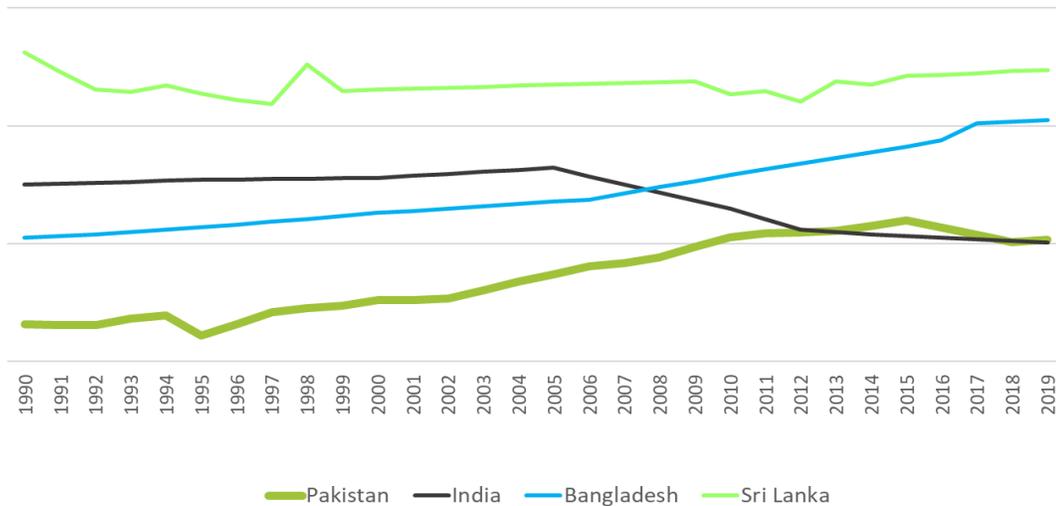
Figure 2: Trends in Female Labor Force Participation Rates, 1990 - 2019

Pakistan ranks very poorly on the indices of international differences in gender inequality. There are a number of them where Pakistan is the second most unequal in Asia according to the gender inequality index, and it is a second from the top (Figure 3). This reflects how should it must be tackled if Pakistani women are to be empowered to fulfill their potential.
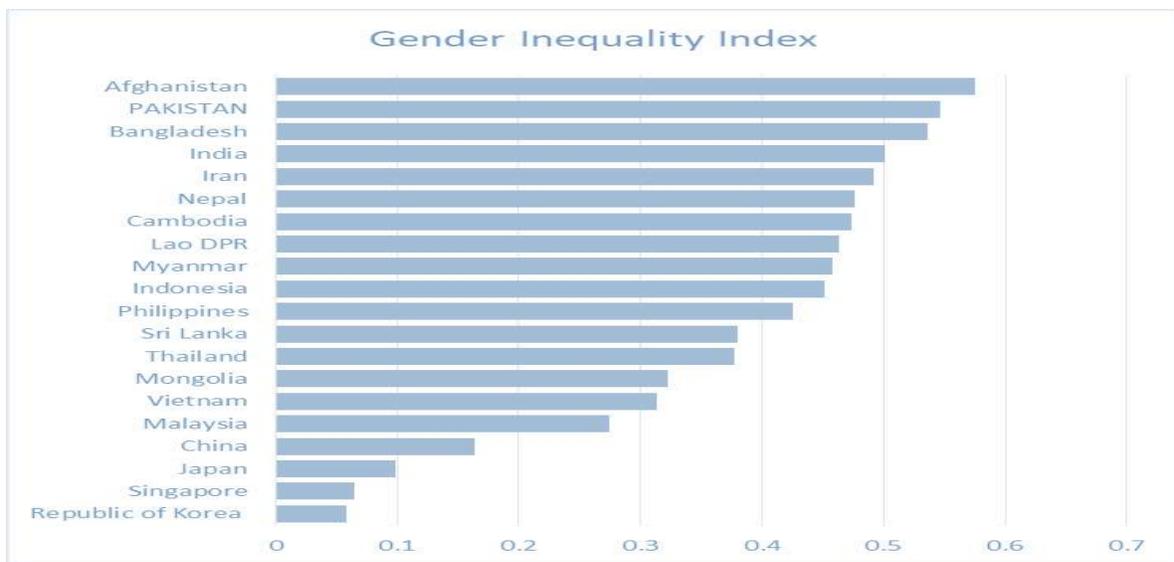
Figure 3: Gender Inequality Index, Asian Countries, 2018

The difference between Pakistan and every other country in terms of development indicators, the health indicators, the fertility, the contraceptive prevalence, female labor force participation and education in Pakistan. In all of these indicators (Table 1), Pakistan lag

behind the other countries in the region and particularly education and enrollment rates are much lower. Under five-mortality rate is much higher compared to these comparable countries. As we have seen a low ratio of working age to dependents, I think a key point is that these are not isolated statistics. All of these factors are interrelated. The low rate of education is leading to a high level of fertility and high levels of fertility means that it is very hard to get a high quality education because of the large number of children in each youth cohort. The health, education, and economic factors are contributing to the slow fertility decline and the slow fertility decline is in turn contributing and holding back these all other indicators. I would say that it is important that we do not think of development as one thing. I think all of these factors have to move together and population issues have to be addressed together with addressing education, health and economic questions. So handling the population in isolation will not resolve the issues. We have to link the population with all other development indicators in terms of the development.

Table 1: Development Indicators: Pakistan and Comparators

| Indicator	Pakistan	Bangladesh	India	Sri Lanka	Iran
Per capita GDP (USD) PPP	4,884	4,950	7,034	13,620	14,536
Under 5 mortality rate per 1000 births	75	32	39	9	15
Total Fertility Rate	3.6	2.1	2.2	2.2	2.1
Ratio of Working age to Dependents	1.5	2.1	2.1	1.9	2.2
Contraceptive Prevalence Rate (modern)%	34(25)	62(54)	53(48)	62(51)	77(57)
Female Labour Force Participation %	22	36	21	34	17
Enrolment rate, primary education	68	91	92	99	100
Enrolment rate, secondary education	37	67	62	91	81

There are two fundamental challenges. One is can Pakistan speed the fertility transition and get a faster increase in the working age share. More women are willing to enter the labor force and the potential for an economic takeoff. But harnessing that is going to be a major challenge for Pakistan as one of the issues is that the ratio is shifting in the favor of Pakistan, but there is an issue with very large inflows. There are about 4 million young people entering the working age group each year and there is an outflow of people aging into retirement but less than 1 million. So there is a net increase in the working age population of Pakistan over

3 million. It is a very large increase and that increase has to be absorbed into the labor force in Pakistan. What does it lead to? A major problem is that it forces people into a low productivity sector. So the jobs created force people into low productivity sectors and there are barriers to female labor force participation. The low level of child health, education and then workers productivity make it more difficult to absorb this huge labor force.

In the data, the migrant workers reduce the working age population but in-fact there are quite good things because they work abroad and remit their earnings back to Pakistan which are major sources of foreign earning for Pakistan. But that flow has also been reduced recently particularly with the onset of COVID-19 which has in fact affected a number of countries including Pakistan.

Population has also a deep linkage with climate change. There are a number of challenges which have been highlighted in the population situation analysis but I have taken only one slide out of this, which is the water scarcity in connecting the population issue (Figure 4). Pakistan's water insecurity is deeply linked to the growth in population. Despite high dependence on groundwater, per capita water availability in Pakistan has gone down sharply from 5,260 cubic meter in 1951 when the population was 34 million to 1,000 cubic meter in 2020 when population is now more than 220 million, and is expected to be around 550 cubic meter by 2025. Based on population projection, water demand will go up from 109 million acre feet in 2017 to 124 million acre feet by 2030. The experts have pointed out that the amount of freshwater availability per person will further decline the water level in Pakistan.

Water Availability

Source: Qureshi, R.H. and M. Ashraf (2019), Water Security Issues of Agriculture in Pakistan. Pakistan Academy of Sciences (PAS), Islamabad, Pakistan, pp.41.
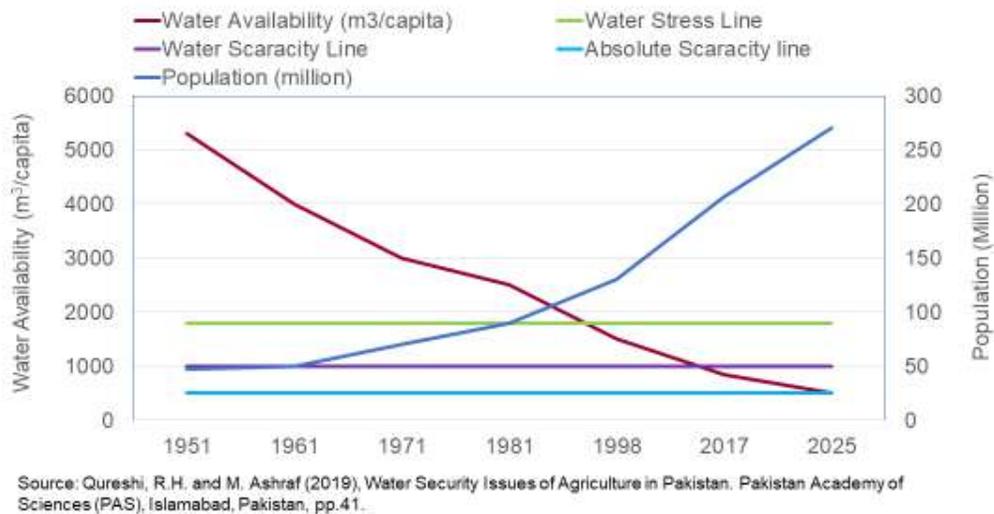
Figure 4: Population and Climate Change: A decline in water availability

These policy recommendations have been highlighted in the population situation analysis report. The main point is that these proposed set recommendations aim to speed the demographic transition in Pakistan through reducing fertility level and reaching a balance between population growth and environmentally sustainable social and economic development. That should be consistent with a national narrative on population growth. But we have to emphasize here that these sets of recommendations are not limited to family planning and reproductive health. It aims to consider the population problem in a comprehensive approach. These policy recommendations cover many areas, some of these areas have been highlighted over here. I have highlighted the key areas where the recommendations have been made in the population situation analysis report. For more detail, the population situation analysis report is available and anybody can access that report. Just send me an email and I will share the soft copy with you to see all the recommendations for different thematic areas that have been deeply linked with the high population growth rate.

This is the front page of the population situation analysis. It can be accessed through google or you can send me an email. Thank you very much"

Dr. Saima Bashir

Senior Research Demographer, Pakistan Institute of Development Economics (PIDE)

Bio: Dr.Saima Bashir is currently working as "Senior Research Demographer" at Pakistan Institute of Development Economics (PIDE). She also serves as the Head of Social Dynamics Units. She received her Ph.D. in Sociology from Bowling Green State University, Ohio, USA in 2017. Trained as family demographer and sociologist, Dr. Bashir studies couples' reproductive attitudes and behaviors, maternal and child health, and family demography. One line of research examines the marriage market in Pakistan, looking at trends over time in consanguineous unions, and how they influence reproductive decision making. Recent and current line of research focuses on unintended fertility, particularly looking at trends over time as well as the antecedents and consequences of unplanned childbearing. In all her research, she pays close attention to gender and socioeconomic differentials to better understand the couple's or women's reproductive decision making processes. Her research expertise includes Demography, Family, Gender inequality, Population and Health.

Presentation: Reproductive Behavior in Pakistan: Incorporating Men and Couples to Understand Change over Time

"Thank you Dr. Ali Mir, thank you so much and first of all I really want to thank the Population Research Center at FCC University for inviting me and it is a great honor for me to share this distinguished forum with all the distinguished presenters and it was a great learning experience for me

So today I am going to talk about Reproductive Behavior in Pakistan: Incorporating Men and Couples to Understand Change over Time. The scholarship on reproductive attitudes and behavior has long recognized the importance of both partners' fertility intentions and desires for fertility behaviors. For instance in 1970s, Fried noted that models that incorporated both the husband and wife intentions, strongly predicted subsequent fertility behavior of the couple than models with only one partner's intentions and that conclusion is mirrored in work from other countries such as Taiwan where they also found that husbands and wives frequently have different fertility attitudes that affect their consequent fertility behaviors

and as we all know that the decision to have a child is essentially a direct matter, as both husband and wife has the role to play in it however conventional fertility analysis assumes women's responses about the frequency and timing of child bearing are more accurate than the men's report as they are the actual bearers of the children. In countries, where most fertility is marital, wives usually report fertility data and the data on dates of birth and number of children collected from wives support is largely assumed to be identical for husband but this cannot be particularly true for more subjective fertility related information such as intentions and this is more true in traditional societies such as Pakistan because we have observed and many studies have shown that men disproportionately influence the fertility behaviors and women's inability to translate their own fertility intentions to behavior and that is evident through different studies. To date, family planning research as well as policy formulation has largely focused on women and ignoring men and couples. Variations in levels of spousal agreement on fertility intentions can have many reasons, for example, men and women may not necessarily share the same fertility attitudes and goals particularly in societies marked with higher gender segregation where husband's fertility desires and attitudes takes precedence. Moreover, fertility intentions are not static and are reassessed over the individual life course with the changes in the economic and social standing of the family. During the fertility transition, scholarship has shown that women's desires for larger families may decrease more quickly than men's. Spousal disagreement on fertility intention is important because it may be indicative of women's empowerment. Though I suppose it could go both ways, there can be higher disagreement if women feel like they can express their own opinions versus less disagreement if men and women are discussing their preferences [spousal communication is going on].

The important question that arises is how fertility decisions are made in case of disagreement. Research is inconclusive on this aspect; studies from the developed world usually show that wife's characteristics have greater influence than husband's characteristics but in less developed countries, a husband's characteristics, particularly attitudes toward contraception strongly influenced the wives' attitude towards contraception but not vice versa. For instance, one study done in Sub-Saharan Africa in 2005 observed that a husband's education strongly influenced wife's intentions to stop childbearing than her own education.

My study is based on Pakistan and as we all know that Pakistan is the fifth most populous country in the world. With respect to its familial structure and fertility, it is a patriarchal society where men play a major role in decision making including the reproductive ones and women's position in society is increasingly contested. Pakistan started its family planning

program in the 1960s but despite this early start, fertility has declined really slowly. We have seen that after the 1990s, the fertility rate continued to decline but at a slower pace and the recent estimate from the Pakistan Demographic Health Survey 2017 shows that the fertility is stalled, the current fertility rate is 3.60 births per woman and there is a percentage decline in current contraceptive use. 34% of currently married women are using some type of contraceptive method. Although the desire to stop child bearing is high among currently married women that is around 42% but the majority of women are not using contraception to avoid unintended births and it is observed that 16% of the births were unintended in nature. Studies have observed that married women who want no additional children but are not using contraception cited their husband's disapproval as the most common reason among non-fertility related reasons. Though the fertility percentage is low in India, that is 2.3%, but different studies particularly the qualitative ones show that husband disapproval is the main reason. What is interesting about Pakistan's fertility stall is that, though the rates are still very low, since the 1990s women's education has improved. Female literacy rate grew from 21% in 1990 to 47% in 2015 and moreover, participation in paid work has increased as well.

The next question that arises is what is the missing link in Pakistan's family planning program and in this research I argued that Pakistan's gendered and couple perspective is one of the missing link, situating Pakistan's current fertility patterns fit within a gendered perspective and couple level analysis might provide us some more insights because we know that female system plays a significant role in reproductive behaviors and outcomes. As I mentioned before, the husband's fertility, desire and attitude takes the central priority. As in one of the studies, more women cited their husband's objection as a reason for non-use of contraceptives than men cited their wives' objection to non-use in Pakistan and moreover communication between spouses about fertility may be limited. In this perspective, not only the gendered dimensions of fertility but spousal agreement on reproductive matter are often considered an important indicator of a couple's future reproductive behavior as well as potential contraceptive use. If we look at the scenario of couple-based research in Pakistan, we find a very few studies that have used the couple level data. One of the major reasons for this limited research is the lack of couple level data though some surveys have included questions on partner attitudes and desires but responses are not very reliable especially on subjective matter because these responses usually favors the respondent's own fertility attitudes and desires because in these surveys women were asked "what they think about fertility desire of their partners?" and those are studies that are available are usually dated or regional level qualitative studies. For instance, one study done by Mahmood in 1998 observed that 40% of the couples had dissimilar fertility desires and desire for few children

was higher among women but those women were more likely to disapprove of family planning. Another study observed that husband's influence was stronger in deciding whether to use contraception than wives. Overall, earlier studies demonstrated the importance of spouse's fertility goals for reproductive behavior yet there has been little research. So in study we argue that research based on solely men or women data may produce misleading results and research that examines the relative influence of husbands' and wives' fertility preferences in shaping their reproductive behavior is needed as it may provide us some more insights into the decision making process.

