

COMSATS-COMSTECH National Meeting

Challenges for Socio-economic Development in Pakistan: Role of Science and Technology

26th - 28th October 2009

P R O C E E D I N G S



Commission on Science and Technology for
Sustainable Development in the South (COMSATS)

14

COMSATS' Series of Publications on Science and Technology

COMSATS-COMSTECH National Meeting

Challenges for Socio-economic Development in Pakistan: Role of Science and Technology

held on 26th - 28th October 2009

PROCEEDINGS



Commission on Science and Technology for
Sustainable Development in the South (COMSATS)

COMSATS-COMSTECH National Meeting

Challenges for Socio-economic Development in Pakistan: Role of Science and Technology

Published: June 2010

Printed by: M/s New United Printers, Islamabad

Copyright: COMSATS Headquarters

No Part of this book may be reproduced or transmitted in any form or by any electronic means, including photocopy, xerography, recording, or by use of any information storage. The only exceptions are small sections that may be incorporated into book-reviews.

This book is published under the series title, *COMSATS' Series of Publications on Science and Technology*, and is number 14th of this series.

Copies of this book may be ordered from :
COMSATS Headquarters
4th floor, Shahrah-e-Jamhuriat
Sector G-5/2, Islamabad, Pakistan
Email: comsats@comsats.org.pk
Website: www.comsats.org
Ph: (+92-51) 9214515-7
Fax: (+92-51) 9216539

Price: US\$ 10 or equivalent



Commission on Science and Technology for
Sustainable Development in the South

PROCEEDINGS OF COMSATS-COMSTECH NATIONAL MEETING ON CHALLENGES FOR SOCIO-ECONOMIC DEVELOPMENT IN PAKISTAN: ROLE OF SCIENCE AND TECHNOLOGY

TABLE OF CONTENTS

FOREWORD	01
INTRODUCTION	03
TECHNICAL PROGRAMME	05
INAUGURAL SESSION	09
• Introductory Remarks Dr. Hasibullah, COMSATS	11
• Welcome Address Dr. Anwar Nasim, COMSTECH	13
• Inaugural Address (Summary) Dr. Imtinan Elahi Qureshi, COMSATS	15
TECHNICAL SESSION - I: EDUCATION	17
• Keynote Address by Dr. Inam ur Rehman	19
• Keynote Address (Summary) by Dr. S.M. Junaid Zaidi	21
• Technical Presentations on:	
- Investment in Education: Panacea for Pakistan By Ms. Zubda Rashid	23
- A Review of National Educational Policy of Pakistan by Dr. Dur-e-Nayab	31
- Strengthening Classroom Instructions by Ms. Shaista Bibi	37
• Outcome	41
TECHNICAL SESSION - 2: HEALTH	43
• Keynote Address by Dr. Birjees Mazher Kazi	45
• Technical Presentations on:	
- Role of Taxonomy of Medicinal Plants in the Socio-economic Uplift of Pakistan by Ms. Hina Fazal	47
- Health Issues Hurting Socio-economic Well being of Pakistan and their Possible Solutions by Ms. Safia Bibi	59
- Role of Science and Technology: Health Challenges of Pakistan by Dr. Saira Bashir	63
• Outcome	71

TECHNICAL SESSION - 3: ICTs **75**

- Keynote Address by Dr. Arshad Ali 77
- Keynote Address (Summary) by Dr. Khalid Rashid 79
- Technical Presentations on:
 - Role of Science and Technology in Media Development 81
by Ms. Saadia Ishtiaq
 - Role of Information and Communication Technology in Entrepreneurship Development 83
by Mr. M. Iqbal
 - Role of Information Technology in the Development of Pakistan 87
by Ms. Tahira Yasmeen
- Outcome 91

TECHNICAL SESSION - 4: ECONOMY AND S&T ISSUES **93**

- Keynote Presentation by Dr. Tariq-ur-Rehman 95
- Keynote Address by Dr. Asad Ali Shah 99
- Technical Presentations on:
 - University-Industry-Government Inter-linkages in Pakistan 101
by Mr. Wahid Bux Mangrio
 - Role of S&T in Economic Issues 103
by Mr. Asad Raza
 - Productivity 105
by Ms. Samar Min Allah
 - Use of Expansion Materials in Block Mining of Marble Granite 107
by Mr. Aamir Muhammad
 - Socio-economic Development of Pakistan: Role of Engineering and Technology 119
by Mr. M. Jawad Qarni
 - The Challenging Economic Problems and their Solutions 123
by Mr. Syed Qudratullah
 - Factors Influencing the Socio-economic Development of Pakistan 125
by Mr. M. Kashif Munir
 - Freedom of Information: A Tool for Accountability 131
by Mr. Syed Safwan Khalid
 - Practicing ICTs in Private Sector 135
by Dr. Khalid Latif
- Outcome 137

