

The Presidential Address

Environment and Natural Resource Management

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Past Presidents of the Pakistan Society of Development Economists,

Distinguished participants to the 23rd Annual Conference and General Meeting of the Society.

Ladies and Gentlemen:

It is indeed an honour and privilege for me to deliver the Presidential address at this prestigious forum.

I am very well aware of my distinguished predecessors who have served as Presidents of this Society and I hope that I can during my tenure do justice to this responsibility.

As you perhaps know yesterday we held the first Convocation of the Pakistan Institute of Development Economics and in the afternoon we launched the Golden Jubilee Celebrations to mark fifty years of its existence.

I am sure that given the high regard and esteem with which we all hold the Pakistan Institute of Development Economics, members of the Society will share in the pride that we all feel on the award of 10 PhDs and one MPhil to students of the Institute and also join me in congratulating the Institute on the occasion of its Golden Jubilee. The plans are to hold the Golden Jubilee Celebrations in different parts of the country and we look forward to your active participation in these events.

The theme of this years Conference, “Environment and Natural Resource Management” addresses the most pressing issue of our times. These are of critical importance for the long term sustainability of economic development and for the sustainability of the human race itself.

Before turning to this critical issue I would like to take a brief moment in drawing attention to the major economic, social and political developments that are taking place around us at this very time and especially in Islamabad itself where we are holding this meeting.

My aim in drawing attention to these developments is not to get into a political debate, as this is not the forum to do so—but to raise some of the critical issues faced

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today by Pakistan's economy and to emphasise that we economists would need to play a vital role in finding answers and practicable solutions to these problems.

Let me touch upon some of the critical issues that need to be addressed:

First, we need to find ways in which the Pakistan economy can adjust to the pressures of rising commodity and oil prices by putting in place an incentive structure which ensures efficient use of our resources, when valued in world prices, as well as provides safety net for those adversely affected. To put it in plain words, what should be the price of basic commodities like *atta* in Pakistan which provides a fair price to our farmer as well as an affordable price to the common man?

Second, there is the increasing polarisation in a two-tier economy characterised by widening income inequalities in the face of high levels of poverty and social exclusion. This phenomenon is partly the result of globalisation and purely market-driven economic policies for spurring economic growth. The challenge is to put in place economic and development policies that lead amongst others to the creation of productive, remunerative, and decent jobs, which is the most effective means of ensuring integration and linkages between these two tiers and which would result in reducing poverty and reducing income inequalities.

Third, how do we ensure that the current high levels of investment in knowledge, education, and technology result in increasing productivity, competitiveness, and sustainable high growth. Unfortunately productivity growth remains low. There are clearly problems of quality in the face of rapid expansion which require urgent attention. There is also a need to invest in and create conditions for growth of entrepreneurship and innovation that would result in productivity growth and increasing competitiveness.

Fourth, we must face up to the pressures of globalisation and increasing global competition by restructuring the productive sectors of the economy, and find new leading sectors to replace those that are losing competitiveness.

Fifth, we need to come up with more refined and new indicators of economic development and progress as the existing ones seem alien to most people and divorced from the economic realities that they face every day around them.

Many of these are indeed complex issues and we need to find realistic solutions to them. In many cases there are real trade-offs between efficiency and equitable solutions. It should be the task of the economist to present these trade-offs to policy-makers in a manner they can weigh the advantages and the costs of different policy options and indeed help him identify solutions which can best balance the two.

I have also deliberately highlighted in my list of challenges the task before us economists in finding more accurate and nuanced indicators of economic progress.

Unfortunately, there has been a tendency to report economic performance only in glowing and at times a very exaggerated manner—playing down the negatives and adverse consequences of this economic growth. This way of presenting results has been resented by most people and indeed this is one of the messages that we must draw from the recent election results.

There is always of course the danger of going to the other extreme and just dismissing all the positive things that have taken place on the economic front.

But there is a clear need for economists—whether in the private or public sector—to assess economic developments in an objective manner and in a way that is more easily

understood by ordinary people and to which they can relate in terms of the ground realities that surround them.