This leads us to our research questions: How has the joint distribution of wives' and husbands' fertility preferences changed over time? For this study, I used data from PDHS 1990 and 2017. We wanted to see if women's education has improved in this time period. The overall socio-demographic aspect of Pakistan has changed so we wanted to assess the status of a couple's fertility preferences. The second and third research questions were: When couples disagree on fertility preferences, which partner's fertility preferences are more strongly related to contraceptive use, and has this changed over time?; How is women's educational attainment related to contraceptive use and has its importance changed over time? Looking at whether the importance has changed over time is especially important given the dramatic changes in women's education. The Pakistani society is modernizing with increased exposure to modern family ideas. By modern family ideas, I mean lifestyle, values, and attitudes that favor smaller families. The widespread messaging about the importance of smaller families through media (dramas, talk shows) may alter both men and women views about family size and contraceptive behaviors. There are many other avenues of diffusion of novel ideas and in this case we are talking about contraceptive behaviors through personal social interactions and broader social factors such as media. To answer this, we used matched couple data from PDHS 1990 and 2017. These surveys were used to observe change over time in contraceptive use. The dependent variable for this study was the current contraceptive use. PDHS asked women if they were currently doing something or using any method to delay or avoid getting pregnant. The current contraceptive use question was not asked from the men so following other studies if a woman reported using any contraceptive method, it was considered as the couple using contraceptive right now. The key independent variables in the study were: (a) Couple's agreement in fertility intentions which was measured using the following response categories, (i) both want a (another) child, (ii) only wife wants another child, (iii) only husband wants another child, and (iv) both do not want a (another) child; (b) Wife's education (no formal education; primary education (grade 1 to 5); secondary and above education that is, grade 6 and higher). We controlled for various variables, such as

socio-demographic variables like women's work status, couple educational homogeny, couple's age difference, and preference for a male child. The results showed that contraceptive use has increased among couples significantly between these two time periods (1990, 2017) from 12% to 40%. The finding that I want you to pay attention to is that the majority of couples agreed on their fertility preferences at both time points and this agreement is related to when both want another child (49.9% in 1990 and 52.4% in 2017) or both do not want another child (25.9% in 1990 and 27.3% in 2017). In light of widespread changes in women empowerment as well as the promotion of smaller family ideas, we asked whether couples were less likely to disagree about fertility preferences over time. We found that the disagreement among couples on the desire for additional children decreased by about 4% between 1990 and 2017, a small but statistically significant shift. However, husbands (only husband wants: 18.1% in 1990 and 12.2% in 2017) continued to be more influential than wives (only wife wants: 6.1% in 1990 and 8.1% in 2017) in both time periods as evident from the statistics. This suggests that during the course of demographic transition in highly gendered societies, women are forced to internalize the desire for smaller families. The graph (Figure 1) shows the current contraceptive use by couple's fertility preferences. We expected that the husband fertility preferences would have more influence on contraceptive use that is when couples disagree, contraceptive use will be lower when husband wants to have another child instead we found that contraceptive use is higher among these couples in which wife wants to stop the child bearing and the difference in contraceptive use between those in which only wife wants versus only husband wants has widened between these two time periods.
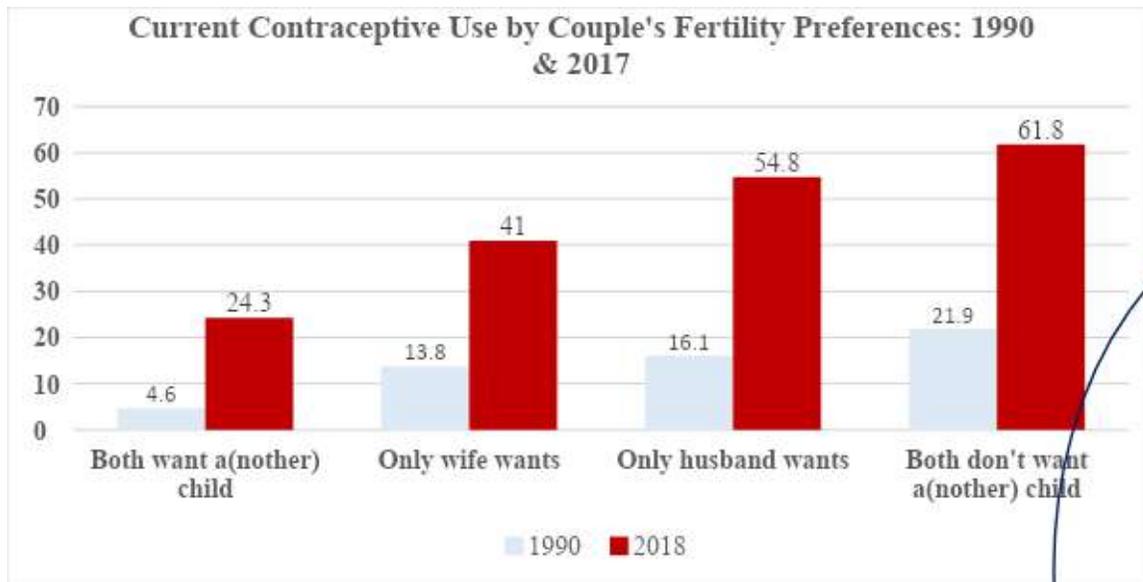
1: Current Contraceptive Use by Couple's Fertility Preferences: 1990 & 2017

If we look at the current contraceptive use by education then we see that the contraceptive use is higher among educated women than women with no formal education. Contraceptive use has increased between 1990 and 2017 among all educational categories (Figure 2). The important thing that I want to highlight is that the increase is much higher among women with no formal education and primary educated women. This suggests that education's association with contraceptive use seems to have weakened over time. The results of logistic regression models predicting current contraceptive use can be seen.
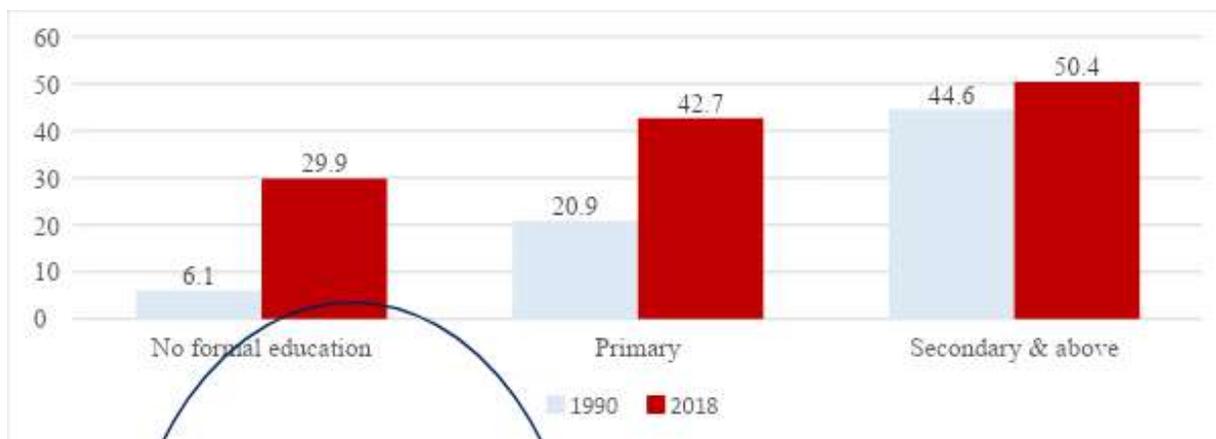

Figure 2: Current Contraceptive Use by Wife's Education: PDHS 1990 & 2017

It is quite straightforward that when both spouses do not want to have another child, they will use contraception compared to couples who both want to have more children. However, in case of disagreement, we were expecting that the contraceptive use will be lower when

the husband wants to have another child, however we found support for the opposite pattern. We found that women's fertility preferences outweighs at least in Pakistan, though this pattern is unexpected but we have seen such patterns in other countries such as Sub-Sahara African countries. The stronger association between women's fertility preferences and aspects of family planning service delivery (their methods and programs) may give women more access, ability, and permission to use contraception when they do not want to have another child even if their husband does. Women may also believe that fertility is their business so they may use contraception covertly but we do not have data to investigate this possibility. With respect to women's education, the results supported our hypothesis that educated women, especially those who have secondary and higher education were significantly more likely to use contraception than women with no formal education. The results did support the hypothesis that the education gradient weakened as contraceptive use increased substantially among uneducated women. In Model 4, if we look at the coefficient of year variable (Table 1), we see that it has significantly increased from Model 2 to Model 4. The coefficient of year indicates that contraception use among women with no formal education has increased by four times between 1990 and 2017. In short, we found that in instances of disagreement among couples on fertility preferences, a wife's preferences were more strongly related to contraception use than her husband's preferences. This is contrary to what might be expected in a traditional society such as Pakistan in which husband generally has more power in the relationship but this result indicate that even if men have more authority in household decisions, that power does not influence over reproductive choices of women however more research is needed to understand how and why women are able to exert their own influence in this domain but not in other ones. Nonetheless this suggests that investment in family planning programs that support and broaden women's knowledge of and access to contraception continues to be worthwhile. Moreover, we observed that women's education is strongly associated with contraceptive use and the educational gradient of contraceptive use has diminished over time consistent with the diffusion processes. This is again not a very surprising finding as studies from our neighboring countries like India have also observed that contraceptive use is increasing more among women with no formal education and this provides evidence of an ongoing fertility transition (though slower). At the same time, it shows that a woman's own socio-economic characteristics such as education are no longer the only predictors of their fertility behaviors.

Table 1: Predicting Current Contraceptive Use

Variables	Model 1	Model 2: Model 1+ Wife's Education	Model 4: Model 3 +Interaction
Survey year (Omitted=1990)			
2017	6.01***	4.44***	8.40***
Couples' Fertility Preferences (Omitted=wife wants another but husband does not)			
Husband wants another but wife does not	1.64†	1.66†	1.93*
Both don't want another child	2.25***	2.22***	2.77***
Both want another child	0.44***	0.37***	0.60*
Wife's Education (omitted= no formal education)			
Primary		2.07***	2.3†
Secondary & higher		3.80***	5.89***

To conclude, the overall low level of contraceptive prevalence rate in Pakistan suggests continued attention to support Pakistan's family planning program by utilizing innovative ways to generate demand as we have observed that knowledge about contraception is universal but there is an increase in unmet need over time and unmet need for family planning among men should be considered. Our findings that couples in which both partners want to limit child bearing are more likely to use contraception than couples in which only the wife wants to limit child bearing suggests that men's preferences are a more important influence on couple level reproductive behavior. Men also have different sets of practical concerns, for example, Kamran et al. (2014) observed that husband's cited cost and lack of availability of services as primary reasons for not using contraception. Couples fertility preferences are essentially a direct decision therefore efforts to promote family planning will be more effective when husbands are more involved and more approving of contraception and they revise their fertility goals to match with the fertility goals of their wives. More in-depth studies that focus on the cultural context of the society are also needed. Education gradient still exists but we need to also look into the diffusion mechanisms as it was observed that contraceptive use has increased significantly among women with no formal education. The avenues and interactions from where such women are getting information should be explored.

That is all. Thank you so much and if there are any questions, I will be more than glad to answer. Thank you"

Dr. Ali Mohammad Mir, MBBS, MPH

Senior Programme Director, Population Council Pakistan

Bio: Dr. Ali M. Mir is an accomplished researcher and senior programme director with over 20 years professional experience and expertise in Family Planning (FP). His key skills are research design and implementation, capacity building, and advocacy to increase access to FP services. He is responsible for technical leadership of the Population Council projects in Pakistan related to FP, reproductive health (RH), including sexually transmitted infections, capacity building, and leadership development in population and RH. Dr. Mir made significant strategic, technical and management contributions to USAID's flagship $48 million Family Advancement for Life & Health (FALAH) Behavior Change Communication (BCC) project in Pakistan. He was a senior team member for the duration of the project and served as its Chief of Party from 2011-2012. Under the leadership of Dr. Mir, the project increased contraceptive use in implementation districts by 9% in just four years by creating demand for FP by using innovative BCC approaches and engaging key stakeholders, including men, religious leaders, and Lady Health Workers, and by improving access and quality of care in public and private sectors. Through Dr. Mir's guidance, birth spacing has now been recognized by the Government of Pakistan as a key health intervention and the Prime Minister has required birth spacing services be provided nationwide. Dr. Mir was responsible for providing overall technical and strategic guidance, working with government officials to develop strategies to improve birth spacing and reduce maternal mortality, collaborating with USAID, and overseeing financial and administrative aspects of the project. Dr. Mir recently implemented a technique developed by the University of Aberdeen, referred to as "Made-In/Made-For," for estimating maternal mortality and identifying its causes and circumstances using community informant networks at the district level to measure provincial maternal mortality ratio for KP province. This technique has been pilot tested in district

Chakwal and based on the results achieved through the successful implementation, the provincial governments of KP and Punjab recommended a scale up to obtain a reliable MMR estimate for the entire provinces of Punjab and KP.

Previously, Dr. Mir led one of the major studies on reproductive tract and sexually transmitted infections in Pakistan, spearheaded the development and implementation of an initiative to expand contraceptive choices in 26 districts. Through his work, Dr. Mir has made a significant contribution to the evidence base for FP in Pakistan. He has authored two books, published numerous research publications, presented at many scientific conferences and meetings, and is in frequent communication with policymakers through his work. Dr. Mir holds a master's in public health from Leeds University, UK and a degree in Medicine from Rawalpindi Medical College.

Concluding Remarks & Chair Panelist Address

"We have come to the end of this panel discussion. I would like to really thank FCCU and specially the PRC for arranging this very important and very constructive panel discussion. Let me also thank the Rector of FCCU, the Dean of Social Sciences and specially record my appreciation for all the efforts put in by Dr. Vaqas Ali, the Director of PRC. I would like to congratulate PRC for setting up the Center in a really short period of time that has established itself as a very vibrant center. We have heard this morning very thought provoking, valuable and informative presentations by globally recognized scholars who have touched upon various aspects of the population dynamics in Pakistan. We have heard that our population growth has grown by six times since our independence. Our fertility rate has not come down as compared to the levels we see in other countries of the region which makes us an outlier in the region. We have also heard about how all of this is impacting upon our development prospects. The messages that have come out clearly from all the presentations sensitize us to look at a more multi sectoral approach if we have to work towards bringing the population growth to stabilization levels. We would have to work on the demand side as well as the supply side and the areas that we have to focus is improving educational levels, focusing on economic development, focusing on the availability and access to healthcare and specially also looking at access to family planning services because as we have learnt that there is such high and persistent unmet needs for family planning which can only be met through the availability of some essential services. We started many good programs in the past and one of the programs that really impacted initially on our fertility trajectory was the Lady Health Worker (LHW) program. It was an excellent program but unfortunately, with the passage of time, the direction of the LHW got shifted from family planning. Perhaps, now as part of the solutions that we heard, one of them would be that we should refocus the attention to the Lady Health Worker program and bring it back to its

original mandate of providing family planning services or focusing on within the whole paradigm of family health care. We have heard the importance of how education is linked to fertility decisions and behavioral changes. It is appalling that in this 21ˢᵗ century when countries have moved so much ahead, we still have high numbers of uneducated people as well as a high number of out-of-schools of boys and girls. To enhance their skills and employability and their ability to graduate out of poverty, education is an extremely important element. It is unfortunate that despite the constitutional provision 25A that makes it mandatory for everyone to get education; we still have children who are not going to school. We have heard about the importance of gender equality, women empowerment and bringing more women into the labor force.

We now have several opportunities available to us. We have a very comprehensive plan of action that has been approved by the Council of Common Interest developed in 2018 by subject experts. Some of the experts are Dr. Zeba Sathar and Ms. Shehnaz Wazir Ali who participated in the development of that plan of action. So we have a roadmap and now it is a question of how to implement it and how we are making people accountable for its implementation. We have a new narrative on population dynamics as we have moved away from the "two children" theme, which we are not talking about. We are talking about the balance between resources and rights, responsibilities. The theme has changed making it more acceptable to the people especially for those who might have opposed this because of religious consensus, religious political parties and religious scholars approve their idea to improve the health and wellbeing of mothers and children. So there is nothing contrary to the Islamic teachings in that regard.

Overall, as I said we have a tremendous opportunity available. If we are able to implement the CCI plan of action, we can shift the trajectory and we can achieve population stabilization. Otherwise, we have heard the consequences are horrendous.

Once again, I would like to thank the PRC for arranging this important seminar and also all the panelists who took out time and spoke on this occasion. Thank you very much and Allah Hafiz"

Dr. M. Vaqas Ali

Assistant Professor, Department of Sociology

Director, Population Research Center, FCCU

Bio: Dr. Mohammad Vaqas Ali has a Ph.D. in Criminal Justice from Michigan State University. Previously, he has taught at the University of the Punjab, UMT, LUMS, University of Sargodha (Lahore Campus), and the Pakistan College of Law. He has been a visiting lecturer at the Civil Services Academy and frequently delivers guest lectures at the Police Academy (Chung).

He has worked as a consultant in two projects:(1) 'Four Country Study (Pakistan, Nepal, Afghanistan, Sri Lanka) of Children Working in Brick Kilns'; (2) 'Children Working in 12 Hazardous Sectors in Punjab'. Both were collaborations between the International Labor Organization (ILO) and the Center for the Improvement of Working Conditions & Environment (CIWC & E), Punjab. Recently, he published a paper on entitlements and rights of child laborers employed in hidden hazardous sectors in Punjab. He is currently piloting a project that provides skill-based training to adolescent brick kiln workers, as part of a sustainable solution to escape debt bondage. Dr. Vaqas's research interests are terrorism and its coverage in the mass media, the social construction of national conflicts in the mass media, and radicalization research.

Thank You Note

"I would now take the opportunity to conclude the second session of the panel discussion. I would like to thank each and every one. A special thanks to all our panelists Dr. Gavin Jones, Professor Eric Fong, Dr. Ghulam M Arif, Dr. Minhaj Qidwai, Dr. Farid Midhet, Dr. Nasra Shah, Ms. Shahnaz Wazir Ali, Mr. Muqadar shah, Dr. Naeem Majeed, Dr.. Saima Bashir and of course Dr. Zeba Sathar and Dr. Ali Mir for chairing both sessions.

A special thanks to our chief guests Dr. Jonathan Addleton and Dr. Sikandar Hayat. Also I would like to thank Ms. Saima Shah and Ms. Zalla Khatak from the Population Council for helping in arranging this event. Their help was invaluable in organizing this event. I would also like to thank our partners from UNFPA, our members from PRC Advisory Board

especially Dr. Sufiyan Aslam, Dr. Gloria Calib, Dr. Muhammad Ali Bhatti, Dr. Sharoon Hanook and Mr. Kashif Shafique. I would also like to give a shout out to our departmental representatives: Dr. Hafiz Rizwan Ahmad, Dr. Khadija Shakrullah, Ms. Samia Ayub and Mr. Athar Azeem.

I would like to thank the Higher Education Commission (HEC) and ORIC, FCCU for their help in arranging this event.

Last but not the least, I would like to thank the PRC team which has been working for over a month in arranging this event. A special thanks to Mr. Jawad Tariq, Ms. Khizra Nasir, Ms. Shanzeh Ahmed, Ms. Fatima Alam, and Mr. M. LutfUllah and a very special thanks to Ms. Fatima who has been a linchpin for arranging this entire event.

With these words, I would like to thank all of you again"

ACADEMIC CONFERENCE

Panel I

Chair(s):

Dr. Sara Rizvi Jafree

Chairperson & Associate Professor, Department of Sociology, FCCU

Dr. Khadija Shakrullah

Associate Professor, Department of Geography, FCCU

Paper Presenters:

Dr. Alamgir

Associate professor, Department of statistics, University of Peshawar

Topic: A Comparative study of the Determinants of Socio-Economic and Demographics Factors of the Child malnutrition in South Asian Countries

Dr. Iram Naseer Ahmad

Assistant professor, Department of History & Pak studies, Forman Christian College University

Topic: Environmental Challenges and Green economy; A Case Study of South Asia

A Comparative study of the Determinants of Socio-Economic and Demographics Factors of the Child malnutrition in South Asian Countries

Dr. Alamgir[1], Muhammad Iqbal, Syed Muhammad Asim and Mashal

Abstract

The present study is concerned with the prevalence of malnutrition and their risk factors among children in South Asia countries. For this study, the data have been taken from the recently conducted Demographic and Health Surveys (DHS) in South Asian countries. A Multivariate logistic regression is employed to identify the determinants of child malnutrition. The results reveal that among other factors, female baby, rural area, low wealth index, low mother education, low father education, older child age, higher birth order, father and mother working in agriculture, large, small size at birth, no toilet facility, type of cooking fuel (animal dung and no food cooked in house) show a significant effect on child malnutrition. Moreover, the prevalence of stunting in South Asian children below five years of age is 36% in which 20.8% is moderately stunted, and 15.2% are severely stunted. The prevalence of stunting is found higher in India with 36.8%, Pakistan with 36.1%, Nepal with 32.9%, Bangladesh with 27.7%, and Maldives with 14.5%.