TECHNICAL SESSION - 5: AGRICULTURE AND ENVIRONMENT **139**

- Keynote Presentation by Dr. Qamar-uz-Zaman Chaudhry 141
- Keynote Presentation by Dr. M.E. Tusneem 157
- Technical Presentations on:
 - Rural Poverty Alleviation through Skill Development 159
by Mr. M. Masood Azeem
 - Socio-economic Challenges of Pakistan and Role of Science and Technology 163
by Ms. Shumaila Afzal
 - Climate Change: Challenge for Fresh Water Resources of Pakistan 169
by Mr. Shabeh-ul-Hason
- Outcome 189

TECHNICAL SESSION - 6: ENERGY	191
• Keynote Address by Mr. Ashfaq Mahmood	193
• Keynote Address (Summary) by Dr. Shaukat Hameed Khan	195
• Technical Presentations on:	
- Biodiesel Concept and Prospects in Pakistan by Mr. Ali Bahadur	197
- Energy Crises - The Way Out by Ms. Faroha Liaqat	205
- Energy Production through Solid Materials by Ms. Shaima Akhlaq	211
- Energy Crises: A Challenge for Pakistan by Mr. Kaleem Anwar Mir	215
• Outcome	219
CONCLUDING SESSION	221
• Invited Lecture on "Nanotechnology: A Vehicle for Socio-economic Development" Dr. N.M. Butt, PINSAT	223
• Technical Summary Dr. Hasibullah, COMSATS	225
CONCLUSIONS AND RECOMMENDATIONS	229
ANNEXURES	
• Annex - 1: List of Resource Persons	231
• Annex - 2: List of Participants	233

FOREWORD

The ultimate objective of any development strategy for a country is to achieve socio-economic progress that is sustainable and consistent with its cultural values. It is well-understood that development is a complex and prolonged process depending on the internal characteristics of a society as well as the impact of external influences. With rapid advances in natural sciences following the 18th century industrial revolution, it became increasingly obvious that science and technology would be indispensable for the progress of future societies. The realization of this primal tenet has been the focus of COMSATS endeavours in its 21 Member Countries over the last fifteen years.

Cognizant of the potential of our youth, COMSATS decided in early 2009 to convene a national meeting in Pakistan, to elicit the young people's opinions about the socio-economic challenges being faced by Pakistan and their possible solutions through the applications of Science and Technology. We were glad that COMSTECH and the Higher Education Commission of Pakistan joined hands to strengthen our effort. We welcomed the idea of COMSTECH that the planned moot should be in the format of a meeting rather than a seminar or symposium so that the young participants could have ample chance to express themselves freely, having a lot of time at their disposal for debate and discuss. I am glad that the meeting met its objectives successfully. The young participants came up with extremely apt assessment of the challenges faced by Pakistan in the realms of education, health, agriculture, ICTs, environment and energy – all closely linked to the socio-economic progress of Pakistan. They also gave very useful ideas about the pragmatic solutions to the problems identified in various technical sessions. We were lucky to have the voluntary services of some of the most renowned subject experts of the country who provided guidance to the young participants during the entire course of the three days' discussions.

The present document embodies the Proceedings of the above-mentioned meeting. It consists of a brief introduction, eight keynote addresses/presentations, three summaries of the keynote addresses of the subject experts/ resource persons, 25 presentations of the young participants in six technical sessions, an account of the inaugural and the concluding session and two Annexes. In order to retain the true flavour and nuances, the speeches and presentations have been kept un-edited. We believe that in this way, the reader will be able to extract the essence of the message the young presenters wanted to convey. COMSATS would not like to close this important course of discussions at this stage but would provide a solid and effective way for the continuation of the creation and dissemination of useful ideas through the establishment of a think-tank and an exclusive web-portal. Several more young people who may have the interest and passion for the welfare of Pakistan would also be welcomed to join the think-tank. We would like that the idea of youth's participation in national welfare matters should be repeated in other member countries of COMSATS and COMSTECH for their benefit. I also hope that the ideas of Pakistan's enlightened youth will be given due importance by our own policy makers.

Finally I would like to put on record my deep sense of appreciation to the organizing teams of both COMSATS and COMSTECH who have made this meeting a real success. I am thankful to the Higher Education Commission of Pakistan for its generous financial support. I would be failing in my duties if I do not acknowledge with profound gratitude, the keynote addresses by the nation's most celebrated scientists, Prof. Dr. Atta-ur-Rahman and Dr. Samar Mubarakmand during various technical sessions of the meeting which provided inspiration to the young participants of the meeting. I am also grateful to Prof. Dr. N.M. Butt for a highly informative lecture on nanotechnology in the concluding session. I hope this document will provide useful insight, from the perspective of Pakistan's youth, to the policy makers of the country for the purpose of formulating future development plans. COMSATS will welcome the views and comments of the readers on the contents of this document.