My message is quite clear. Let us not become “spin doctors” and go out of our way to put an exaggerated positive spin on all economic developments. The people of Pakistan are very mature in their analysis and foresight. They would be comfortable with realistic and objective assessments of the economic situation.

Let me now turn to the topic in hand.

ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT: ISSUES AND CHALLENGES

The theme of this Conference as I have said addresses the most challenging issues of our times, I have attended many Conferences over the years and I tend to divide them into two types. The ones in which I am eager to contribute and ones which I predominantly attend to learn.

I must confess at the very outset that this is a Conference in which I have come to learn. What I have done is to present a brief survey of the critical issues that will be addressed at the Conference including a feel for some of the papers to be presented. On the basis of this I have drawn some general conclusions which to my mind deserve attention.

KEY ISSUES¹

Since the mid-20th century the world has lost about one-fifth of its topsoil from its cropland, a fifth of its tropical forests and numerous plants and species. The carbon dioxide emissions have resulted in global climate change. According to Tietenberg (2003), “Humans have negotiated the transition from “adapting to” nature to “managing” nature. The scale of activity has become so large that we affect the life processes of the planet.....Modern ecologists, for example, have suggested that the environment possesses a unique “carrying capacity” to support humans, and once that capacity is exceeded widespread ecological disruption occurs with disastrous consequences for humanity. The focus is no longer on individual societies but on the survival of the planet.”

Rapid degradation of resources has raised several issues, viz., the sustainability of economic growth, lower productivity of factors, scarcity of resources, environmental degradation and others. Some claim, based on technique of *systems dynamics*, that within a span of hundred years the non-renewable resources will be exhausted resulting in collapse of economies and in excessive pollution.

According to an official assessment by the Pakistan government, “Environmental degradation, resource scarcity, and inequitable distribution of resources have emerged as key factors for insecurity and at times violent conflicts.” [Pakistan (2005a)]. *The World Bank estimates that environmental degradation costs the country at least 6 percent of GDP, and these costs falls disproportionately on the poor [World Bank (2006)].*

FOUR AREAS

Due to time constraint, I will focus briefly on a few critical areas in environment and natural resource management. These are:

¹The sections that follow are based on a background note prepared by Dr Rehana Siddiqui.

- Land and Water Resources
- Climate Change
- Forests
- Waste Management.

The Conference programme also covers a number of other areas of critical importance and before I turn to the above four let me touch on some of these. The first critical area of concern which has implications for all dimensions of resource use and environmental degradation is population dynamics. The rapid rise in population is increasing the burden on resources. The issue of population growth and poverty are critically linked with environmental degradation. However, the literature on this issue on the causality between them is far from conclusive. The poor are sometimes seen as causing the degradation of natural resources and are affected disproportionately by the degradation. The paper by Khan (2008) to be presented in this conference concludes that the relationship is a very complex one and at best there can be a simultaneous relationship between indicators of environmental degradation and poverty.

(a) Land and Water Use

The issue of sustainable development is closely linked with management of land, i.e., efficiency, sustainability and equity in land use. Currently the conversion of forest land to agricultural land and agricultural land to commercial land (like development of housing schemes and other commercial uses), rapid and unorganised expansion of urban centres, has affected the environment and the health of the neighbouring communities. Lack of clarity and complexity of the legal framework, underdeveloped land markets and under-pricing of public land are responsible for this misallocation.

“Water is life”—this simple statement reflects its extreme importance. It is not just the quantity of water but also the quality of water. Water scarcity/per capita water availability has declined in Pakistan from 5300 cm in 1950 to 1105 cm in 2005, only slightly above the generally accepted water scarcity level of 1000 cm. Low rain falls and current population growth rate are expected to reduce per capita availability of water further to 850 cm by 2013 and 659 cm by 2025. Current water scarcity of 9 million acre feet is expected to increase to 25 F by 2025.