Keywords: malnutrition, socio-economic & demographic factors, prevalence, logistic regression,

1. Introduction

Malnutrition is a serious public health issue especially arising in South Asian countries. Malnutrition is a condition caused by eating a diet that is deficient in nutrients or excessive in nutrients, resulting in a variety of health concerns (Sharma et al., 2015). To quantify the nutritional status of a population, one must look at the Childhood malnutrition of that population as it affects the socio-economic development of a population (Tiwari et al., 2014). Malnutrition can increase the child's morbidity, mortality, and reduce the mental development of children (Demissie&Worku, 2013).

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[1]Dr. Alamgir is an associate professor at the department of statistics, University of Peshawar. He is one of the executive members of Population Research Center, established recently in the Department of Statistics, University of Peshawar.
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Child Malnutrition is one of the serious health issues in developing countries globally, 24% of the Children aged under-five are stunted in South Asia. Also, the prevalence of stunting in South Asia is very high with 38% which is three times more than East Asia with 12% (UNICEF South Asia, 2015). According to Singh et.al (2015), every year, 5 million children die due to malnutrition in which 2 million from India. The Proportion of malnutrition in Bangladesh was declared the highest in the world due among children aged 0-59 months suffering from one or more forms of malnutrition including stunting, wasting, underweight, low birth weight, iodine, and vitamin A deficiencies (UNICEF, 2009).

A huge literature is available to study the prevalence and determinants that affect the child malnutrition, for example, Yasmin and Islam (2016) studied the prevalence and determinants of under nutrition among school going children in Bangladesh. Bwalya et al. (2015) studied stunting and its associated factors. Torlesse et al. (2016) conducted a study on assessing the role of hygiene, water and sanitation in stunting. Islam and Biswas (2015) conducted a study on stunting among children under-five year of age in Bangladesh. Demirchyan et al. (2016) conducted a study to identify predictors of stunting under-five year's children. Semali et al. (2015) conducted a study on the prevalence and associated risk of stunting in children aged less than five years of age. Tariku et al. (2016) analyzed a total of 681 mother-child pair's data to assess the prevalence and associated factors with stunting. For more detailed study on child malnutrition and its associated risk factors, the readers are referred to see, Demissie and Worku (2013), Mekonnen et al. (2013), Agedew&Chane (2015), Tiwari et al. (2014), Gaurav et al. (2014), Das and Gulshan (2017), Mushtaq et al. (2011), and Khan et al. (2016).

The main aim of this study is to measure the prevalence and to determine the socio-economic and demographic factors that have a significant relationship with child malnutrition.

2. Methodology

The Data for this study has been taken from the recently conducted Demographic and Health Surveys (DHS) in South Asian countries consisting of Pakistan Demographic and Health Surveys 2017-18, Bangladesh Demographic and Health Surveys 2017-18, Indian Demographic and Health Survey 2005-06, Nepal Demographic and Health Survey 2016 and Maldives Demographic and Health Survey 2016-17.

To measure an acute malnutrition among children aged below five years, the World Health Organization (WHO) has recommended to use height-for-age index represented as a "Z" score (Mwangome& Berkley, 2014). Mathematically, the Z-score is defined by

$$Z \text{ score} = \frac{\text{Individual value height} - \text{Median value of the referenced population}}{\text{Standard deviation of the referenced population}}$$

According to Das &Gulshan (2017), a Z-score less than -2 indicates malnutrition or stunted growth.

To quantify the relationship between several explanatory variables and a binary/dichotomous response variable, the following Logistic regression model will be considered

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k$$

where $Y_i = \frac{P_i}{1-P_i}$ and P_i is the probability of $Y_i = 1$ and $1-P_i$ is probability of $Y_i = 0$. β_i's are the coefficients which show the change in log odds of Y with the per unit change in X_i keeping all other variables fixed.

3. Empirical Analysis and Discussion

This section provides the measurement of the prevalence, and quantifications of the significant factors with child malnutrition.

Table 1: Sex wise Prevalence of malnutrition based on stunting in South Asia

Severity of Malnutrition	All n = 253392	Boys n = 131724	Girls n = 121668
Prevalence of global malnutrition (z score < -2)	(91148) 36% (35.8-36.2 C.I.)	(48078) 36.5% (36.2-36.8 C.I.)	(43070) 35.4% (35.1-35.7 C.I.)
Prevalence of moderate malnutrition (-2 < z-score ≤-3)	(52746) 20.8% (20.7-21.0 C.I.)	(27323) 20.7% (20.5-21.0 C.I.)	(25423) 20.9% (20.7-21.1 C.I.)
Prevalence of severe malnutrition (z score < -3)	(38402) 15.2% (15.0-15.3 C.I.)	(20755) 15.8% (15.6-16.0 C.I.)	(17647) 14.5% (14.3-14.7 C.I.)

Table 1 shows the prevalence of stunting in South Asia among children below five years of age. In total, 36.5 % boys, and 35.4 % girls are globally stunted (**z-score** < -2), 20.7 % boys

and 20.9 % girls are moderately stunted (**-2 < z-score ≤-3**), and 15.2% boys and 14.5 % are severely stunted (**z-score** <-3).
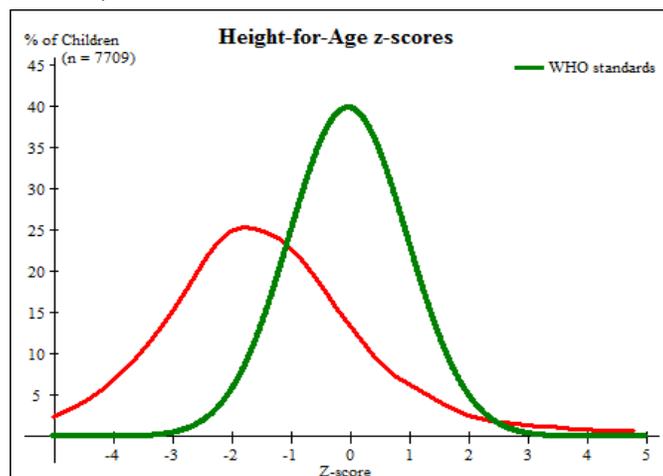
Figure 1: Distribution of the Height-for-age Z-scores of children in South Asia as compared to international reference data (WHO-2006)

In figure 1, the green line represents height for age z scores of the WHO standard population while the red line shows the height for age z scores of South Asian children using obtained data. The red line is clearly skewed to the left shows that the children in south Asian countries are more stunted as compared to a standard population (WHO-2006).

Table 2: Prevalence of Malnutrition among South Asian Countries

Asian Country	Malnutrition			
	Normal		Stunted	
	N	N %	N	N %
Pakistan	2701	63.9%	1527	**36.1%**
Maldives	2076	85.5%	353	**14.5%**
India	149498	63.2%	86957	**36.8%**
Bangladesh	5713	72.3%	2188	**27.7%**
Nepal	1596	67.1%	783	**32.9%**

Table 2 depicts the prevalence of malnutrition/stunting among south Asian countries. The result shows that the higher prevalence of stunting 36.8% is observed in India. Similarly, the prevalence of stunting in Pakistan is 36.1%. In Maldives, the stunting percentage is very low, 14.5%. Furthermore, the prevalence of stunting in Bangladesh and Nepal are 27.7% and 32.9% respectively.
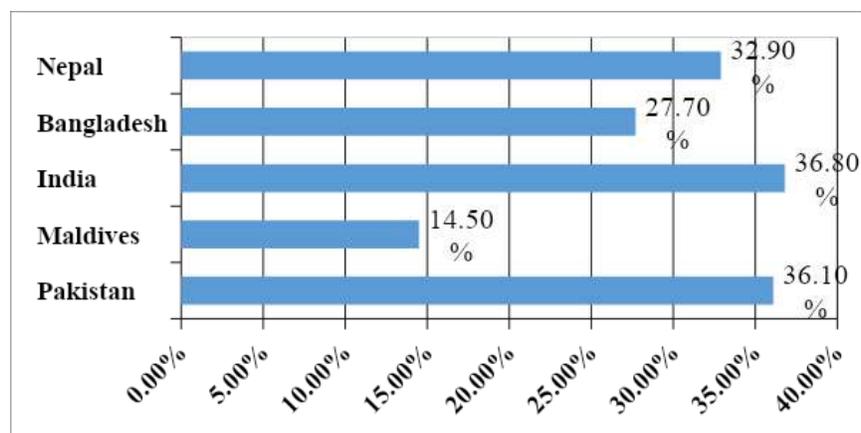
Figure 2: Prevalence of Malnutrition among South AsianCountries

Figure-2 shows the prevalence of stunting across south Asian countries. The graph clearly shows the higher prevalence of stunting found in India followed by Pakistan, Nepal, Bangladesh and Maldives.

Table 3: Prevalence of Malnutrition with Regards to Socio-Economic and Demographic Factors

Socio-Economic and demographic Characteristics		Malnutrition	
		Normal	Stunted
		HAZ≥-2	HAZ<-2
Child Age (Months)	0-12	79.6%	20.4%
	13-24	59.1%	40.9%
	25-36	59.4%	40.6%
	Above 36	59.7%	40.3%
Birth Order	1-3	65.6%	34.4%
	3-6	54.9%	45.1%
	>6	50.2%	49.8%
Wealth Index	Poorest	52.4%	47.6%
	Poorer	59.5%	40.5%
	Middle	66.1%	33.9%
	Richer	72.2%	27.8%
	Richest	79.0%	21.0%
Size of child at birth	Very large	66.2%	33.8%
	Larger than average	67.1%	32.9%
	Average	63.8%	36.2%

	Smaller than average	57.8%	42.2%
	Very small	51.8%	48.2%
	Don't know	56.6%	43.4%
Area	Urban	70.1%	29.9%
	Rural	61.7%	38.3%
Mother Education	No education	53.0%	47.0%
	Primary	59.3%	40.7%
	Secondary	68.8%	31.2%
	Higher	80.4%	19.6%
Father Education	No education	53.5%	46.5%
	Primary	61.6%	38.4%
	Secondary	67.7%	32.3%
	Higher	78.5%	21.5%
	Don't know	72.1%	27.9%
Father Occupation	Did not work	66.5%	33.5%
	Professional/technical/managerial	78.7%	21.3%
	Clerical	71.9%	28.1%
	Sales	70.5%	29.5%
	Agricultural - self employed	61.7%	38.3%
	Agricultural - employee	59.7%	40.3%
	Household and domestic	86.6%	13.4%
	Services	69.1%	30.9%
	Skilled manual	63.7%	36.3%
	Unskilled manual	63.7%	36.3%
	Other	71.6%	28.4%
Mother Occupation	Not working	66.7%	33.3%
	Professional/technical/managerial	81.1%	18.9%
	Clerical	75.7%	24.3%
	Sales	67.1%	32.9%
	Agricultural - self employed	60.8%	39.2%
	Agricultural - employee	59.5%	40.5%
	Household and domestic	68.1%	31.9%
	Services	64.7%	35.3%
	Skilled manual	62.7%	37.3%

	Unskilled manual	74.6%	25.4%
	Other	64.6%	35.4%
Toilet Facility	Flush	70.7%	29.3%
	Pit Latrine	66.1%	33.9%
	No Facility	55.0%	45.0%
	Any Other	68.0%	32.0%
Water Source	Piped Water	68.2%	31.8%
	Tube Well	58.8%	41.2%
	Dug Well	62.9%	37.1%
	Surface Water	68.4%	31.6%
	Filter Water	76.0%	24.0%
	Any other	68.0%	32.0%
Cooking Fuel	Electricity	72.4%	27.6%
	LPG	73.6%	26.4%
	Natural gas	74.8%	25.2%
	Biogas	74.2%	25.8%
	Kerosene	67.4%	32.6%
	Coal, lignite	60.7%	39.3%
	Charcoal	59.8%	40.3%
	Wood	60.3%	39.7%
	Straw/shrubs/grass	52.8%	47.2%
	Agricultural crop	58.0%	42.0%
	Animal dung	54.3%	45.7%
	No food cooked in house	57.1%	42.9%
	Other	68.0%	32.0%

Table 3 highlighted the prevalence of stunting across social economic and demographic factors. The table shows the percentage of stunting and normal children under each socio economic and demographic factors. Table 3 is used to identify the low prevalence of stunting on each level of socio economic and demographic variables. A category/level with low prevalence of stunting is selected as a reference category for that variable/factor. In child

age, the 0-12 group with 20.4% should be considered as a reference category. In birth order 1-3 groups with 34.4% and rest of the factors categories can be interpreted as the same.

Table 4: Socio-economic Demographic Factors of Child Malnutrition in South Asian Countries

Factors	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
Child Age (Months)						
0-12 (reference)	1	-	-	-	-	-
13-24	2.959357	.0995006	32.27	0.000	2.770626	3.160943
25-36	2.938396	.0991201	31.95	0.000	2.750407	3.139234
Above 36	2.846445	.0861851	34.55	0.000	2.68244	3.020478
Birth Order						
1-3 (reference)	1	-	-	-	-	-
4-6	1.077007	.0311808	2.56	0.010	1.017595	1.139887
>6	1.074796	.0676355	1.15	0.252	.9500817	1.215881
Wealth Index						
Richest (reference)	1	-	-	-	-	-
Poorest	2.120424	.1153451	13.82	0.000	1.905986	2.358988
Poorer	1.778252	.088232	11.60	0.000	1.613463	1.959871
Middle	1.442364	.0649516	8.13	0.000	1.320518	1.575454
Richer	1.22632	.0514328	4.86	0.000	1.129546	1.331386
Size of Child at Birth						
Very Large (reference)	1	-	-	-	-	-
Larger than average	.902034	.0510766	-1.82	0.069	.8072809	1.007909
Average	1.007934	.0497309	0.16	0.873	.9150277	1.110273
Smaller than average	1.298861	.0749571	4.53	0.000	1.159952	1.454405
Very small	1.661722	.124601	6.77	0.000	1.434606	1.924793
Other	1.078164	.0891112	0.91	0.363	.9169216	1.267761
Area						
Urban (reference)	1	-	-	-	-	-
Rural	1.068702	.0299705	2.37	0.018	1.011546	1.129088
Mother Education						
Higher (reference)	1	-	-	-	-	-

No education	1.715896	.0882238	10.50	0.000	1.551408	1.897824
Primary	1.563949	.0826048	8.47	0.000	1.410145	1.734529
Secondary	1.377186	.0626985	7.03	0.000	1.259622	1.505722
Father Education						
Higher (reference)	1	-	-	-	-	-
No education	1.19366	.0562909	3.75	0.000	1.088277	1.309247
Primary	1.169161	.0545221	3.35	0.001	1.067037	1.281058
Secondary	1.060555	.0409602	1.52	0.128	.9832378	1.143952
Other	.9479443	.1845523	-0.27	0.784	.6472396	1.388355
Father Occupation						
Professional (reference)	1	-	-	-	-	-
Not working	1.091801	.0737408	1.30	0.193	.9564296	1.246333
Clerical	1.067487	.0817588	0.85	0.394	.9186905	1.240384
Sales	1.11383	.0598384	2.01	0.045	1.002512	1.237508
Agricultural - self employed	1.499362	.1324997	4.58	0.000	1.260913	1.782903
Agricultural - employee	1.179517	.0590486	3.30	0.001	1.069281	1.301119
Household and domestic	1.074195	.0596327	1.29	0.197	.963451	1.197668
Services	1.192922	.0583522	3.61	0.000	1.083865	1.312952
Skilled manual	1.349365	.103297	3.91	0.000	1.161363	1.567801
Unskilled manual	1.199164	.1307812	1.67	0.096	.9683807	1.484946
Other	2.394768	1.830511	1.14	0.253	.5353313	10.71283
Mother Occupation						
Professional (reference)	1	-	-	-	-	-
Not working	.9871259	.0842079	-0.15	0.879	.835141	1.16677
Clerical	.9022955	.2152912	-0.43	0.667	.5652607	1.440286
Sales	1.127332	.1418423	0.95	0.341	.8809529	1.442617
Agricultural - self employed	.7960292	.089384	-2.03	0.042	.6387779	.991992
Agricultural -	.9973414	.0904835	-0.03	0.977	.8348699	1.191431

employee						
Household and domestic	1.02071	.1121122	0.19	0.852	.8230167	1.265891
Services	1.032124	.1001595	0.33	0.745	.853354	1.248344
Skilled manual	.6765708	.1967426	-1.34	0.179	.3826389	1.196292
Unskilled manual	1.080086	.1609326	0.52	0.605	.806547	1.446396
Toilet Facility						
No Facility (reference)	1	-	-	-	-	-
Flush	.8451739	.0244737	-5.81	0.000	.7985422	.8945288
Pit latrine	.8053979	.0314098	-5.55	0.000	.7461298	.869374
Other	.7933543	.0599213	-3.06	0.002	.68419	.919936
Water Source						
Filter Water (reference)	1	-	-	-	-	-
Piped Water	1.092844	.1040849	0.93	0.351	.9067507	1.31713
Tube Well	1.155827	.1111221	1.51	0.132	.9573211	1.395494
Dug Well	1.080505	.1092905	0.77	0.444	.8861955	1.317418
Surface Water	.96472	.0989635	-0.35	0.726	.7890106	1.179559
Other	.8870915	.2155702	-0.49	0.622	.5509596	1.428292
Cooking Fuel						
Natural Gas (reference)	1	-	-	-	-	-
Electricity	.8330755	.1061217	-1.43	0.152	.6490133	1.069338
LPG	1.098722	.0805535	1.28	0.199	.9516594	1.268511
Kerosene	.7183061	.128157	-1.85	0.064	.5063397	1.019007
Coal, lignite	.8488858	.1288337	-1.08	0.280	.6304695	1.142969
Charcoal	.961614	.1262028	-0.30	0.766	.743513	1.243692
Wood	1.148949	.1593524	1.00	0.317	.8754763	1.507848
Straw/shrubs/grass	1.143278	.0854569	1.79	0.073	.9874764	1.323661
Agricultural crop	1.172456	.1192368	1.56	0.118	.960574	1.431075
Animal dung	1.292595	.1207412	2.75	0.006	1.076346	1.552291
No food cooked in house	1.298965	.1051761	3.23	0.001	1.108348	1.522363

Other	1.68092	.4106914	2.13	0.034	1.041303	2.713421
Gender						
Female (reference)	1	-	-	-	-	-
Male	1.05011	0.00869	5.91	0.000	1.033216	1.067281
Constant	.0688379	.0106495	-17.30	0.000	.0508328	.0932205

Table 4 shows the results of the logistic regression model. It has been realized that the children with the age more than 36 months are 2.85 times more at risk of being stunted as compared to the younger children, aged 0-12 months (AOR = 2.85, p<0.05). Similarly, Children having birth order of 4-6 are 1.07 times significantly more likely to be stunted as compared to children having birth order of 1-3 (AOR = 1.07, p<0.05). The study sample showed children from low wealth status households are 2.12 times significantly more likely to be stunted as compared to children from richest households (AOR = 2.12, p<0.05).. Moreover, the analysis showed that children with small size at birth are 1.30 times more at risk for being stunted as compared to children with large size at birth (AOR = 1.30, p<0.05). Children from rural area are 1.07 times more likely to be stunted as compared to urban children (AOR = 1.07, p<0.05). As regard to parental education, the result indicates that children whose fathers have no education are 1.19 times more at risk for being stunted as compared to children whose mothers attained higher education (AOR = 1.19, p<0.05). Moreover, children whose mothers attained no education are 1.72 times more likely to develop stunting as compared to children whose mothers attained higher education (AOR = 1.72, p<0.05). Children whose fathers are agriculture employee (AOR = 1.18, p<0.05) and having service occupations (AOR = 1.19, p<0.05) are more likely to develop stunting than children who fathers working as professional. Children who lived in the households with flush toilet facility (AOR = 0.85, p<0.05) and pit latrine (AOR = 0.81, p<0.05) significantly less likely to be stunted as compared to those children who lived in the households with no toilet facility. Similarly, the result indicates that the children from households using animal dung as a cooking fuel are 1.30 times more at risk for being stunted than children from households using natural gas as a cooking fuel (AOR = 1.30, p<0.05). The results also reveal that children eating food not cooked at home are more at risk for being stunted (AOR = 1.30, p<0.05). Male children are 1.05 times more likely to develop stunting than female children (AOR = 1.05, p<0.05).