Dr. Imtinan Elahi Qureshi
Executive Director
COMSATS

INTRODUCTION

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) convened a national meeting entitled “Challenges for Socio-economic Development in Pakistan: Role of Science and Technology” from 26th to 28th October 2009, in collaboration with the OIC’s Standing Committee for Scientific and Technological Cooperation (COMSTECH) and the Higher Education Commission of Pakistan. The venue of the meeting was COMSTECH Headquarters, Islamabad.

The major objectives of this meeting were, (a) to enable the educated youth of Pakistan to express their opinions on the key/primary socio-economic challenges of Pakistan, (b) to elicit their views on the practicable solutions of the identified challenges through the application of science and technology, (c) to provide a forum to the young participants of the meeting for continuing their interaction to evolve further ideas on the subject of the meeting, and (d) to interject the opinions of the resource persons into the debate in order to enrich the outcome of the meeting with the knowledge and experience of the resource persons. Prior to the commencement of the meeting, the participants and the resource persons were requested that the direction of discussions should be kept Pakistan-specific and youth-centric.

The meeting was attended by 25 young scholars, doctors, scientists, engineers, sociologists, etc., from various academic and R&D organizations from all over the country. The areas of discussion were chosen to be agriculture; energy; ICTs and media; education; health; economy and S&T issues – all closely linked to the socio-economic development of Pakistan. It was also felt that these areas were of considerable importance to the socio-economic uplift of many developing countries and the findings of the meeting could be of interest to the Member States of COMSATS and COMSTECH. Similar meetings in the Member States of COMSATS and COMSTECH could also be held that would generate valuable information for preparing future programmes and projects by both the organizations.

The national meeting was structured around eight sessions – one inaugural, six technical and one concluding – spread over a period of three days. The keynote speeches and presentations (unedited) are given in the subsequent sections of the present Proceedings. Each technical session started with keynote address(es) by the country’s renowned resource person(s) and was followed by the presentations prepared by the selected young participants. This was followed by an exhaustive debate in which all the participants and the resource persons took part with full freedom of expression. This mode of discussion produced very useful, candid and mature opinions of the participants that could be of immense importance to the policy makers of the country. Some technical sessions were attended by the renowned scientists – Prof. Dr. Atta-ur-Rahman and Dr. Samar Mubarakmand – providing further enrichment to the substance of the meeting.

Most of the discussions touched upon the core issues from the perspectives of policy, strategy, priorities and the role science and technology can play to address the identified issues. General and specific aspects of the six thematic areas were taken up both in the presentations and the discussions. All participants attended the meeting in its entirety.

TECHNICAL PROGRAMME

	Starting Time	
Day 1		Inaugural Session [FOR THE PARTICIPANTS ONLY]
26-Oct-09	9:30	Registration
	9:50	Participants to be seated
	10:00	Arrival of the Speakers
	10:05	Recitation from the Holy Quran
	10:10	Introductory Remarks Dr. Hasibullah Advisor International Affairs - COMSATS
	10:20	Welcome Speech Dr. Anwar Nasim, S.I. Advisor Science - COMSTECH
	10:35	Inaugural Address Dr. Imtinan Elahi Qureshi, T.I. Executive Director - COMSATS
	10:50	Refreshments
		Technical Session-1 (Education)
	11:25	Address by Dr. Inam ur Rahman
	11:35	Address by Dr. S. M. Junaid Zaidi
	11:45	Presentation by Ms. Zubda Rashid
	11:55	Presentation by Ms. Dur-e-Nayab
	12:05	Presentation by Ms. Shaista Bibi
	12:15	Brainstorming Session for Identification of Problems and their S&T Solutions
	13:45	Address by Dr. Samar Mubarakmand N.I., H.I., S.I. Member Science and Technology Planning Commission of Pakistan
	14:05	Lunch Break
	14:45	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
		Technical Session-2 (Health)
	15:15	Address by Dr. Sania Nishtar
	15:25	Address by Dr. Birjees Mazher Kazi
	15:35	Presentation by Ms. Hina Fazal
	15:45	Presentation by Ms. Safia Bibi
	15:55	Presentation by Dr. Saira Bashir
	16:05	Brainstorming Session for Identification of Problems and their S&T Solutions

continue...