Basic information about availability of water, reported in Table 1, shows the main user of water is the agriculture sector with 96 percent of the use. Industry and households jointly consume only 4 percent. With the population growth rate of 1.9 percent per annum, the per capita availability of water is expected to be below 1000 cm from 2010 onwards. This reduction in water availability is expected to affect the quality of life, availability of food, industrial activity and other sectors of the economy.

In addition to quantity, the quality of water is also a major concern. The waste water discharge from industry and households and lack of water treatment results in a decline in the quality of water. The water quality indicators reported in Table 2, for three major cities in the province of Punjab show that in general all are well above the minimum international standards. In the industrial sector, textiles, leather and tanning, cement, chemicals, sugar and paper and pulp are the major industrial polluters. For example, in the case of the sugar industry the waste water is discharged with out

Table 1

Basic Water Information

Indicators	Data	Year
Total Water per Capita	1,805 cm	2000
Water Use	Total	61 %
	Domestic	2 %
	Industry	2 %
	Agriculture	96 %
Water Withdrawal per Capita	1,267 cm	1991
Ground Water Withdrawals per Capita	489.5 cm	1991
Watershed Management (Annual Rate of Change in Forest Cover-1990-2000)	-1.5 %	2000
Incidence of Diarrhea in Children under 5 Years of Age	26 %	1995
Number of Deaths due to Floods and Droughts	1990-2001 4,138 persons	2001

Source: Pakistan (2005a).

Table 2

Indicators of Water Quality in Various Cities

	BOD (Japan's Standard 10 ppm)	COD (NEQs of 150)	TSS (NEQs of 200)
(a) Lahore			
Ravi River BRB Siphon	9.2	9.2	124.0
Hudiarra Drain (Ferozepur Road)	163.0	163.0	5982.0
Hudiarra Drain (from India)	449.0	449.0	537.0
Chichukimallain Drain, Sheikhpura Road	73.0	73.0	1562.0
(b) Rawalpindi and Islamabad			
Peshawar Road	31.3	58.2	146.0
I-10 Pirwadhai Crossing, Nullah 1	57.6	83.7	358.0
Nullah Lehi before Joining River Soan	81.7	147.1	255.0
Mix of Soan and Nullah Lehi	42.6	68.7	22.0
(c) Faisalabad (for BOD: NEQs of 80)			
Pharan Drain	267	812	236
Western Domestic Wastewater Influent-F4 (1)	198	577	246
Noor Pur Station No. 28-F7 (1)	988	2676	464
Muhalla Mustafaabad Jail Road-F8 (2)	279	681	198

Source: Pakistan (2005a).

Notes: BOD: Biochemical Oxygen Demand, COD: Chemical Oxygen Demand, and TSS: Total Suspended Solids.

treatment due to lack of storage system. The contamination of ground water as a result of this is another critical concern. In most cases, it is permanent as it takes centuries to clean the toxic metals flushed in by industries. The rise in the use of pesticides and chemical fertilisers in agriculture, rise in urbanisation and lack of sewerage system has also added to the water pollution in Pakistan.

The deteriorating quality of water also raises concerns about its health impact and in its lowering productivity of labour. Only 50 percent of the population has access to relatively safe drinking water source which results in higher incidence of diarrhea, as

compared to other developing countries, among young children. The polluted water is also responsible for reduced productivity of the marine and inshore fisheries.

NATIONAL ENVIRONMENT POLICY—2005

This policy focuses on development of a monitoring systems, for ensuring availability of better and low cost technologies for water purification, integrated watershed management, enforcement of standards, introduction of standards and metering and Water Conservation Act. However, despite these provisions the environmental concerns remain critical because of non-implementation of various water settlements between the government and people. [see Pakistan (2005b)].