4.   Conclusion

The study focuses on the prevalence and determinants of child malnutrition in South Asian countries. The data were taken from the recently conducted demographic and health surveys (DHS) in South Asian countries. First the prevalence of stunting was obtained for South Asian countries (combined) and then the binary logistic regression with 95% confidence intervals were applied so that to assess the adjusted risk factors for stunting (Malnutrition). The prevalence of stunting in South Asian children below five years of age is 36% in which 20.8% is moderately stunted, and 15.2% are severely stunted. The prevalence of stunting was higher in India with 36.8%, Pakistan with 36.1%, Nepal with 32.9%, Bangladesh with 27.7%, and Maldives with 14.5%.

The result of logistic regression showed that the significant predictors of child malnutrition (stunting) in South Asian countries were found to be female baby, rural area, low wealth index (poorer), low mother education, low father education, older child age, higher birth order, father and mother working in agriculture, large and small size at birth, no toilet facility, type of cooking fuel such as animal dung and no cooking in home.

The prevalence of stunting in overall south Asian countries was 36.0%. The higher prevalence rates of malnutrition indicated that the under five children were in a worst condition (Demissie and Worku, 2013). The results of this study showed that the risk factors of malnutrition (stunting) were female baby, rural area, low wealth status, younger mother, low mother education, low father education, later birth order, older child age, small size at birth, type of cooking fuel such as animal dung. These results are in line with the findings of Islam (2016), Bwalya et al (2015), Demirchyan et al (2016), Demissie and Worku (2013), Agedew and Chane (2015), Tiwari et al (2014), Das and Gulshan (2017), Mushtaq et al (2011) and Dhok&Thakre (2016).

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Environmental Challenges and Green economy; A Case Study of South Asia

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Abstract

Rapid demographic change is detrimental to the ecosystem, early by initiating the expanded practice of the world's natural resources. Afterwards, by applying bigger constraint on the earth's environment through the statement of more waste into the air, terrestrial and water than are often fascinated or reprocessed. One pointer of the impression of growth and depletion on the atmosphere is that of the emanation of CO2. The rising local population and thus the joint increase in demand for liveliness are the intense issues. In this backdrop, the research investigates South Asia's enormous environmental matters. It is a rich diversification of environmental hazards, like deforestation, people, deterioration of horticultural region, air and pollution, climate variation and growing ocean heights. Besides, the subject considers green approach and the concept of Inclusive Green Economy to value green economy in South Asia. We have accumulated evidence for this scholarship from Asian Development Bank, World Health Organization, McKinsey Global Institute Reports, World Bank Annual Reports, Goldman Sachs paper. The study is reliable, narrative, and informative. We have used qualitative style in order to figure out the core findings of this inquiry.

Keywords: Environment, earth, region, South, Asia

1. Introduction

The United Nations Environment Programme (UNEP) describes a "green economy" as one "that marks in enriched human happiness and shared justness, whereas meaningfully decreasing ecological dangers and environmental insufficiencies" (Handl, 2012). It brands a provocative entitlement that "a green economy cultivates speedier than a brown economy over time, however, preserving and reestablishing physical wealth" (Kasztelan, 2017). Likewise, increasing oil rates, the economic catastrophe of 2008, and the ever-growing

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discussion across international natural calamities, comprising climate variation, can be understood as significant sparks for the quest for green development globally (Ghetti, 2015).

Moreover, the Rio+20 Conference has initiated curiosity and force on possible passageways to attaining green economy results in equally industrialized and evolving states. It is after-effect record countries that a green economy "must add to eliminating neediness as well as continued economic development, increasing shared presence, cultivating human wellbeing and generating openings for work, whilst preserving the wholesome running of the Earth's environments" (Otto-Zimmermann, 2012). It, additionally, emphasizes that every nation— whether advanced or emerging—can prefer a suitable attitude, regarding a green economy, which is according to its particular national maintainable growth policies, approaches, and urgency (Aldieri& Vinci, 2018).

Thus, the anticipation is that it will be administratively more practicable to initiate national strategies that will benefit in the progress and arrangement of types of machinery to decrease discharges and recover supply usage competence. As a result, this will produce viable rewards in the economy and affect in-market prospects for such skills (Cook & Smith, 2012). The standoff in intercontinental discussions on accepting a worldwide bargain on climate change has altered the emphasis to continuing countrywide balanced green evolution stratagems and their conceivable scaling up through local collaboration (Steward, 2012). In the illustration of South Asia, while rising nations in the region have given merely a minor portion of the remarkable international greenhouse gas emanations, the area is developing as a prominent supplier in modern eras. Regularly, emissions have increased at about 3.3 percent yearly since 1990—more quickly than in any other section of the World excluding the Middle East. But in Afghanistan, the per capita emission of energy-related carbon dioxide is expected to upsurge by two to six folds between 2005 and 2030. For an important deviation to occur from this upcoming emissions situation, South Asian republics must be changed to antiseptic replacements away from petroleum and gasoline. A technology-led tactic directed at market attractiveness, which has functioned in states like South Korea and Germany, may not be completely suitable in South Asia (Mishra, Kedia, & Mishra, 2014). Any roadmap for a shift to a green economy in South Asia cannot disregard the forms of segregation and susceptibilities that presently describe the socio-economic background of the territory(A. D. Bank, 2014).

2.   Conceptual Framework

First of all, it's vital to discuss the green economy to better comprehend its significance for South Asian regions. Indeed, the word 'green economy' was primarily devised in a ground-breaking version for the Administration of the Government of the UK by an assemblage of chief ecological economists, called Blueprint for a Green Economy in 1989 (Lavrinenko, Ignatjeva, Ohotina, Rybalkin, &Lazdans, 2019). The commentary was authorized to instruct the UK Management on whether there was an agreement classification on the term 'justifiable development,' as well as on the propositions of workable growth for the dimension of economic advancement and the evaluation of schemes and strategies (Hamdouch&Depret, 2010). Besides, the information construes justifiable progress as "non-declining human wellbeing over time" – that is, an enlargement pathway that brands individuals better off nowadays without denouncing the people of tomorrow to a lesser standard of breathing. A significant memo of the report was that finances could and should come to the support of a conservational roadmap. An arena in the discipline of economics which examines the association between the economy and the milieu founded on the notion, in 1991 and 1993 the writers announced outcomes to the first account enabled Blueprint 2: Greening the World Economy and Blueprint 3: Measuring Sustainable Development. These continuations protracted their earlier communication to international glitches – climate change, ozone lessening, hot deforestation, and reserve harm in the emerging world (Pearce, 2014). All statements created investigation and exercise in eco-friendly crossing back numerous decades. The writers contended that as today's economies are prejudiced towards reducing natural wealth to protected development, supportable advancement is unfeasible (Mendon, 2009). Moreover, in 2000, the acceptance of the Millennium Development Goals delivered greater motivation for policy modification and venture that was abruptly absorbed around a controlled set of objectives and arithmetical marks and prospered in catalyzing transnational collaboration and stock towards social purposes. Nevertheless, the targets were inadequate in possibility and unsuccessful insufficiently report interlinkages with ecological and economic scopes of enlargement (Bina, 2013). In reality, it is closely the connections between the environmental and economic magnitudes of improvement that are producing the very shockwaves we understand currently in the form of unstable world marketplaces, resource shortages, and adversities. Interestingly, in 2008, the green economy notion was revitalized in the setting of deliberations on the strategy reply to manifold comprehensive catastrophes (King, Mori, &Kipp, 2012). Amongst the clarifying international monetary disaster and apprehensions of a global depression, UN Environment advocated the impression of green incentive sets and recognized explicit parts where extensive public investment could kick-start a green economy (Linnér&Selin, 2013). As an outcome,

numerous administrations were stimulated to instrument noteworthy green impetus letters as part of their economic rescue will powers. Besides, the Global Green New Deal called on administrations to assign a noteworthy portion of stimulus backing to green zones and set out three purposes: (i) economic recovery; (ii) poverty eradication; and (iii) reduced carbon emissions and ecosystem degradation. It also proposed a framework for green stimulus programs, as well as support domestic and international policies (Chomsky, Pollin, &Polychroniou, 2020).

Furthermore, the Global Green New Deal meaningfully induced managements' reply to the monetary disasters and economic decline through the acceptance of expansionary strategies that integrated a green economic element (E. B. Barbier, 2010). Practically, the complete worldwide green impetus was prepared by G20 nations, with processes comprising provision for renewable vitality and carbon capture, energy competence, civic transportation and rail, enlightening electrical network broadcast, plus other shared ventures and inducements intended for green shield. It has been estimated that almost US$ 3.3 trillion was assigned all-inclusive to economic incentives over 2008 to 2009, US$ 522 billion (around 16 percent) was dedicated to green costs or tax breakdowns (Streich, 2010). Likewise, at the domestic level, the Republic of Korea's Green New Deal proposal dealt an extraordinary 95 percent of its US$ 38.1 billion financial incentive to green enterprises, constructing up 3 percent of its GDP (Yoshida & Mori, 2015). China allocated one-third of its US$ 647.5 billion monetary impetus to green actions, also adding 3 percent of its GDP (Steblyanskaya, Mingye, Bocharnikov, & Denisov, 2021). Whereas the European Union committed more than half of its expenditure to low-carbon reserves, the entire amount spent was rather slight: US$ 22.8 billion, or 0.2 percent of its GDP (Sulich, 2020). In the United States, 12 percent of the US$ 787 billion American Recovery and Reinvestment Act and 0.7 percent of GDP were capitalized in green firms. An appraisal of incentive strategies meant for renewable energy types of machinery in the USA determined that the incentive agendas had an optimistic upshot on the renewable energy segment, incorporating noteworthy and direct development in investments, mechanisms, and involvement to the liveliness source (Bruyère& Filiberto, 2013). It also facilitated an increase in mechanized volume and the renewable energy supply chain. It is joined with the financial decline, which is backed by a deterioration in CO2 radiations and carbon strength (Victor & Jackson, 2012).

Additionally, in June 2009, at the UN Climate Change Conference in Copenhagen, the UN announced that the economic revival would be a great initiative for a go-getting and operational intercontinental reaction to the manifold crunches confronting humankind

which are established on a large-scale green economy (Trevors&Saier, 2010). In March 2010, distinguishing the serious connection between economy and the environment, authorities approved 'green economy in the background of maintainable enlargement and poverty abolition' as one of the two matters for the 2012 UN Conference on Sustainable Development (Rio+20), commanding numerous arrangements of worldwide consideration and investigation (Otto-Zimmermann, 2012).

Similarly, UN Environment announced its Green Economy Report, to improve the report, UN Environment combined with think tanks and marketable players (including Deutsche Bank and the Millennium Institute), advancing reliability to its economic examinations (HDR, 2019). For instance, the Green Economy Coalition concisely describes the green economy as 'a buoyant economy that offers a healthier feature of life for all within the environmental parameters of the earth' As accomplished by Allen and Clouth (2012), these meanings are generally dependable and, as was the illustration with justifiable elaboration, there would be tiny additional worth now in endeavoring to attain at a particular widespread description (E. Barbier, 2011).

It is the application of the green economy that is more imperative. After Rio+20, UN Environment and its coworkers jumped a Partnership for Action on Green Economy (PAGE) and widened the thought of green economy to discourse apprehensions over fairness and comprehensiveness and better intensify the idea of ecological onsets (Bann, Bazan, Seydi, Yansanjav, & Sun, 2017). The reformulated IGE combined a wider variety of notions such as justice, contribution, indirectness, teamwork, harmony, pliability, prospect, and interdependence (UN Environment, 2015). In 2015, the approval of the 2030 Agenda for Sustainable Development and the Sustainable SDGs provided a new improvement dream for all nations founded on an agenda of objectives and measurable objectives and guides (Allen, Metternicht, &Wiedmann, 2016). The SDGs are inclusive and combined, and incorporate societal, monetary, and ecological magnitudes of supportable enlargement, emphasizing the inter connections between these scopes. They propose a chance to reframe economic policy, comprising practical utilization and manufacture, reasonable results and human happiness, parting no one behind, incorporation and collaborations. These characterize the essential features of Inclusive Green Economy (IGE) (Eaton & Sheng, 2019).

The achievement of the SDGs, conversely, will principally be contingent upon accomplishment by administrations, corporations, civil associations, and a wide range of shareholders (Eaton & Sheng, 2019). Although the SDGs assist to fix the objective, it remains to be realized whether countries and corporations will be able to surprise the important

execution of contests that have inadequate growth on supportable enlargement previously. These contain the absence of a justifiable project for the economy, and workable commercial replicas that can motivate investment and evolution in green areas, careers, know-hows, and commodities (Allen et al., 2016). The IGE model is vital in today's period because it provides an approach towards addressing challenges for developing states. It is an unconventional ideal to attain the SDGs, which relies on the institutions, systems of the game, and strategies and motivations that are shapers and drivers of marketplaces, commerce, and business (Ban, 2016). IGE is a substitute to today's leading economic standard, which produces extensive environmental and health jeopardies, inspires extravagant depletion and fabrication, motivates environmental and resource shortages, and outcomes in disparity (Alfredsson&Wijkman, 2014). But IGE is a prospect to develop both sustainability and social impartiality as tasks of an established and wealthy financial scheme within the outlines of a determinate and delicate globe. It is a corridor towards attaining the 2030 Agenda for Sustainable Development, exterminating poverty whilst upholding the environmental onsets, which underlie human well-being, and development. According to the European Union Development Report, the IGE model is a passageway to sustainable development as well. Its emphasis on supply proficiency and environmental capital as the building blocks of the economy, identifying that conservation deprivation destabilizes long-term economic progress and social expansion (Alfredsson&Wijkman, n.d.). Developing nations, in particular, need a central economic restructure and alteration towards what we demand the IGE, an economy which is "low carbon, proficient and fresh in manufacture, nonetheless also comprehensive in ingesting and aftermaths, grounded on contribution, indirectness, teamwork, harmony, elasticity, chance, and interdependence. It is concentrated on increasing choices and adoptions for national economies, exploiting leveled and suitable economic and communal defense strategies, plus supported by robust institutes that are explicitly geared to defending social and environmental bases" (Eaton & Sheng, 2019).

Indeed, IGE as an economic ideal, varies from outdated styles in that it yields due deliberation of ecological and common externalities, and does not emphasize GDP development as a decisive economic purpose. Its somewhat emphases on resource competence and on ecosystems, as an edifice of the economy, captivating into explanation that environment disgrace damages long term economic progression and human improvement (W. Bank, 2012). IGE can be assumed as one in which conservational, financial and social strategies and modernizations facilitate people to practice capitals efficiently - enriching human happiness in a comprehensive means, whilst preserving the natural structures that endure us (Eaton & Sheng, 2019). IGE is connected to an affluence of

prospects, for both people -to recover their existing atmospheres and have well-mannered occupations- and for productions – to intensify paybacks through more effective construction observes that produce investments, take benefit of the mounting market for eco-friendly goods and amenities, develop their appearance etc (Alfredsson&Wijkman, n.d.).

Therefore, in this framework; the core argument of this paper is that South Asia needs to conceptualize an IGE that is relevant to the current socio-economic and demographic trends in the region. The focus has to be on inclusion and resilience, which has important implications for the choice of technology and the design of public policy. This paper addresses the ecological issues of South Asia at macro level, applying the theoretical framework of green economy in general and the concept of IGE in particular keeping in view the apprehensions about population. This paper suggests how South Asian nations should be required to follow a pathway which can encourage extraordinary human growth with a high climate control track model which has mostly been adopted by the developed countries.

South Asia and Environment; A Glance

South Asian nations in terms of human size and structure of economy are rather weaker than other parts of the World. The current estimated population size of this region is equal to 24.89% of the entire earth planet population (Hagerty, 2005). South Asia ranks number one in Asia amongst sub-regions placed by population. For instance, per capita, freshwater accessibility in Bhutan is more than a thousand times that in the Maldives. On the "brown" side, India further outdid its neighbors in 2000 by accounting for 73.4 percent of the total Green House Group releases in the region (W. Bank, 2007). The off-road multiplicity is much less obvious once one reflects the development-environment association in the region, in terms of means of contingent incomes and openness to ecological anxiety and distress. Unfortunately, the poor have an extraordinary level of need on natural resource structures for their business, plus with over forty percent of the world's poor, we expect South Asia to have the uppermost attentiveness of poverty and starvation in the world with mounting people (Asia, n.d.).

South Asia has been deteriorating over the past couple of eras, it still rests at high levels inside states like Bangladesh, India, Nepal, and Pakistan. More prominently, the underprivileged in these states spend 65 to 75% of their interest on food. The other foremost harmony across states in South Asia is an extreme relegation (Roberts, 2013). These states are going through important socio-commercial changes because of rapid monetary evolution and snowballing development. Likewise, there is increasing industrial disparity and difference within civilization in terms of entry to goods and facilities that are significant for co-existence (Lautensach&Lautensach, 2011). The huge intensification in the indicators of destitute individuals is in abundance. Once the earning worth has changed from US$1.25 per time to US$2 per day, it suggests the main attentiveness of poverty above continued concentrations of longevity. Because the horrible picture of the society would be defenseless to the danger of wealth variabilities. Even a small reverberating income current can thrust them beneath the endurance stage (Sobhan, 2018). An added expressive pointer of exclusion narrates contact with fresh energy. Around thirty ratio of South Asia's populace, (establishing about 450 million) requirements for electricity (Cardona, 2011).

On the flip side, if we talk about South Asian regions, one can find that although India's growth is going well. But what is remarkable is low net employment growth — that less than a fifth of the degree of GDP development—throughout the similar phase. This suggests that India's speedy economic situation has continued slightly to job formation and

has thus not been comprehensive. With the state estimated to be the most occupied republic on the earth by 2025, there is widening pressure in strategy planners to safeguard a wide-ranging shift (Khosla, 2019). The other puzzle is that since cultivation's part in GDP in most South Asian networks has reduced over time, its change on the entire work remains to stay very excessive. Services in horticulture in South Asian unions are common (Yousaf&Navid, 2020). A World Bank report on utilization in South Asia delivers state-wise estimations of informal business in both cultivation and non-agriculture segments. It argues for a high gradation of prohibition of workforces from labor market guidelines. Such elimination is likely to increase the susceptibility of employees, female laborers, to unfair exercises controlling deprivation and poverty (W. Bank, 2007). Another vital region of South Asia and largest after India, Pakistan, is facing severe Climate Change issues. When Pakistan attended the Group Environment Day in cooperation with the United Nations Climate Programme as pulling out of labors to increase consciousness and demand the misery of temperature modification (Nations, Paris, & Initiative, 2008). During the occasion, Pakistan commended the industrialized democracies to come forward and support the weakest states by launching a Green Fund. Climate diversity is a main existential danger to humankind, fast-tracked by enormous carbon emissions, fossil fuels, deforestation and greenhouse gasses, leading to global warming. Which exists in dissolving glaciers, rising sea heights, altering rain designs, scarcities, and frequent heat waves. All this intimidates food safety. The nastiest separation is that these impressions are only becoming sadder. Pakistan is on the list of the ten most unnatural lives by chance despite its insignificant effect on nursery gas releases. Besides, overall South Asian states have been suffering important societal shifts. Urbanization has been a noteworthy fact in the area as well. With the urban community increasing at an average annual estimate of 2.8 percent throughout 1990–2005. It is higher than the region's average people progress rate of 1.9 rate per year for the conforming epoch. Immigration from countryside zones, persuaded by livelihood-related "push" and "pull" aspects, has appeared as a crucial force on metropolitan structure in all societies of the region. Added momentous social transformation in South Asia is the increase of the "middle class" (Kharas, 2010). For example, vicissitudes in Indian society have led to a variation in the ingestion arrangements and existences. This influences the resource use patterns. The middle class, with their optional intake tendencies, will generate an extra desire for industrial commodities, transport gear, vehicles, medical apparatus, broadcastings, etc. It would then proliferate the demand for different capitals. With the mounting test, India has transformed from being a net exporter to an earned importer, with import advances controlled by fossil fuels and metals (Uddin, 2014).

A blueprint of IGE in South Asia

There is abundant substantiation to ascertain that the motivating strengths of economic development in South Asia have meaningfully worn the physical wealth of the region. A newly guided local condition inquiry of the state of ecosystems and ecosystem facilities in the Indo-Hindu Kush area states that the eco-friendly prices of extraordinary and non-inclusive progress outlined in the area resume to be principally unaccounted for predictable growth arrangement and source distribution (Khosla, 2019). It provides safety to a huge and mounting population; ii) it offers engagement and business to a mainstream of the local workforce; and iii) a normal household in the county still passes more than half of its spending on nourishment. Even if the sector's involvement to domestic GDPs in the region is increasingly deteriorating, it rests dominant to growth preparation. Any treatise on alteration to a green economy has to bounce the agriculture segment a significance deliberation(Chand, 2014).

An analysis, dealing with a 25- years duration in growing states, has shown that one percent increase in cultivation is at least two to three seasons more powerful. It diminishes poverty then the same increase taking place from non-agriculture regions. In China, it was 3.5 times more sophisticated and in Latin America societies, including Brazil, it was 2.7 times higher active (W. Bank, 1994). As per the FAO, there are four pedestals of food conservation: i) an opportunity for abundant feed stores; ii) economical means to meal; iii) bread and nourishment designated as absorption issues, including releases of meat storage; and iv) insurance of feed policies, further so in the aftermath of temperature variation. To assure availability of plentiful food transfers, South Asian voices want to offer that they set up or know the best Agri-machineries on the earth (W. Bank, 1992). The Green Revolution in India of the 1960s and 1970s proceeded through maintaining such technology, coupled with price stimuli. It was the cycle in the manufacture of cotton, hybrid maize, or Pusa Basmati. To imitate this upheaval in diverse parts of South Asia, takes to be a regional experience of tool and transmission of philosophy. The focus on appliance and plantation practices suggests the convenience of integrating green production approaches. Reductions in emissions intensity from the culture sector will have to be worked out through promotion of power economic structures. It inspires widespread approval of functional harvest processes and outcome and distribution of sustainable energy-based technologies (W. Bank, 1991).

i. Urban evolutions

Urbanization tendencies in South Asia present significant spaces for an invigorating shift to a green economy. One of the distinguishing objectives of later decades relates to the expansion of Asian megacities. One billion humans to Asia's metropolitan community in the last 30 years have been added (Yeung & Olds, 2001). To implement this cosmopolitan community, the McKinsey Global Institute predicts that 600–900 million green feet of economic and residential location would have to be determined. Across all populous centers in South Asia, contribution in downtown infrastructure—in fields such as residence, fresh water and hygiene resources, civic area development—is lingering to be escalated up on a large scale (Lewis, 2005).

ii.   Role of corporate sector

For trade and advertising, the compromises from climate change go beyond the natural intimidation from climatic excesses, such as waves and windstorms, to base and information resources. In fact, economic compromises arising out of bold responses at both foreign and domestic standards are considered being more dangerous and wide-ranging for companies (Sassen, 2018). But, more than the endangers, it required the potential monetary spaces to do a part in regulating collective management on humidity variation. At the international stage, this concept is taking place at this length. Along with the possible wholesale freedoms, two large and interpreting directions of the decade in the present century prove the joint part of the demand for authority on temperature shape results. In many parts of the developing part of the World, the progress of knowledge and standard of communal attention is speeding up with connection to instruction and transmission machinery (Mishra et al., 2014). This is driving the "market networks". Second, the ever-strengthening process of overall assimilation is hitting a game-speculator for commerce and industry by redefining issues such as market procedure, scale economies and technology shift. To develop the learning societies, in increased civil corporation, consideration of environment change is pivotal. It requires collective strategizing on governmental capacity to be in excellent harmony with green contents (Aldieri& Vinci, 2018). Global integration acts as a great enabler by simplifying the flow of learning, capabilities, and instruments. The descriptions of the Carbon Disclosure Project are illuminating of the spectrum and amount of sustainability efforts by enterprises as a response to increasing social concerns of environmental quality. Another barometer of climate entrepreneurship is the enterprise capital support in green energy technologies. Which was growing till the economic deterioration in most of the established countries earlier this year (Streich, 2010).

We can observe variation to environment differences as a local public goods. This takes about significant flow over transnational benefits arising from proposed adaptation measures accepted by individual states. But, drawn adaptation to climate change affects is proceeding to be valuable (Jones, Pascual, & Stedman, 2009). An investigation supervised by the World Bank in 2009 says that the yield of variation for developing states would reach between US$77–89 billion a year from 2010 to 2050 (Straub, 2008). The measure for South Asia is around US$17–18 billion, and India alone accounts for 70–74 ratio of this assessment. Local cooperation among SAARC member states can take the requiring of designed transformation (Ahmed, 2016). But, this requires to be determined through economic evaluation. The large standard of heterogeneity can perplex regional partnership for the arrangement of a provincial civil good among cooperating states. Still, such help is simplified by the courage of a "threatened but valuable support," confidence and an experienced awareness of the condition and the freedom to establish laws. Initiatives to keep resident public stocks should appear with an organized architecture with little linkage costs. Pre-existing institutions can take part in a major task in fostering collective performance in the spirit of heterogeneity (Bina, 2013). For SAARC countries, conversion options would comprise the improvement of fresh crop mixtures, afforestation, water use operation, structure of healthy drinking water and cleanliness, coastal defense plan, emergency preparation, and timely information procedures. In most positions, pursuing policy responses would involve considerable reorientation. For example, the direction of renewal in the marshy zones must transfer from setting-disaster acts toward more anticipatory integrative risk reduction proposals (World Health Organization, 2008). It covers environmental governance, constitutional reactions, shelter of strategic resources, land need method, commercial mechanisms and initial knowledge techniques. For energy help to arise in South and South-West Asia (SSWA), there is a demand for unique sets of institutional structures at the local stage. It would foster cross-community collaboration on distribution of ability, automation, competences, and capabilities (Yasmin & Dixit, 1995). SAARC has an estimate of local businesses and leadership, which can go forward with the local program on climate change transformation. World Trade Organization negotiations on foreign trade liberalization and retail approach have established the capacity of substantial properties and corporations to set up "triple win scenes" (Bandara& Yu, 2003).

iii.   Strengthening innovations, institutions and control

It is believed that innovations are referred to as key elements to long-term industrial expansion and progress in South Asia. In Schumpeter's examination, significant

developments of apparatus are the root of the transformation and they influence the full economy (A. D. Bank, 2014). Apart from the intellectual property right structure, existing regulatory schemes could impede innovation at various stages. Economic stimuli, remission of fees and charges, tariff favors and stronger legal safeguard to additional measures, it can respond to these e.g., establishing provisions of classified trade advice within South Asia (Najam& Yusuf, 2013). We could not overlook the magnitude of change in practice interventions that could set social and market procedures in plan. It could leverage business and national leadership for sustainable growth. As the USA, Asia Pacific indicated civil processes indeed brought that shift about. So, different segments of the nation, the youth and those in any command, must take into the scheme. This is an indispensable condition for the welfare of any drive inside South Asia. It can generate low carbon development potential and is workable. It would be advisable for South Asia (Vld, Carlsson, &Dobias, 2010).

iv.   Crafting tourism maintainable

The evolution to an IGE requires serious attempts at many degrees, consisting of encouraging sustainable lifestyles, adjusting visitor industry and promoting green entrepreneurship. Nations can get it through the progress of eco-modernization, the support of capital productivity, and the mainstreaming of green buyer position (Cheong & Miller, 2000). In transition, we should establish modern tourism action to strengthen the green economy. It would cut down carbon emissions, debris and other forms of pollution from South Asia.

A recent report titled Tourism in the Green Economy carries out a commercial situation for spending in traveling. It, likewise, gives direction on how to make such contributions. It features the tourism management challenges, including the sector's improvement to "global greenhouse gas (GHG) discharges (Streich, 2010). Besides, it focuses on extra water consumption correlated with residential water treatment, clearance of dirty water, the breed of drain, the destruction to local terrestrial and aquatic biodiversity and the risks to the continuity of native ways of life, built right and customs." The document also sets out the spaces for tourism development in advancing current money, job production and deficit reduction (Ling, 2012). A fundamental prerequisite for a fresh economy is a good assessment of the national process. It is now quite established that the GDP, made from standard national income interests, neglects to secure the economy- ecosystem link. A huge-level commission was set up "to classify the specifics of GDP as a symbol of industrial operation and civil growth." The task was to operate a profusion of sustainability indicators,

environmental enlargement and monetary to uphold an analysis. It could concentrate on expenditure rather than revenue, that can highlight distributional aspects and is adequate for securing non-market responses. In this respect, SAARC countries have picked these remarkable processes up towards establishing more meaningful metrics of domestic worth and wellbeing. The perception of Gross National Happiness has been chosen by Bhutan. This brings a method that comprises a spectrum of conventional sectors of diplomatic consideration. Such as working requirements, health and literacy, along with fewer common ingredients, intellectual well-being, ability, community strength, and natural diversity are added. India has set up an authority group to formulate a roadmap for a Green National Accounts Framework and in- mentions a further thorough GDP estimate by 2015(Razzaque&Basnett, 2014). At a collective level, SAARC leaders have approved a collection of 22 SAARC SDGs. The Micro, Small, and Medium Enterprises (MSME) zone in South Asian states is a prerequisite in terms of advancement and progress. In India, the MSME sector contributes 8 percent to the state's GDP, 45 per cent to producing productivity and 40 percent to transport. Which provides the greatest percentage of use after the horticulture region. In Pakistan, MSMEs support better than 30 per cent of the region's GDP and 90 per cent of the state's non-agricultural trade. In Bangladesh, MSMEs contribute 25 percent to the country's GDP, 80 per cent to contemporary businesses, and 25 percent to the overall employment demand (Ahmed, 2016).

The trust gap for MSMEs in South Asia allowed for US$30 billion to US$40 billion. In the MSME sector, there is a demand to set up a strength of state-owned development Small and Medium Enterprises (SMEs). In India, for illustration, the Small Industries Development Bank of India proposes to build up energy savings by supporting technology upgrading in the micro, small and medium-scale industries of India. In the foreign presence, North-South bilateral help is a measure to start up models of machinery help that extend beyond the conventional "technology transfer rule"(Karim, 2013). For instance, the International Finance Corporation (IFC carries the South Asia Enterprise Development Facility out), along with assistance from the United Kingdom's Department for International Expansion and the Norwegian Agency for Development Cooperation. In 2010, IFC's Regional Committed Portfolios in MSME financial institutes in South Asia was 6% of its entire portfolio(Asia, n.d.). It can enhance further, to establish green rise in the MSME part, commercial systems need enlarging. Conforming to various estimates, 33% of SMEs receive allowances from banks in India, 32 percent in Bangladesh, 7 per cent in Pakistan. Simplification of policies around practices and adjustments, along with knowledge of provisions applicable to fielding the MSME sector, is expected, for which a universal platform becomes relevant. Capacity

enhancement of micro-business industries that cater to climate sensitive zones, such as cultivation, is again remarkable to strengthen flexibility in the South Asian region (Briceno, Estache, &Shafik, 2004).

3.   Results & Recommendation

The present study has examined how the green economy and IGE model can help the South Asian region to reduce the ecological issues. As IGE is all about growth-oriented climate investment and social involvement at its bottom line. The roadmap presented here may develop as a series of specific strategic factors. We expect these procedures to be incorporated for a convenient transformation to a South Asian green economy. It bolsters the strategic influence of concurrent and integrated changes in strategy for successful formation and up-mounted green growth scenarios. More substantially, it will drive civil players in this development process to accept different machineries and processes. When there are strongly established institutional structures to check for and to share and the expected gains (Straub, 2008). The discrimination debate, which is predominant in South Asia, perceives the deficiency of the radical growth model based on the "trickle-down effect" to reach this specific ambition. It recommends a distinctive result path while establishing a case for mitigation productions for the state. Domestic climate actions should be taken. The research has analyzed that pioneers in ecological economics have acknowledged that addressing discrimination in the South Asia involves an original attitude than standard economics. It urges relying on monetary supplies to incorporate conditions like human capacity building particularly in South Asia (Alkire, 2015).

4.   Conclusion

Overall, the paper has explored that states in South Asia should require changing on a line which would encourage high individual progress with a poorer environment-related footprint. South Asian states, except Sri Lanka, have a smaller Human Development Index than the World average. In terms of per capita CO_2 emissions, all states are below the earth average. South Asia should call for both mechanical and human strength to adhere to a development trajectory like the advanced world has shown by adopting the IGE approaches, where significant individual improvement is considered by higher carbon emissions. There can be several passages to this transition depending on how the situation-2015 (and beyond) international scenario develops. Climate change cooperation and the environment-2015 development program, comprising the Sustainable Development Objectives. It can vary with

character to machinery and business flows from developed to developing states. At one stage, an impressive technique must require regional collaboration on competence increase. Government of this region should implement it for a local public good. At another level, collective negotiation with the North is indispensable for South Asian policy makers for an easier approach to clean technologies. Thus, the concept of an IGE in South Asia is as high a socio-cultural challenge at the country's status as that of the political management at the local level. Moreover, South Asia should gain both industrial and individual competence, like the advanced world. Besides, the research has identified that regional help for a green economy should be made in South Asia; along with multi-state demonstration projects, local climate services for decision- makers, knowledge distribution and collaborative capacity strengthening. The region's effectiveness rests on an increasing number of scientists, philosophers and engineers and an existing structure of knowledge institutions. What we need is strong political authority in all states to use this ability and operate it for effective evidence-based rule-making. Some areas that can deal with knowledge distribution and skill building. Thus, the capacity to a green economy in South Asia is already a socio-cultural challenge at the state level, as that of the political government at the local side.

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Panel II

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Mr. Jawad Tariq

Assistant Professor, Department of Sociology, FCCU

Paper Presenters:

Dr. Jamal Abdul Nasir

Chairperson, Statistics department, Government College University, Lahore

Topic: Population Growth and Demographic Dividend in South Asia

Mr. Sher Khan

M.Phil. Quaid-i-Azam University, Islamabad

Topic: Toward Economic Growth without Emissions Growth: The Role of Urbanization & Industrialization in Pakistan

Population Growth and Demographic Dividend in South Asia

Jamal Abdul Nasir, Farah Hassan[3], AfzaRasul[4]

Abstract

The article investigates the regional analysis of demographic dividend. The study aims to make an attempt of achieving additional knowledge about demographic dividend. Over the last two decades, the phenomenon of the demographic dividend has become the source of significant and dynamic communal debate in both policy and academic scopes. A developing frame of research discovers this phenomenon in South Asian countries trying its existence to a range of demographic transition factors popular among which are fertility and vibrant population age structures. The study examines the Demographic Dividend of the projected population up to the year 2050 from the year 2020, taking the population of 2015 as the base year population using the Cohort Component Projection method. The study investigates the demographic dividend in South Asia with an emphasis on fertility assumptions as it relates to other demographic and economic parameters. The study results clarify the demographic dividend occurrence in South Asia, extend the literature, and sets the ground for policy concentrated on making the vision of a demographic dividend a reality.

Keywords: Demographic Dividend, Projected Population, Population growth, South Asia

1. Introduction

Demographic Dividend is an idea that economic growth is related to the population that is of working age. The demographic dividend is time-limited as the share of the working-age population varies over time in different regions. It is the opportunity for a region or a country to grow its economy when the window is open. The term Demographic dividend originated from the study of Asian growth (Bloom & Williamson, 1998). Demographic Dividend is the idea that economic growth is related to the working-age population. The demographic dividend is time-limited as the share of the working-age population varies over time in different regions. It is the opportunity for a region or a country to grow its economy when the window is open.

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Mathematically, the difference between percentage for the working-age and total population of growth rate is Demographic dividend. Demographic transition is the process where a country must face low mortality and high fertility, both of which lead towards population growth. With time, the decrease in death rates prompts a stable and constant reduction in Fertility. Such all lead to notable changes in the structure of the population of a country which can have consequences on the growth of the economy of that country. Demographic transitions are the opportunities for countries to examine past errors and learn from them (Bloom, Canning, &Sevilla, 2003).

In South Asia it is the time for the dividend to be on for countries and to rise high because the ratio of independent (non-working age) to dependent (working age group) is getting lower hence the window is open. And to raise the demographic dividend the working-age people must be employed as well instead of being unemployed because it will create a problematic situation. Therefore, choices and decisions should be made to encourage the employment of labor market policies (Bloom, Canning, & Rosenberg, 2011).