Keeping in view its importance we have organised a panel discussion and a technical session on water and land use. The paper by Ahmad (2008) discusses the issues of water and land uses. The water issues are related to uses of surface water and ground water. Rising population is a major challenge faced by the sector. Unless successful efforts are made, the quantity of untreated sewage and industrial waste effluents will increase, thus resulting in adverse health and productivity impacts. The gap in water availability and use (agricultural and non-agricultural use) is expected to go up from 0.9 billion m³ in 2007 to 6.6 billion m³ in 2010 and to 12.2 billion m³ in 2025. Thus, there is a need for comprehensive strategy for the development and management of the water resources, both surface and ground water.

Khan (2008) indicates that current water availability in Pakistan is 1050 m³ per capita per annum and it is very close to the 'water stress level'. According to the paper, "On an average it takes roughly 70 times more water to grow food than people use directly for domestic purposes. In view of high demand for crop production, the stress is with reference to the availability for irrigation purposes and not for domestic/hygienic/industrial use leaving aside its quality." The study reports very high wastage of water in the urban areas due to leaky pipes, illegal connections, wastage at stand post and others. According to the study, with no additional storage, the shortfall in water availability and requirement is expected to rise from 15.53 BCM in 2001 to 37.28 BCM in 2025. To deal with the issue of water scarcity, the study recommends strategies for efficient use and conservation of water. The study reports that the current water rates neither meet the operation and maintenance cost nor encourage its economic use. The study indicates, "...prevailing water rate is equal to 2 percent of the cost of water saving likely to be saved by improvement of irrigation system. It is 5 percent of the cost of diesel tubewell which is a true indicator of the value of water." Thus, the study suggests appropriate water prices and increase in Abaina rates.

Ahmed, Iftikhar, and Chaudhry (2008) discuss issues related to water conservation and propose a conservation strategy. The paper reports that the current water uses are not efficient and conservation strategies need to be implemented seriously for the improvement in quality of life of current and future generations. The study suggests a need for 'blue revolution' by improving the irrigation practices and lining of the canals. Small flood dams can be effective to save and conserve water and also help to meet energy shortages.

CLIMATE CHANGE

The following passage from *Human Development Report (2007-08)* summarises the need for immediate action to prevent the crises linked to climate change:

“Climate change is the defining human development issue of our generation. All development is ultimately about expanding human potential and enlarging human freedom. It is about people developing the capabilities that empower them to make choices and to lead lives that they value. Climate change threatens to erode human freedoms and limit choice. It calls into question the Enlightenment principle that human progress will make the future look better than the past.” [*Human Development Report (2007-08)*, p. 1].

Climate change affects the impact of efforts to reduce poverty and improve the standard of living of the current and future generations. While as the contribution of the poor to climate change is not significant yet the poor, globally estimated at 2.6 billion, and future generations will have to bear un-proportionately a heavy burden of the negative impact of climate change. Keeping in view the importance of the issue, we have organised, with the help of LEAD-Pakistan, a panel discussion on “Climate Change”. We hope this will generate healthy discussion and we will be able to identify policy measures for controlling the damage to the environment and suggest meaningful policies to control it.

Air Pollution

The air quality has deteriorated over time due to decline in the rainfall and rise in industrial activity, construction activity and in traffic (due to quality of fuel used). Comparison of all the indicators of air quality, viz., SPM, ppm, SO and CO with international standard, reveals a higher level of air pollution in Pakistan [Pakistan (2005a)]. The presence of excessive Suspended Particulate Matter (SPM) in the air is the most serious threat. Another pollutant is presence of toxic gases. This has resulted in rise in respiratory and cardiovascular diseases.

Due to lack of information, research on problems related to air pollution little attention is paid to control it. Although the standards (for industrial pollution and quality of fuel used) exist and the pollution charges are levied, however, implementation is lacking. In recent years a number of efforts are made to create institutional set up with the support donor agencies and FPCCI to actively impose standards for controlling air pollution. For example, Dutch funding of Rs 260 million was provided for adoption of environment friendly technology in the past.