In 2010, sixty percent of the world's population lived in Asia, and of those 1.7 billion lived in South Asia which will increase by projection to 2.4 billion by 2050. Throughout different stages of demographic transitions, all regions of Asia including South Asia had a significant increase in the working-age population since the 1970s (Gubhaju, 2013).

This article aims to empirically investigate the demographic dividend for all the countries of South Asia. More explicitly, a country wise comparison is employed to assess this originality of demographic dividend in different countries of South Asia.

2.   Methods

Data: The main data source used in this article was from the Population division of the United Nations data, World population prospects 2017 Revision (United Nations, 2017).To estimate the population projection and demographic dividend, it requires the age-specific population, death rates, and fertility rates for the countries of South Asia. Data from the countries of South Asia including Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka is used.

Projection Technique: The Cohort Component method is used to project the population data. This method was first proposed by the English economist Edwin Cannan (Cannan, 1895), and later re-introduced by Whelpton (Whelpton, 1936) and used by (Notestein, 1945). Computational details of the Cohort Component method are available in all major books of Demographic Methods (O'neill, Balk, Brickman, & Ezra, 2001; Vaupel, 2006). Five-year

interval projections are computed. To project the population till 2050 five different criteria: minor variant, low variant, moderate variant, high variant, and a very high variant with increased and decreased fertility rates are used. For each criterion, net migration is assumed to be zero whereas fertility rates are increased and decreased simultaneously by 10, 20, 30, 40, and 50 percent. For calculation of demographic dividend, percentage of working and the total population growth rate are required. The difference between percentage of working and total population growth rate is demographic dividend (Ross, 2004).

3. Results

Projected populations

In South Asia, the population of every country is increasing throughout the projection period. The second most populated country of the region South Asia is Pakistan and figure 1 showed the highest projection of population in Pakistan after 2035.
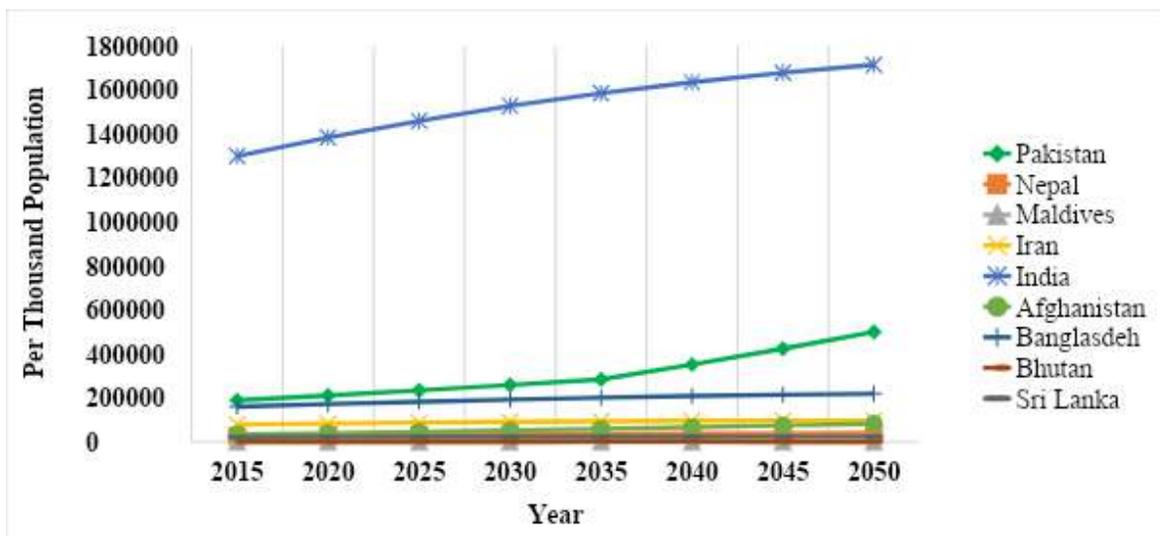

Figure 1. Projected Population of South Asia

Non-working Populations

To measure non-working (dependent) populations of countries of South Asia the measure of Dependency Ratio is used in the study especially in three main variants i.e., Total Dependency Ratio, Child Dependency Ratio and Old-age Dependency Ratio.
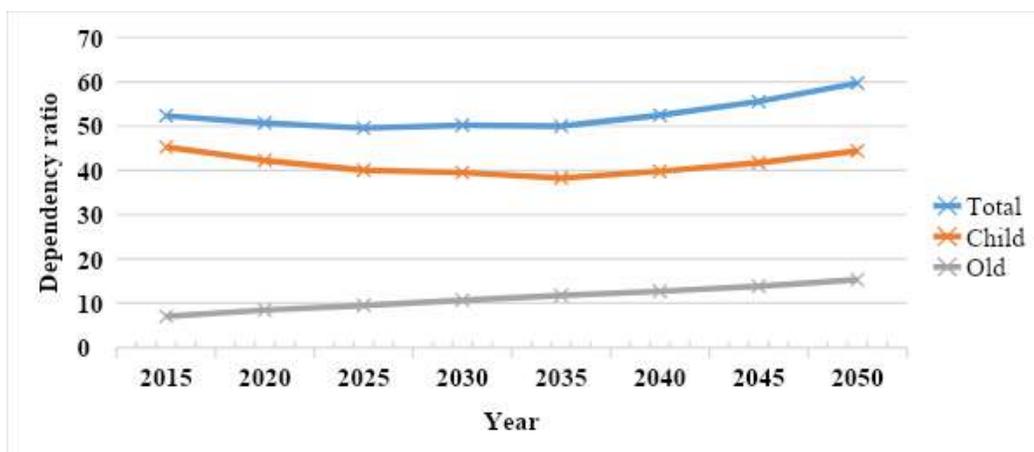
Figure 2: Projected Dependency Ratio of South Asia

Figure 2 displays the tendency of the total number of dependents, child dependents and elderly dependents in South Asia by the year 2050. In South Asia Total Dependency has a slightly falling trend till 2025 after 2035 it has an increasing trend till 2050, along with child dependency. Alternatively, the old-age dependency ratios display an increasing tendency afterward 2035. From the above debate, it may be determined that South Asia needs to arrange itself for the population that is getting old that will take place in the next few years.

Demographic dividend

The article investigates the demographic dividend for the year 2015-2050 by taking the population of the year 2015 as the base year and projected population up to the year 2050 by using the cohort component projection method. Also estimate the Demographic dividend under five variants namely: minor, low, moderate, high, and very high variants of increase and decrease of fertility rate.

Table 1: Projected Demographic dividend in South Asian countries.

Period	Pakistan	Nepal	Maldives	Iran	India	Afghanistan	Bangladesh	Bhutan	Sri Lanka
2020	0.01	0.93	-0.8	-0.34	0.22	0.63	0.68	0.14	-0.13
2025	0.06	0.62	-0.46	0.03	0.16	0.49	0.3	0.05	-0.03
2030	-0.02	0.13	-0.16	0.09	-0.09	-0.04	-0.07	-0.1	-0.12
2035	0.12	0.19	0.31	-0.09	0.05	0.53	-0.09	0.01	-0.18
2040	-2.37	0.18	-0.07	-0.24	0.03	0.46	-0.06	-0.05	-0.08
2045	-1.95	0.08	-0.42	-0.62	-0.03	0.33	-0.16	-8.7	-0.15

| 2050 | -1.75 | -0.04 | -1.02 | -1.09 | -0.16 | 0.21 | -0.14 | -4.86 | -0.02 |

Table 1 shows the comparative analysis of the projected demographic dividend of South Asia. Results illustrated that the structure of demographic dividend changes in the different countries of South Asia. In Pakistan, in the window of 2025 to 2030 projected demographic dividend declines and goes negative, later it rises till 2035 and rapidly slows down after 2035. In Nepal, projected demographic dividends decline slowly but live positively till 2045. Bhutan showed the worst demographic dividend after the year 2045. Demographic dividend of Sri Lanka remains negative in all projected years ranging from -0.02 to -0.18.

Figure 3 shows the projected demographic dividend of South Asia. South Asia will have a 0.2% demographic dividend for the period of window of opportunity from 2020 to 2026. After 2026 it declines and the dividend becomes negative to almost -0.1%, it will rise positively in 2033, then again fall negative and remain negative throughout the projected period.
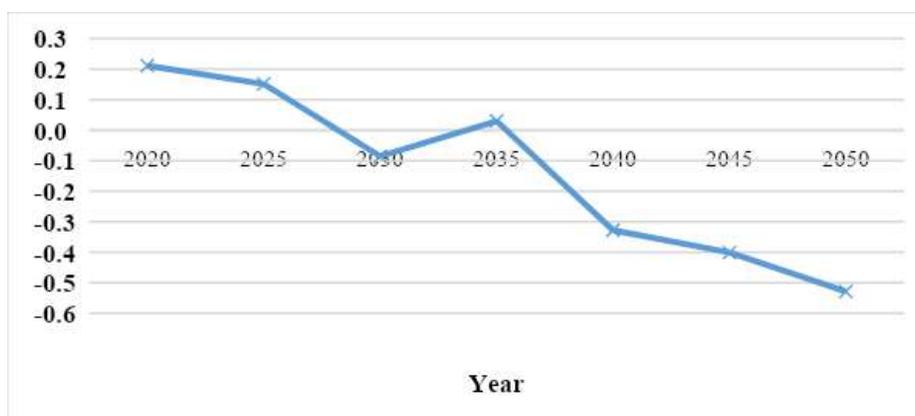

Figure 3: Projected demographic dividend in South Asia

Results illustrate the timings which eventually take to the complete period of Demographic opportunity for South Asia. It can be seen that in South Asia 'Window of Opportunity' will unlock in 2020 and it seems to close by the year 2025 and decline in 2030 and then open again in 2035, after it will again fall negative, and the window of opportunity is closed. So, demographically, the 5 years opportunity appears to close till 2050.

4.   Conclusion

Ideally, the "Demographic Dividend" is computed through the difference between the growth rate of the Working-age population (independent) and the total population. Optimistic changes propose a one-time Window of Opportunity for any nation to create

usage for development. Our findings suggest that the level of growth of the economy is due to the increasing part of working-age people in the population in South Asia. Demographic dividend exists for all countries of the South Asia regions. Results show the differences in demographic dividend in South Asia at five-year intervals from 2020 until 2050 (using the Projected Population structure for the years from 2020 onwards). The window of opportunity for the South Asia region will close in 2025 and will reopen in 2030 for 4 years, then it will decrease and be negative till 2050.

The young labor force of South Asia needs to be improved into a more dynamic human capital by capitalizing in education, skill up-gradation, and research. Subsequently, this working labor force could be absorbed by the labor market of the economy. However, only a bright economy can yield employment chances for the new participants in the labor market. In short, the need is to communicate and implement a healthy manpower plan covering from education to industry, for helping from the rich factor of a labor excess economy. Though, if they become economically active the countries must be sited to provide them profitable employment chances.

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TowardEconomic Growth without Emissions Growth: The Role of Urbanization & Industrialization in Pakistan

Sher Khan and Tariq Majeed[5]

Abstract

The relationship between economic growth and carbon dioxide (CO_2) emissions is the most debated topic of the present world. The global world is intended to curb CO_2 emissions up to a threshold level of the 1990s, while maintaining the same pace of economic growth. This study analyzes decoupling of economic growth from CO_2 emissions and its main driving forces from 1980 to 2014 for Pakistan. The decoupling status is examined using Tapio decoupling elasticity analysis. The co-integration and Impulse Response Function (IRF) are employed to explore the role of main decoupling drivers. The Tapio decoupling results exhibit that Pakistan experienced expensive negative decoupling (END) throughout the study period, moreover the IRF and co-integration results suggest that economic growth, carbon emissions intensity and urbanization strengthen the decoupling, while the industrialization weaken the decoupling of economic growth from environmental impact.

Keywords: Decoupling; Economic Growth; Industrialization; Climate

1. Introduction

Global warming, a result of greenhouse gas (GHG) emissions, is one of the most concerning issues that poses a serious threat to all living things. The consumption of primary energy sources is the major source of these GHG emissions (Majeed &Mumtaz, 2017; Leal et al., 2019). Global GHG emissions nearly tripled from 9385.8 million tonnes to 36,138.3 million tonnes between 1960 and 2014, indicating a 2.6 percent yearly increase rate (Shuai et al., 2019). According to the International Panel on Climate Change (IPCC, 2014), the last five decades (1983-2012) were the warmest on record, owing to increasing levels of GHG emissions in the atmosphere.

These GHG emissions are considered to be responsible for 95% of the global climate change, and these GHG emissions are driven by the enhanced consumption of primary energy sources. There are various pieces of academic literature (Meinshausen et al., 2009; Sari &Soytas, 2009; Majeed &Mazhar, 2019b), which states that primary energy consumption is the core driver of climate change through the exponential consumption of primary energy sources. The degrading environmental quality is the challenge for both developed and

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developing nations, though, the conditions are more devastating in the developing world (Majeed, 2018; Majeed &Mazhar, 2019a). In this regard, British Petroleum also states in their report that developed countries experienced a decline in GHG emissions by 1.1×10^9 tons, however, developing countries depicted an increase in their GHG emissions by 6.1×10^9 tons (BP, 2019). The above statistics confirm that developed countries are doing their best to reverse climate change, while developing countries offset the impact of developed countries.

Urbanization is also one of the main factors that influence environmental quality as well as the economic structure of the country. The migration of people from rural to urban areas is termed as the urbanization, it also includes the transition of rural to urban areas, as well as the adaptation of change and innovation by the society (Sharif & Raza, 2016). The urban population reached about 50% of the world population in 2010 and during the 1975-2007 world urban population significantly increased from 1.52 billion to 3.29 billion (United Nations, 2008). Furthermore, this number could be increased to 6.4 billion up to 2050 that will cause severe issues of climate change resulting from increase of CO2 emissions, along with the rapid depletion in the natural resources. According to the International Energy Agency (IEA), the current trends of urbanization consume 2/3 of world energy and are responsible for 70% of global CO2 emissions (IEA, 2008). In addition, Rosenzweig et al. (2010) also states that 78% of the global energy-induced CO2 emissions is due to the consumption of energy by urban areas.

Economic growth is a key objective of all economies and a high pace of industrialization helps to attain it. However, industrialization also has a severe impact on environmental quality. In 1997, industrialized countries signed the Kyoto Protocol agreement, to restrict the residuals of industrial output with the objective to reduce national level CO_2 emissions up to the level of 1990s in 2008-2012. Furthermore, developing countries especially Asian countries are severely affected by industrial residuals because of the use of heavy industrial machinery and their warm weather (Attari et al., 2016). Besides, due to improper financial and infrastructure conditions, developing countries are also unable to mitigate/reduce the environmental impact that leads to climate change (IPCC, 2007). In the case of Pakistan, increase in per capita income led to the demand of industrial goods and energy consumption that later raised CO_2 emissions from 0.86 metric tons to 0.92 metric tons during 2005-2011 (Shahzad et al., 2017).

The discussion on the paramount factors of economic growth and their impacts on climate change emphasize the need of delinking economic growth from environmental impact, as economic growth is considered to be the key factor behind climatic change. The term decoupling was coined by United Nations Environmental Protection (UNEP) in (2011),

which states that the concept of delinking economic growth from CO_2 emissions is termed as decoupling. Similarly, the Organization for Economic Co-operation and Development (OECD) first proposed the decoupling phenomena as a mechanism of breaking the link between economic growth and CO_2 emissions (OECD, 2002). Prior, decoupling was considered to be adopted in delinking economic growth from resource consumption (Juknys, 2002). Besides, academic literature also suggests that decoupling was first introduced in the relationship between economic growth and energy consumption (Lu et al., 2007; Vavrek&Chovancova, 2016; Wang et al., 2018; Zhao et al., 2017 &Khan & Majeed, 2019). However, when the climate change threat was observed in 1970's, decoupling phenomena broadened its boundaries to the environment as well. One of the significant contribution has been made by Tapio (2005), when he proposed Tapio decoupling indicator and sub-divided it into eight sub-categories, namely Recessive Decoupling (RD), Recessive Coupling (RC), Expansive Coupling (EC), Weak Negative Decoupling (WND), Weak Decoupling (WD), Expansive Negative Decoupling (END), Strong Negative Decoupling (SND) and Strong Decoupling (SD).

The above discussion on the bi-lateral relationship between economic growth and CO2 emissions along with the emergence and importance of decoupling analysis in delinking economic growth and CO_2 emissions led to our interest to conduct this study. Besides, there is no study conducted examining the relationship between economic growth and CO_2 emissions, using decoupling and econometric analysis, in the case of Pakistan. Therefore, the current study is adopted to fill up this research gap by employing Tapio decoupling analysis, JohansonJuselius cointegration, IRF and variance decomposition analysis. Further, urbanization and industrialization are specifically included to check their relationship with decoupling indicators, in the case of Pakistan.

In the light of above discussion, following research objectives are made to be achieved in the current study.

· To identify the decoupling status between CO_2 emissions and economic growth, in the case of Pakistan during 1980-2018.

· To examine the impact of industrialization and industrialization on the decoupling of economic growth and CO_2 emissions in the case of Pakistan.

The remainder of the paper is laid out as follows: A critical literature on economic growth-environment nexus is reviewed in the "literature review" chapter. The methodological approaches of the study along with data sources are gathered in the "Methodology and data sources" chapter. The "results and discussion" chapter depicts the

outcome of the research study, while the "conclusion and policy recommendation" chapter outlines the outcomes and policy recommendations of the research study.

2. Literature Review

The global climate change driven by disastrous increase in the GHG emissions provoked concerns of world leaders to decouple economic growth from environmental hazards. Since decoupling is not only related to economic growth and CO_2 emissions, it also decouple/reduce resource use from economic growth simultaneously. Since, the decoupling phenomena revolves around the OECD decoupling and Tapio decoupling indicator, proposed by OECD (2002) and Petri Tapio (2005). The literature suggests that prior decoupling technique is comparatively easy, as compared to later one. However, the OECD decoupling analysis is extremely vulnerable to change in base year, further, it also failed to provide clear indication in decoupling, due to change in the economic growth and CO_2 emissions. Due to these limitations, Tapio proposed an elasticity based decoupling indicator, which helps in accurate prediction of changes in economic growth and CO_2 emissions. Besides, Tapio decoupling index is further divided into eight sub-categories i.e. Expensive Negative Decoupling (END), Expensive Coupling (EC), Weak Decoupling (WD), Strong Decoupling (SD), Recessive Decoupling (RD), Recessive Coupling (RC), Weak Negative Decoupling (WND) and Strong Negative Decoupling (SND).

The emergence of decoupling indicators highlights the weaknesses of Environmental Kuznets Curve (EKC), which is one of the most adopted models to examine the relationship between economic growth and environmental harms. According to Khan and Majeed (2019), EKC is considered to provide an inverted U-shaped relationship between economic growth and environmental harms. Further, EKC also states that it gives a long run relationship between economic growth and CO_2 emissions, which is also called relative decoupling. However, Ilhan et al. (2021) stated that EKC does not provide a clear time when relative decoupling would be achieved by the country. In addition, EKC also failed to possess the clear relationship between economic activity and environmental harms, while it also stated a long and short run relationship and failed to provide annual coupling/decoupling status between the two paramount factors. Due to such issues and drawbacks, decoupling indicator is one of the most employed techniques in recent literature to examine the relationship between economic growth and CO_2 emissions.

In the wake of climate change impact on the socio-economic life of human beings, the current study will gather academic literature on different aspects of economic growth and CO2 emissions to provide a concise and clear picture of the said relationship. In this respect, critical literature about economic growth, urbanization and industrialization

induced environmental impact will be gathered in this study, as these are the main variables of the study.

Economic Growth Induced Environmental Impact

The relationship between economic growth and environmental impact has been debated for decades, however, there is no accurate technique, which can portray the accurate relationship between these two paramount factors. However, a decoupling indicator makes it possible to evaluate the annual decoupling status between these correlated factors. In this respect, Khan and Majeed (2019) examine the decoupling relationship between economic activity and environmental harms for Pakistan, using tapio decoupling index and Log Mean Divisia Index (LMDI) decomposition index. The study stated that Pakistan experienced END throughout the study period, while the main factors that drive environmental impact are the population, energy structure and affluence. Carbon and energy intensity are the main factors that reduce the environmental impact of economic activity. Similarly, the comparative study among Pakistan, India and Chain has been conducted by Khan and Majeed (2020) with the employment of Tapio decoupling indicator and LDMI decomposition technique. The study found that END and WD and EC decoupling status has been found in Pakistan and India, while China mostly exhibits WD. Further, the LMDI decomposition results stated that energy intensity is the core driver of decoupling economic growth from environmental harms. In contrast, energy structure, population and economic growth are the main factors that weakens the decoupling performance in the respective countries. The studies of Lin and Raza (2019) and Khan et al. (2019) also state that energy and carbon intensity are the main factors that strengthen the decoupling relationship, while energy structure and economic activity weakens the decoupling relationship.

2.2) Industrial Sector Induced Environmental Impact

The industrial sector is regarded as the backbone of any country, and it also plays an important role in economic development, though the pre- and post-industrial eras have had a more devastating impact on environmental quality. In terms of industrial performance, nations are ranked according to their industrial growth, in 2015 report by the United Nations Industrial Development Organization (UNIDO) Pakistan has ranked 80th, in the 148th global countries, while Bangladesh ranked (77), China (3), Iran (59), India (39) and Sri Lanka (75) (UNIDO, 2015). The relationship between industrial growth and environmental impact has been analyzed by Wen et al. (2015), the findings suggest that iron and steel industry development leads to the increase of environmental impact in short run, while in the long run, these industries led to the reduction of CO_2 emissions due to technological advancements. The same results were also founded between industrialization and

CO_2emissions by Shahbaz et al. (2014) based on the EKC hypothesis during period of 1975-2010. Raheem and Ogebe (2017) stated that industrialization leads to increase in CO_2 emissions however indirect effect of industrialization leads to the improvement in quality of environment through increase in per capita income. Further, study also elaborates that indirect effect is stronger than direct effect, which concludes that industrialization leads to the improvement in environmental quality. In addition, li et al. (2015) also stated that there exists an inverse relationship between industrialization and environmental quality, which means that industrialization leads to the decrease in CO_2 emissions in Nigeria. Besides, several studies stated that industrialization leads to the deterioration of the environmental quality (Xu & Lin, 2015; Lin et al., 2014; Chernichawn, 2012; Sun et al., 2011 &Akbostanci et al., 2011).

2.3) Urbanization Induced Environmental Impact

The economic growth of the country leads to the development of rural areas into urban areas. This process leads to the increase in the environmental harms through rise in energy consumption and deforestation, which further led to climate change. After the 1970's industrial revolution, urbanization rate significantly increased. In this respect, there are three environmental theories that summarize the effects of urbanization on the environment (Poumanyvong and Kaneko, 2010). These theories include urban environmental transition, ecological modernization and compact city theory. These theories are analyzed with respect to environmental harms and rate of change in urbanization. The study of Ehrhardt-Martinez et al. (2002) examined the impact of urbanization on the environmental condition. The results stated that urbanization negatively affects the environment through an increase in deforestation. Besides, the study of Alam et al. (2007) links urbanization with energy consumption and examines its impact on the environment. The study reveals a positive relationship between energy induced CO_2 emissions and urbanization. Same results between urbanization and energy induced environment has been reported by Al-Mulali et al. (2014) for the Mena Region. Besides, a panel of 16 countries has been examined by Sadorky (2014) for the relationship between their rate of urbanization and environmental harms for the period of 1971-2009. The results depict that the increase in energy consumption of urban areas significantly increases environmental harms. Similarly, Zhang et al. (2014) reported that increase in urbanization rate negatively influences environmental harms. The ASEAN region has been examined by Khan and Majeed (2020) and the results state that population growth is one of the significant factors which increase CO_2 emissions in the ASEAN region.

The brief and critical literature on the impact of economic growth, urbanization and industrialization on the environmental harms depicts the importance of the relationship

between these paramount factors. However, the growing trend of decoupling economic growth from environmental harms led to our interest to conduct this research study. Further, in the case of Pakistan, there is no study conducted based on decoupling economic growth from CO_2 emissions, focusing on the urbanization and industrialization induced CO_2 emission. Further, the study combines the decoupling analysis with econometric analysis. The study will fill up the literature gap in this area, while it also provides significant insights to the policy makers to propose and implement suitable policies to mitigate climate change.

3. Econometric Methodology and Data Sources

1. Specifications of Decoupling

The decoupling research has become a hot topic in the field of energy and the environment in nearly ten years, decoupling is often used to study the relationship between economic growth and environmental impact, in other words, the relationship between GDP and CO_2 emissions. Initially, the concept of decoupling is attributed to diminished/weaken the relationship among two or more physical quantities, while the current paper is undertaken to assess the impact of economic growth on environmental impact. In the literature, there are two basic decoupling models that are used to examine the relationship between economic growth and environmental impact. First model is proposed by the Organization for Economic Co-operation and Development (OECD, 2002). Second model was proposed by Petri Tapio (2005), which is based on the elasticity/index and it gives a clear decoupling status between economic growth and environmental impact.

In comparison, the OECD decoupling model focuses on the method of evaluating overall continuous change by explaining the correlation between environmental impact and economic growth (Brannlundet al., 2007). However, the base year selection greatly affects the assessment results of this model. Furthermore, the OECD decoupling model is vulnerable to a measurement error because the appropriate factors for measuring the impact of decoupling are not clearly defined. The Tapio decoupling model plays an important role, to overcome the drawbacks of the OECD decoupling model and evaluates differences in change between years and relates the total indicators of change to the relative index of change to make outcomes more robust and help to optimize the effectiveness of policy implementation. Tapio decoupling model uses the index value of the decoupling indicator rather than the absolute values of the economic variables which enhance the robustness of its results.

Petri Tapio proposed the decoupling indicator to delink economic output from environmental harms (Tapio, 2005). Decoupling indicator comprised of three categories i.e. strong decoupling, weak decoupling, and recessive coupling and these are further divided

into eight sub-categories, including strong decoupling, strong negative decoupling, expensive negative decoupling, weak decoupling, weak negative decoupling, expansive coupling, recessive coupling and recessive decoupling. Decoupling can simply be referred to as "breaking the link between environmental harms and economic output" (OECD, 2002). According to the Tapio (2005), the decoupling indicator can be described as,

$$DI=(\ CO2t\text{-}CO2t\text{-}1)/(CO2t\text{-}1)(GDPt\text{-}GDPt\text{-}1)/(GDPt\text{-}1)=\Delta CO2/CO2t\text{-}1\ \Delta GDP/GDPt\text{-}1= \%\Delta CO2\%\Delta GDP \quad\quad (1)$$

In the above expression, the C02t-1 and GDPt-1 represents lag of CO_2 emissions and economic growth, while ΔC and ΔG represents the change in CO_2 emissions and economic growth. These values are calculated based on a continuous chaining method i.e. t - (t -1). The %ΔCO_2 and %ΔGDP represents the percentage change in growth of CO_2 emission and GDP in the subsequent two years. Figure (2) exhibits a decoupling status based on the decoupling indicator (DI).

Figure 1: The framework of decoupling states. Ref. (Tapio, 2005)

2.   Co-integration Theory

In the literature, decomposition techniques, such as Log Mean Divisia Index (LMDI) is used along with the decoupling technique, however the LMDI decomposition relies on Kaya identity, which is based on the product of the population, affluence, energy structure, energy intensity, and carbon intensity. However, the current study uses the two most influential factors of economic growth and environmental impact i.e. urbanization and industrialization to check their short and long run relationship with the decoupling progress of the country. Therefore, according to the need of the study, the current study uses the ARDL cointegration approach, which seems appropriate for the analysis of the current study rather than the decomposition techniques.

The Autoregressive Distributed Lag (ARDL) model is used in this paper, which was first introduced by (Pesaran& Shin, 1996; Pesaran&Pesaran, 1997; Pesaran& Smith, 1998; and Pesaranet al., 2001). The ARDL approach has superiority on other cointegration techniques because ARDL technique integrates short-run dynamics from long-run equilibrium without losing long-run information (Banerjee et al., 1993). ARDL technique is a more flexible approach compared to other because it deals with different types of integrating orders, e.g. I ˜ (0) or I ˜ (1) (Pesaran&Pesaran, 1997). This approach also evades the unit root pre-testing (Pesaranet al., 2001) by dealing with both the I ˜ (0) and I ˜ (1) variables. The co-integration approach is basically based on three steps i.e. checking for the unit root, selection of lag length and the ARDL cointegration test.

The first step before going towards the co-integration is to check the stationarity of the data through the unit root test to avoid spurious results. For this purpose, many tests are used to check the stationarity of the data, namely; Augmented Dickey-Fuller (ADF) test, developed by Dickey Fuller (1979) and Philips-Perron (PP) tests developed by Phillips and Perron (1988). The current paper applied the ADF test to check the stationarity of the data, ADF test is used because of its extensive use in the literature.

Secondly, the selection of an adequate lag length is important for guaranteeing the efficacy of co-integration among the variables. The lag period should be sufficiently long in normal conditions, to represent the dynamic association among the economic variables. However, the lag period is directly linked with the degree of freedom of the model, longer the lag length, lesser will be the degree of freedom, which will influence the reliability of the results (Michiekaet al., 2013). This study uses the Vector Auto Regressive (VAR) lag selection criteria to select the possible lag length of the model. The VAR model gives the five kinds of judgment criteria (Posada &Buckley, 2004), known as Akaike Information Criteria (AIC), Likelihood Ratio (LR), Final Prediction Error Criterion (FPE), the Schwartz Information Criterion (SC) and the Hannan Quinn Information Criterion (HQ). The current study uses the AIC criterion to select the lag length of the model and the lag length having the lowest value of AIC will be used as an optimal lag length.

Third, the ARDL test for co-integration is used in the current paper to examine the short run as well as the long-run relationship between the variables. The bound testing approach is used to check for the cointegration among the variables. The current study uses the decoupling indicator as an endogenous variable, while the urbanization, industrialization, economic growth and CO_2 emissions intensity are taken as the exogenous variables. The current paper uses the following model, by following the previous literature (Solarinet al., 2017).

$$DI= \beta_0 + \beta_1 LIND + \beta_2 LUP + \beta_3 EG + \beta_4 LCI + \epsilon_t \qquad (1)$$

In the above equation (1), DI represents decoupling indicator, while the LIND depicts the log of industrialization, LUP represents the log of the urban population, EG represents the economic growth and the LCI represents the log of carbon emissions intensity, β represents the coefficient and the € represents the error term.

3. Impulse Response Function

Impulse Response Function (IRF) refers to the reaction of endogenous variables at the time of the shock (change in exogenous variable) and over subsequent points in time. It has certain advantages over co-integration estimates. It provides detailed dynamic correlations

between input (an impulse) and output variables of the dynamic system. In addition, it evaluates direction and intensity of the impact, including capturing the delay in policy effects. Equation (2) shows the basic model for IRF.

$$Y_t = \beta + E_t + F_1 E_{t-1} + F_2 E_{t-2} + \ldots + F_t F_{t-p} + \text{€}_t \qquad (2)$$

It should be noted that E_t indicates that the response variable is affected by the impulse variables in the period t; the general form of matrix F_t is $F_t = l = 1pAlF_{t-l}$. In this paper, the IRF pictures depict the dynamic interaction between an impulse variable and another endogenous variable, so the mathematical expression of the IRF can be written as:

$$IRF_q = F_i Sil_i = l = 1pAlF_{i-l} Sil_i = Sidy_t + id E_i \qquad (3)$$

Where $q = Sil_i$ is the impulse vector, notably, Sil_i indicates an impulse vector whose intensity is a standard deviation in the unit IRF; p is the maximum lag period and l is the lag operator, I = 1, 2, 3, …. indicates time duration.

4.   Variance decomposition

It will be used to compute the amount of information, which is contributed by each variable to the other variables in the autoregression. It decomposes the variance of each variable into other influencing factors, conducting to evaluate the influence of each endogenous variable on the forecast variance. On the other hand, variance decomposition can be used to compare and analyze the relative contributions of multiple drivers to an economic variable.

5.   Variable Description and Data Source

The data for the current study has been taken from the World Bank (WB, 2019) for the time period of 1980-2014. Some of the variables are converted into log form, while some are already in log form to eliminate the heteroskedasticity and collinearity in time series data. The variable description, data sources, and definitions of the variables are given in table 1, while table 2 demonstrates the descriptive statistics of the economic variables that are used in the current study.

4.   Empirical Results and Discussions

1.   Decoupling Status of Pakistan

The findings of the Tapio elasticity analysis support expensive negative decoupling during the analysis period, while weak decoupling, expensive coupling, and strong decoupling are also observed in the various years. The primary reason for the expensive

negative decoupling is the combustion of highly carbon-intensive fossil fuels. Weak decoupling occurs when the growth of the economy is relatively higher than the emissions growth. The expensive coupling depicts that CO_2 emissions and economic growth are not delinked, and both grew in positive terms.

Table 1 Decoupling Statuses in Pakistan

Pakistan	Time period	$\Delta C/C_o$	$\Delta G/G_o$	Decoupling Indicator	Decoupling Status
	1979-1980	0.13	0.10	1.32	END
	1980-1981	0.07	0.08	0.92	EC
	1981-1982	0.08	0.07	1.33	END
	1982-1983	0.07	0.07	1.15	EC
	1983-1984	0.06	0.05	1.25	END
	1984-1985	0.10	0.08	1.33	END
	1985-1986	0.04	0.06	0.88	EC
	1986-1987	0.08	0.06	1.28	END
	1987-1988	0.08	0.08	1.15	EC
	1988-1989	0.04	0.05	0.95	EC
	1989-1990	0.12	0.04	2.80	END
	1990-1991	-0.004	0.05	-0.09	SD
	1991-1992	0.06	0.08	0.86	EC
	1992-1993	0.07	0.02	4.08	END
	1993-1994	0.08	0.04	2.34	END
	1994-1995	-0.004	0.05	-0.08	SD
	1995-1996	0.11	0.05	2.43	END
	1996-1997	0.002	0.01	0.28	WD
	1997-1998	0.03	0.03	1.22	END
	1998-1999	0.02	0.04	0.76	WD
	1999-2000	0.06	0.04	1.42	END
	2000-2001	0.01	0.02	0.87	EC
	2001-2002	0.05	0.03	1.66	END
	2002-2003	0.04	0.05	0.87	EC
	2003-2004	0.10	0.07	1.45	END
	2004-2005	0.03	0.08	0.50	WD
	2005-2006	0.06	0.06	1.12	EC

2006-2007	0.08	0.05	1.82	END
2007-2008	0.001	0.02	0.07	WD
2008-2009	-0.001	0.03	-0.05	SD
2009-2010	0.01	0.02	1.00	EC
2010-2011	0.003	0.03	0.13	WD
2011-2012	0.009	0.04	0.27	WD
2012-2013	0.005	0.04	0.12	WD
2013-2014	0.01	0.05	0.26	WD

Table 1 demonstrates that Pakistan has experienced expensive negative decoupling, expensive coupling, strong decoupling, and weak decoupling during the analysis period. The main reason behind the expensive negative decoupling is the use of primary energy, such as coal, oil and natural gas in the economic activities to run the economic activities, but besides it also leads to the rise in CO_2 emissions (Mahmood & Shahab, 2014). Strong decoupling of (1991; 1995 & 2009) occurred because of the early 1990s electricity supply shortage for industrial and commercial sectors caused strong decoupling of 1991, because of labor-intensive production, electricity shortage affects CO_2 emissions more than the economic growth (Malik, 2012). The International Monetary Fund (IMF) bailout package of 1994-95 levied high taxes on the poor manufacturing sector, which resulted in an immediate decrease of CO_2 emissions compared to economic growth. Strong decoupling of 2009 occurred due to a rise in Pakistan's GDP annually 8-9 percent from 2005-2008 more than the CO_2 emissions growth (Aziz and Ahmed, 2015).