Pakistan (2005b) focuses on the establishing standards for ambient in door air quality, clean Air Act, enforcement of air quality standards and self monitoring rules, regulations to reduce harmful emissions, regulate vehicular emissions, improvements in the quality of fuels, and standards to control noise pollution to control air pollution

Deforestation

In addition to initial low forest cover, below the required 20-25 percent of the covered area, excessive use of forests and forest products has resulted in deforestation causing floods and desertification. Desertification is affecting about 43 million hectares of land and “...to safeguard economic growth and food security”, the need is to

implement a national forestry policy, institutional and legal reforms for good governance, and protection and rehabilitation of mangrove forests.

Population growth, excessive use of wood, and rise in poverty are expected to increase the rate of deforestation. The efforts to conserve are affected by loss of forest cover every year at the rate of 1.5 percent. Furthermore, the loss of forest cover is one of many reasons of increased incidence of floods resulting in loss of lives. In addition, poor forest management and planning and lack of institutional, regulatory, lack of property rights, and legal frame work is worsening the situation.

In addition to desertification, excessive and irrational use of resources with lack of incentives to preserve and conserve is resulting in loss of biodiversity. The Forest Sector Master Plan (FSMP) initiated in early 1990s, focuses on forestry issue at federal and provincial level to increase the forest cover from 5 percent to 10 percent. National Forestry Policy of 2001 focuses on conservation of forests and on maintaining biodiversity. To preserve biodiversity, the focus is on implementation of biodiversity action plan, integrated coastal zone management, national wetland policy, conservation of biodiversity with community involvement, use/conservation of medicinal plants, promote eco-tourism and on implementation of regulations

At the Conference we have organised one panel discussion and one technical session on forestry. The South Asian Network for Development and Environmental Economics (SANDEE), based in Nepal, has supported this initiative. Two papers, in the panel discussion are part of the SANDEE sponsored research. The paper by Pant (2008), deals with the issue of forest degradation as a result of use of forest wood as fuel. The author focuses on the health impact and concludes that the health cost of using traditional fuelwood in the houses are much higher than the cost of modern fuels. The use of modern fuels reduces the health cost at the household level and protects the public goods by reducing fuelwood harvesting. The study concludes, "...not only the internalisation of the externality but also exploration of the hidden internal costs can be instrumental to reduce the public bad."

Waste Management

Waste is generated by households, industries, and hospitals. The waste generated by industries and hospitals is more hazardous and needs extremely careful handling. Inadequate collection and unsafe disposal creates health hazards to the people. More than 54,850 tons of solid waste is generated daily in major urban centers of Pakistan and less than 60 percent is collected and even a lower fraction is disposed off safely.

A number of measures have been outlined to handle the problem of waste generation and disposal [Pakistan (2005b)]. These include:

- Controls on discharge from industry
- Use of environment-friendly production technologies
- Reduction, recycle and reuse of waste
- Regulations to reduce the hazardous waste and contamination
- Regulations and control mechanism for oil spills
- Marine pollution act

- Incentives to reduce pollution
- Plans to meet emergencies/accidents.

However, the policy framework is not sufficient to deal with the issue of waste management, particularly the transboundary waste generation and disposal. Waste recycling and reuse are critical issues and proper handling may lead to lower environmental damage and generation of low cost energy. This will also reduce the health hazards to the population.

Fiscal Measures

There are many other issues of critical importance. We have a session of environmental fiscal reforms. The research on this topic shows that fiscal instruments can be used to control environmental damage. The paper by Siddiqui (2008), using dynamic computable general equilibrium model, highlights the significance of the tax-financed investment in the transport sector for economic development, for exports expansion in the long run and reduction of transport cost and associated negative externalities like cost of congestion, pollution and accidents.

Farooq, Ahmed, and Jasra (2008) emphasises 'on the positive linkage between poverty and natural resource degradation, particularly in the arid agricultural zones of the country. The authors indicate that projects in these areas are given low priority and receive little funds and there is a need to create linkage among the farming communities for effective coordination and consultation among the farmers, the custodians of natural resources and the development institutions to reduce poverty and empower the farmers. A bottom-up approach should be adopted for this purpose.