Expensive coupling reveals that in some years there was no indication of decoupling between economic growth and CO_2 emissions. However, in several years growth of the economy is comparatively higher than that of CO_2 emissions depicting weak decoupling. Overall, expensive negative decoupling dominates among the other decoupling states in Pakistan.
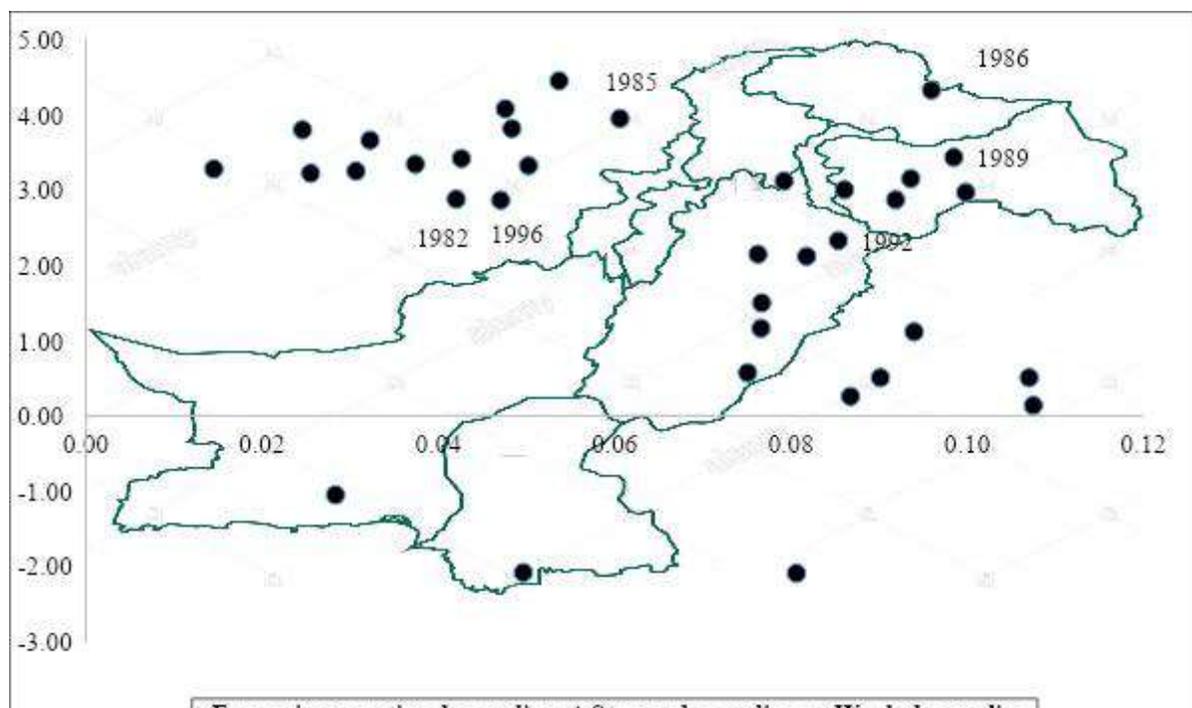
Figure 2: The distribution of Pakistan into sub-categories of decoupling
Author's own elaboration

Table 2Definition and Sources of Data

Variable(s)	Symbol	Definition	Source
Decoupling Indicator	DI	The ratio of %ΔCO_2 to %ΔGDP	WB, (2019)
Economic Growth	EG	Annual percentage growth	WB, (2019)
Urbanization	LUP	% of the total population	WB, (2019)
Industrialization	LIND	% of GDP	WB, (2019)
Carbon intensity	LCI	Metric tonnes of oil equivalent	BP, (2019)

Table: 3 Descriptive Statistics of the Variables

Country	Var(s)	Obs(s)	Mean	Std Dev	Median	Max	Min
Pakistan	DI	34	1.075408	0.879726	1.002962	4.078382	-0.092983
	LUP	34	17.53286	0.349593	17.56253	18.06339	16.90230
	LIND	34	21.43743	1.381189	21.62525	25.52832	19.19149
	EG	34	4.863708	2.181840	4.846321	10.21570	1.014396
	LCI	34	7.908230	0.065551	7.918065	8.043437	7.763067

2. Unit Root Test Results

The study uses the Augmented Dickey-Fuller (ADF) test to check the stationarity of the variables and it was intensively used by researchers in the literature due to its reliability and robustness (Dickey & Fuller, 1979 & Liu & Bae, 2018). Table 4 represents the unit root test results of the economic variables that are used in the current study.

Table 4: Unit Root test results

Country	Series	At level		At 1ˢᵗ difference		Order of integration
		t-stat	Prob	t-stat	Prob	
Pakistan	DI	-1.102815	0.2392	-6.395495	0.0000	I ~ (1)
	LUP	-1.595698	0.4735	-2.374545	0.0192	I ~ (1)
	LIND	-3.248168	0.0257			I ~ (0)
	LCI	0.281486	0.9737	-8.262680	0.0000	I ~ (1)
	EG	-3.743433	0.0077			I ~ (0)

Table 4 demonstrates the unit root test results and it can be seen that the variables have mixed order of integration i.e. some are integrated at level, while some variables are integrated at level (1). So, in this case when we had a mixed order of integration, Auto Regressive Distributed Lag Model (ARDL) is preferred to examine the short and long run dynamics between the variables than any other techniques.

Further to go for the ARDL cointegration, the lags should be selected, in order to ensure the robustness of the results. Table 5 shows the lag selection based on the VAR model and we select the lag length based on the Akaike Information Criterion (AIC).

Table: 5 VAR Criteria for lag selection

Model	Lag(s)	Akaike Information Criteria
Pakistan	1	-14.06034
	2	-15.06394
	3	-16.23926
	4	-18.81241

The AIC lag selection model prefers the model, which has the lowest AIC model. The results of the VAR lag selection model suggests that the model with the 4 lags has the minimum AIC value and it is preferred among the other models.

3. ARDL Short Run and Long Run Results

Table 6: ARDL Short-Run Results

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DI(-1))	2.823652	0.406617	6.944263	0.0001
D(DI(-2))	1.409906	0.239377	5.889899	0.0002
D(DI(-3))	0.773695	0.120483	6.421609	0.0001
D(LIND)	6.370101	1.598356	3.985408	0.0032
D(LIND(-1))	-13.080634	1.827503	-7.157654	0.0001
D(LIND(-2))	-10.956378	2.142263	-5.114394	0.0006
D(LIND(-3))	-3.774326	1.592927	-2.369428	0.0419
D(LUP)	2441.073633	321.697637	7.588099	0.0000
D(LUP(-1))	-5228.361269	701.068988	-7.457699	0.0000
D(LUP(-2))	2663.437640	481.106076	5.536072	0.0004
D(LUP(-3))	-935.219514	214.974096	-4.350382	0.0018
D(LCI)	-2.234471	2.972573	-0.751696	0.4714
D(LCI(-1))	-9.985718	3.922276	-2.545899	0.0314
D(LCI(-2))	11.526736	3.982734	2.894176	0.0178
D(EG)	-0.497676	0.095514	-5.210496	0.0006
D(EG(-1))	0.263089	0.086258	3.050008	0.0138
CointEq(-1)	-4.855688	0.504854	-9.617998	0.0000

Cointeq = DI - (8.8885*LIND -3.1581*LUP -3.4391*LCI -0.2283*EG + 59.7283)

The table 6 demonstrates the short run results of the ARDL between the decoupling indicator (DI), industrialization (LIND), urbanization (LUP), economic growth (EG) and CO_2 emissions intensity (LCI). The results stated that urbanization and industrialization are statistically significant at 5%, while both the variables weaken the decoupling of economic growth from environmental growth in the short run. Furthermore, the results also stated that, economic growth and carbon emissions intensity, both considerably lead to the decrease of CO_2 emissions and strengthen the decoupling progress in Pakistan, in the short run. The error correction mechanism demonstrated by variable (CointeEq(-1) shows that either co-integration exists or not in the model, however, for the existence of the co-integration, the variable CointeEq(-1) must be significant at 5% and the coefficient value

must be negative. The results of the short run ARDL depicts that there exists co-integration between the variables.

Table: 7 ARDL long Run Results

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIND	8.888528	0.688304	12.913661	0.0000
LUP	-3.158076	0.663478	-4.759883	0.0010
LCI	-3.439090	0.929414	-3.700278	0.0049
EG	-0.228286	0.027008	-8.452466	0.0000
C	59.728331	16.804745	3.554254	0.0062

Table 7 shows the long run results of the ARDL model, the results stated that all the variables are significant at 5% level. Furthermore, urbanization, carbon emissions intensity and economic growth have a negative relationship with the decoupling indicator, which means, in the long run, all the three variables will lead to the increase of GDP more than the CO_2 emission and will help to strengthen the decoupling of economic growth from CO_2 emissions. In addition, the results stated that 1% increase in the urbanization, carbon emissions intensity and economic growth will lead to a decrease in CO_2 emissions by -3.15% and -3.43% and -0.22%, which means that urbanization, carbon emissions intensity and economic growth are the main driving factors of the decoupling between economic growth and CO_2 emissions. The results are consistent with the studies of (Javid& Sharif, 2016; Haseeb& Azam, 2015; Mirza &Kanwal, 2017; Ahmed & Long, 2013; Sharif et al., 2017 & Bakhsh et al., 2017), which states that in long run economic growth tends to decrease CO_2 emissions, as there are more environmentally friendly technologies and low consumption of fossil fuel energy. Furthermore, industrialization significantly increases CO_2 emissions in the long run, which resulted in the weakening of the decoupling relationship between economic growth and environmental impact. The results stated that a 1% increase in industrialization will lead to the increase of CO_2 emissions by 8.88%.

4.   Stability of the Model

Prior to the Impulse Response function and variance decomposition, first, we should have to check the stability of the model/dependent variable. So, to check the stability, the current paper uses the Cusum and Cusum square test. The results of the figures 3 and 4, represent the stability results of the model/dependent variable.
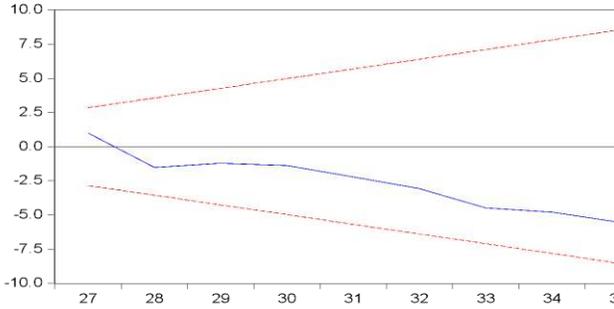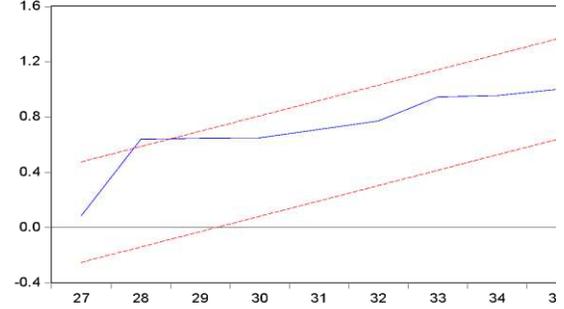
Figure 3: Cusum test   Figure 4: Cusum Square test

Figure 3 and 4 show the results of Cusum and Cusum square test, which states that our model/dependent variable is stable. The blue line of the Cusum and Cusum square test must be between the red lines, which demonstrates the stability of the model.

5.   Impulse Response Function

The Impulse Response Function (IRF) is used to assess the response in the dependent variable due to shocks in the independent variables. Figure 5 shows the results of the IRF, which depicts the response of the decoupling indicator towards shock in the independent variables. The horizontal axis of the IRF figure shows the time period, which is set to be 10 years, however the vertical axis demonstrates the percentage change in the response variable. Furthermore, the black line shows the IRF of the response variable and the red line shows the standard deviation in both the positive as well as in negative terms.

The shock in the standard deviation of the industrialization depicts negative influence on the decoupling indicator in the short run, however it also captures the positive effect on the decoupling elasticity in the long run. The figure depicts that industrialization leads to the decrease of environmental impact in the short run, however in the long run it also causes an increase in CO2 emissions. Now, as the carbon emission intensity is concerned, it also positively influences the decoupling indicator in the short run, however, after period 5, it tends to decrease the decoupling elasticity and make it to below the zero. Carbon emissions intensity leads to the decrease of the CO_2 emissions in the long run due to energy crises in Pakistan.

Response of LIND to DI

Response of LUP to DI

Response of LCI to DI

Response of EG to DI
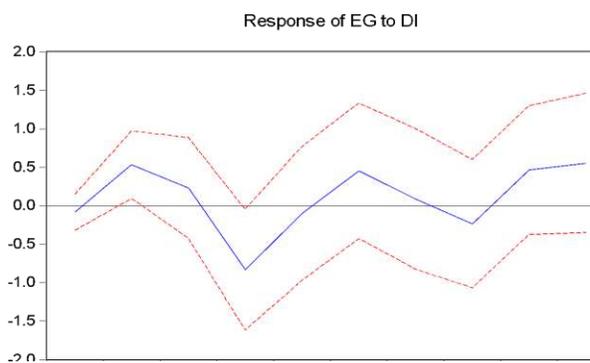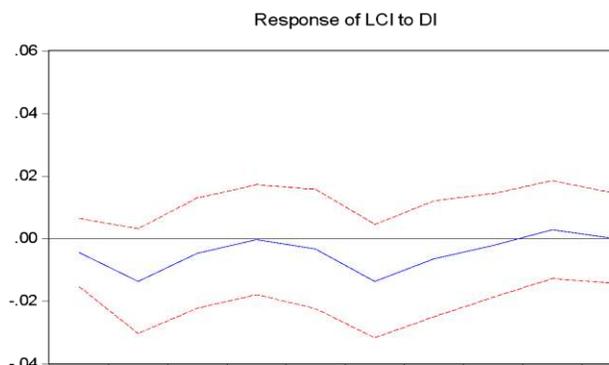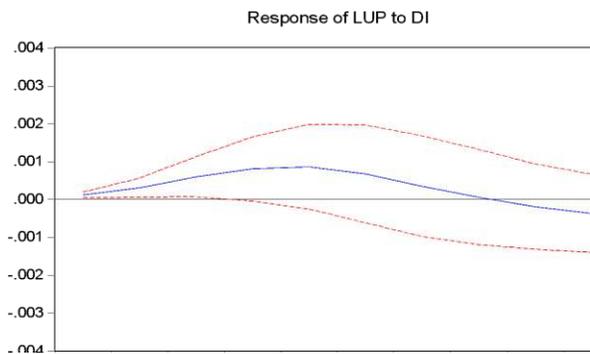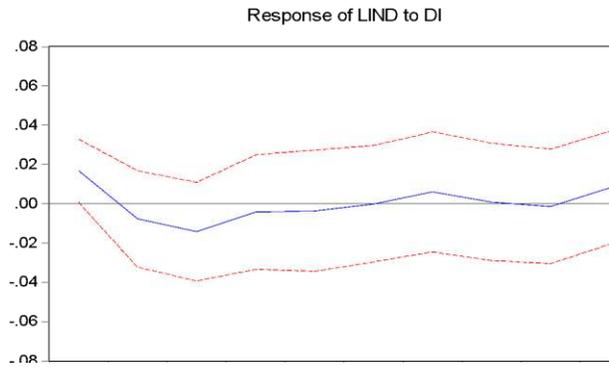
The effect of shock in the standard error of urbanization on DI depicts negative influence throughout the study period, however in some of the intervening years it causes to increase decoupling elasticity but it always below zero. Though, in the long run it leads to the increase in decoupling elasticity but just for one period. The urbanization causes to

decrease in the environmental impact through the environmentally friendly policies, and encouragement of public transport that will lead to a decrease of bulk of energy that was used to run the private vehicles. The impact of shocks in the standard deviation of economic growth have mixed impact on the DI, depicting decrease in the decoupling elasticity in short run, and then increase in the intervening years but in long run it again tends to decrease decoupling elasticity. In case of Pakistan, economic growth tends to decrease the environmental impact in most study periods due to the labor-intensive technology in the production sector. However, in long run it tends to decrease the decoupling elasticity, depicting the increase in environmental impact due to extensive use of primary energy based technology in the economic activities.

Table 8: Variance Decomposition

Variance Decomposition of DI:						
Period	S.E.	DI	LIND	LUP	LCI	EG
1	0.558889	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.804213	95.75880	1.744611	2.103088	0.181246	0.212254
3	0.896688	77.57843	19.82307	1.699559	0.727398	0.171540
4	0.983661	73.21899	17.11707	3.711637	5.669329	0.282978
5	1.279350	54.32299	15.08792	2.547830	27.81514	0.226120
6	1.302495	55.38356	14.87322	2.646016	26.87778	0.219426
7	1.374772	56.55408	13.60532	2.522017	27.07662	0.241966
8	1.379865	56.13742	13.83617	2.818880	26.87847	0.329074
9	1.389485	55.41174	13.68149	2.799723	27.77223	0.334820
10	1.391913	55.21898	13.76793	2.908698	27.67717	0.427223

Table 8 demonstrates the contribution of the exogenous factors to the variance of the decoupling indicator. Besides period 1, where DI 100% contributes to the DI, the 2nd period shows that industrialization contributes about 1.7% to the change in the variance of the DI and held the most influential factor among the others throughout the study period. The second most influential factor that contributes to the change in the variance of the DI, is the carbon emissions intensity (LCI) which significantly contributes from 0.18% in the short run up to the 27% in long run to the variance of the DI and shows continuous rise throughout the study period. After the industrialization and carbon emissions intensity, urbanization and economic growth contributes to the change of the variance of DI in-between 0-2% and 0-1%

throughout the study period. The most influential factor of the DI in the case of Pakistan is the carbon emissions intensity and industrialization.

5.   Conclusion and Policy recommendations

The current study uses the annual time series data of Pakistan from 1980-2014 to analyze the long-term relationship between decoupling of economic growth from environmental impact as well as from its influencing factors. The study uses the Tapio decoupling indicator to examine the decoupling status between economic growth and environmental impact for Pakistan. Besides, the Auto Regressive Distributed Lag (ARDL) model is employed to examine the short and long-run relationship between the decoupling indicator and its influential factors. The impulse response function and variance decomposition are also applied to examine the response of the decoupling indicator to the shocks of its influential factor as well as the contribution of each factor to the variance of the decoupling indicator. The Tapio decoupling indicator results showed that Pakistan had four decoupling status, namely expensive negative decoupling, weak decoupling, strong decoupling, and expensive coupling, during the analysis period. Strong decoupling occurred in 1991, 1995 and 2009, indicating a reduction in CO_2 emissions as economic growth increased. Nevertheless, Pakistan has experienced expensive negative decoupling, highlighting the fact that, in most of the year's growth of CO_2 emissions is beyond the economic growth, which alerts the government that it needs to diverge from fossil fuel energy to renewable energy.

The ARDL results suggest that all the variables are statistically significant at 5% significance level, while the short run results suggests that urbanization and industrialization are the significant factors that lead to the weakening of the decoupling of economic growth from environmental impact, while the carbon emissions intensity and economic growth leads to the decrease of environmental impact and strengthening of decoupling of economic growth from environmental impact in the short run. The Error Correction Mechanism suggests that there exists cointegration among the variables. The long-run results of the ARDL demonstrate that the significant factors that restrict the CO_2 emissions and promote the decoupling of economic growth from environmental impact are the economic growth, urbanization and carbon emissions intensity, while the industrialization leads to the increase of environmental impact and restrict the decoupling of economic growth from environmental impact.

The impulse response function results demonstrate that economic growth, urbanization, and carbon emission intensity have a significant impact on the decoupling of economic growth from environmental impact in both the short as well as long run. All three variables tend to strengthen the decoupling progress in the short and long run, however, in some of the intervening years they also restrict decoupling progress in Pakistan. As far as industrialization is concerned, it tends to decrease the decoupling indicator in the short run and leads to increase in the long run. This demonstrates that industrialization helps to decrease environmental impact in the short run but leads to the increase in CO_2 emissions in the long run.

Furthermore, the variance decomposition results suggest that industrialization followed by economic growth and carbon emissions intensity significantly contributes to the change in the variance of DI. Urbanization has the lowest contribution to the variance of the DI. However, industrialization held the most influential factor which leads to the change in the variance of DI throughout the study period. The findings of the paper help to identify the prime factors that affect the decoupling progress of Pakistan and helped to provide deep insights into the policymakers about the mitigation of the carbon emissions. First, the improvement of technology in the industrial sector or introducing environmentally friendly technologies in the industrial sector will help to reduce the environmental impact of the industrial sector. Second, urbanization also harms the decoupling progress in Pakistan, which leads to an increase in environmental impact. The government should focus on these factors, which influence is higher than the remaining factors, to achieve the strong decoupling between economic growth and carbon emissions.

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