Malik (2008) discusses the implication of rising oil prices for Pakistan's economy. In order to reduce the vulnerability of the economy to the rising oil prices. The study suggests, in addition to expansion in exploration efforts and energy conservation, a coordination between fiscal and monetary policies to minimise the adverse effects of the rising energy (oil) prices.

The paper by Ali, Rehman, and Nasir (2008) supports the view that trade-environment relationship is positive. It suggests that more open countries have more stringent environmental regulations. The environmental quality is a normal good and its demand increases with income. However, the effects of trade and output on environmental protection depend on the level of 'government honesty'.

Azhar, Khalil, and Ahmed (2008), analyse the environmental impact of trade liberalisation. The results of the study show that trade intensity and scale effects increase the air and water pollution. In order to reduce the scale effects the pollution intensity of industrial activity must be reduced. This can be done by transfer of cleaner production technologies.

SOME REFLECTIONS

Based on this cursory review of the state of the environment in Pakistan, the major challenges identified and policy initiatives being taken I would like to put forward some of my reflections on addressing these issues.

On most problems confronting developing countries there is a need in varying degrees to take a multi-disciplinary approach. In addressing the environment challenges

this is absolutely essential. The economists must work closely with other social scientists because environmental problems need to be analysed in their historical context, take into account complex social and property relationships and awareness of local sensitivities. In ensuring success in implementation there is also need for close co-ordination between all levels of government—federal, provincial and local levels, for public-private partnership and active and close involvement of civil society. Building up such a coalition is indeed challenging and must not be underestimated.

It is perhaps for this reason and not just a lack of political commitment that we have made relatively little, and I would say disappointing progress in this area.

This is perhaps also the reason why the Environment Sector broadly defined comes out as the one which is finding it most difficult to spend the resources allocated to it during the Medium-Term Development Framework (MTDF) 2005-10. I have had the opportunity of being involved in a mid-term review of the MTDF by the Planning Commission, which is still underway, but the results do point out that while some good initiatives have been launched overall implementation in the Environment sector including in terms of resources spent against allocations has been disappointed. While many of the solutions require long term commitment and strengthening of the Institutional framework for effective implementation there are areas where investments can have a high return even in the short-run.

I find such an approach of identifying areas of action in terms of returns in the short, medium and long-term as extremely helpful especially for planners and policy-makers. This is an approach which has been taken in a recent review conducted by Kemal and Siddiqui [IUCN (2006)] in relation to some of the new policy areas of intervention in the context of Pro-poor Environmental Fiscal Reforms. Some of the results of this project on Environmental Fiscal Reforms (EFR) at the local level are being presented at this Conference.

Where to my mind the economists can make their most clear cut contribution is in identifying policy measures to create an incentive structure which drive the economy to a more efficient use of its natural resources whether it relates to water use or air pollution. Clearly these measures would have both efficiency and equity implications and how best to package these measures and find optimal combinations are challenges that need to be addressed.

In the context of the role of the economist in developing an incentive structure and criteria for deciding on new investments let me give a few examples. The need for building up our water resources is urgent and essential. But there is a tendency to opt for large sized projects and dams, which in some cases are essential, while not giving sufficient attention to projects for reducing loss of precious water resources as well as for the upkeep of existing infrastructure. Smaller projects are more difficult to implement but this does not mean that on this count alone they should be given low priority. The same is true for investments in the energy sector where insufficient attention and resources are given to developing energy saving devices and systems. In making these choices economists can play an important role in policy-making.

An area which I again believe can have high return is improvements in occupational safety and health for our working people. As the Labour Force Surveys

consistently show, work-related diseases are the major cause for loss of work-days; other studies show that it is a major factor responsible for continuing low productivity in the economy. Improving conditions at the work place, starting with the formal and gradually expanding to the informal and agricultural sector requires amongst others a labour inspection policy which the government has been working on in recent years. Unfortunately, the practice especially in the Punjab province has been to completely do away with this system and again the new government in the province needs to review this stance.

Given that almost half of our labour force works in agriculture and around seventy percent in the informal economy the implications of climate change can be enormous for Pakistan.

Yet, again while some initiatives in this key area have been taken, I believe we need a more concerted effort to tackle this challenge.

I would like to take this opportunity of my Presidential address to call upon the new government to set-up a High Level Commission on Climate Change to be headed by the new Prime Minister, have as members Ministers of key economic ministries, the Planning Commission and experts in the field. PIDE would be willing to serve as the secretariat to this Commission.

PIDE is planning to strengthen its research programme on the Environment and Climate Change as well as start from Autumn 2008 a Masters programme in Environmental Economics for which we have started making preparation.

PIDE intends to start a graduate programme in Environmental Economics soon. The programme is to train the economists in analysis of issues of environmental and resource economics, evaluation and valuation techniques to address the issue whether natural resources are asset or burden and the significance of these resources in sustainable economic growth of countries like Pakistan.

PIDE training programme also plans to strengthen its capacity in this area especially in holding training on “Environmental Impact Assessments” for all level of government, NGOs and the private sector.

Indeed we look forward to the debates and discussions at this Conference to help identify areas for our research programme, which we plan to expand over the environment and natural resource management.

REFERENCES

- Ahmad, S. (2008) Land and Water Resources of Pakistan—A Critical Assessment. Paper presented in 23rd AGM and Conference of PSDE.
- Ahmed, A., H. Iftikhar, and G. M. Chaudhry (2008) Water Resources and Conservation Strategy of Pakistan. Paper presented in 23rd AGM and Conference of PSDE.
- Ali, A., F. Rehman, and M. Nasir (2008) The Impact of Trade Openness and Corruption on Environmental Quality. Paper to be presented in 23rd AGM and Conference of PSDE.
- Azhar, U., S. Khalil, and M. H. Ahmed (2008) Environmental Effects of Trade Liberalisation: A Case Study of Pakistan. Paper presented in 23rd AGM and Conference of PSDE.

- Farooq, U., M. Ahmed, and A. W. Jasra (2008) Natural Resources Conservation for Poverty Alleviation by Making the Farmers Partner with Empowerment. Paper presented in 23rd AGM and Conference of PSDE.
- IUCN (in collaboration with PIDE) (2006) Building Coalitions for Change to Implement Pro-poor Environmental Fiscal Reforms (Unpublished paper).
- Khan, H. (2008) Population, Environment and Poverty in Pakistan: Linkages and Empirical Evidence. Paper to be presented in 23rd AGM and Conference of PSDE.
- Khan, M. A. (2008) Valuation and Pricing of Surface Water Supplies in Pakistan. Paper presented in 23rd AGM and Conference of PSDE.
- Malik, A. (2008) How Pakistan is Coping with the Challenge of High Oil Prices. Paper presented in 23rd AGM and Conference of PSDE.
- Pakistan, Government of (2005a) *Pakistan: State of Environment–2005*. Islamabad: Ministry of Environment.
- Pakistan, Government of (2005b) *National Environmental Policy–2005*. Islamabad: Ministry of Environment.
- Pant, K. P. (2008) Valuing Interventions to Reduce Indoor Air Pollution by Addressing Endogeneity—Fuelwood Use, Deforestation and Health in Rural Nepal. Paper presented in 23rd AGM and Conference of PSDE.
- Qureshi, S. A., M. Khan, and M. I. Husnain (2008) Gender, Environment and Sustainable Economic Growth. Paper presented in 23rd AGM and Conference of PSDE.
- Siddiqui, R. (2008) Quantifying the Impacts of Development of Transport Sector in Pakistan. Paper presented in 23rd AGM and Conference of PSDE.
- Tietenber, T. (2003) *Environmental and Natural Resource Economics*. (Sixth edition). Pearson Education, India.
- UNDP (2008) *Human Development Report 2007-2008—Fighting Climate Change: Human Solidarity in a Divided World*. New York: UNDP.
- World Bank (2006) Pakistan: Strategic Country Environmental Assessment. World Bank. (Main Report.)