...continued

	17:35	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
	18:05	Tea Break
Day 2		Technical Session-3 (ICTs)
27-Oct-09	9:30	Address by Dr. Arshad Ali
	9:40	Address by Dr. Khalid Rasheed
	9:50	Presentation by Ms. Saadia Ishtiaq
	10:00	Presentation by Mr. M. Iqbal
	10:10	Presentation by Ms. Tahira Yasmeen
	10:20	Tea Break
	10:40	Brainstorming Session for Identification of Problems and their S&T Solutions
	12:10	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
	12:40	Lunch Break
		Technical Session-4 (Economy and S&T Issues)
	13:40	Address by Dr. Tariq-ur-Rahman
	13:50	Address by Dr. Asad Ali Shah
	14:00	Presentation by Mr. Wahid Bux Mangrio
	14:10	Presentation by Mr. Asad Raza
	14:20	Presentation by Ms. Samar Min Allah
	14:30	Presentation by Mr. Aamir Muhammad
	14:40	Presentation by Mr. M. Jawad Qarni
	14:50	Presentation by Syed Qudratullah
	15:00	Presentation by Mr. M. Kashif Munir
	15:10	Presentation by Mr. Syed Safwan Khalid
	15:20	Presentation by Dr. Khalid Latif
	15:30	Tea Break
	15:50	Brainstorming Session for Identification of Problems and their S&T Solutions
	17:20	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
	20:00	Dinner at COMSTECH
Day 3		Technical Session-5 (Agriculture and Environment)
28-Oct-09	9:30	Address by Dr. Qamar-uz-Zaman Chaudhry
	9:40	Address by Dr. M. E. Tusneem

continue...

...continued

	9:50	Presentation by Mr. M. Masood Azeem
	10:00	Presentation by Ms. Shumaila Afzal
	10:10	Presentation by Mr. Shabeh-ul-Hasson
	10:20	Tea Break
	10:50	Brainstorming Session for Identification of Problems and their S&T Solutions
	12:20	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
	12:50	Lunch Break
		Technical Session-6 (Energy)
	13:50	Address by Mr. Ashfaq Mehmood
	14:00	Address by Dr. Shaukat Hameed Khan
	14:10	Presentation by Mr. Ali Bahadur
	14:20	Presentation by Ms. Faroha Liaqat
	14:30	Presentation by Ms. Shaima Akhlaq
	14:40	Presentation by Mr. Kaleem Anwar Mir
	14:50	Brainstorming Session for Identification of Problems and their S&T Solutions
	16:20	Summary of Discussions by Rapporteur and Winding up by the Session Coordinator including agreed lists of identified problems and their S&T solutions
	16:50	Tea Break
		Concluding Session
	17:10	Presentation on Nanotechnology by Dr. N.M. Butt
	17:25	Address to the Participants by Prof. Dr. Atta-ur-Rahman F.R.S., HI.,NI.,SI.,TI., Coordinator General - COMSTECH
	17:40	Presentation of Technical Summary
	17:50	Certificate Distribution



A group photo of the young participants of the National meeting with the Executive Director COMSATS, Advisor (Science) COMSTECH and Advisor (I.A) COMSATS

The inaugural session was chaired by the Executive Director COMSATS, Dr. Imtihan Elahi Qureshi. In his inaugural address, Dr. Qureshi highlighted the importance of indigenization of scientific and technological efforts in Pakistan, which is necessary to achieve a meaningful socio-economic development of the country. He asserted that progress cannot be achieved merely through foreign aid/assistance as it perpetuates the dependence of the nation on others. He also gave a brief description of COMSATS' mission, activities and its contributions to the socio-economic uplift of the 21 developing Member States. He advised the youth to work for the nation with commitment, honesty and discipline. He announced that COMSATS will help to create the proposed web-portal for the prospective think-tank following this meeting. Earlier, Dr. Hasibullah, Advisor (International Affairs), COMSATS gave his introductory remarks, whereas Dr. Anwar Nasim, Advisor Science, COMSTECH, delivered a welcome speech. The introductory remarks highlighted the concept of the meeting, importance of engaging the youth of the country in the processes of nation-building, procedures adopted by the organizers of the meeting for the selection of participants on purely merit basis, as well as arrangements made for the stay of participants in Islamabad alongwith financial assistance. The welcome address provided a clear and lucid description of COMSTECH's activities for the scientific and technological uplift of its Member States and the importance of seminars, symposia, meetings, etc., which COMSTECH has been regularly arranging for the promotion of S&T capacity building and socio-economic development.

INTRODUCTORY REMARKS

by
Dr. Hasibullah
Advisor (International Affairs)
COMSATS Headquarters
Islamabad

Dr. I.E. Qureshi, Executive Director COMSATS
Dr. Anwar Nasim, Advisor Science COMSTECH
Distinguished Guests
Ladies and Gentlemen!

It is my honour and privilege to welcome you in this national meeting on “Challenges for Socio-economic Development in Pakistan: Role of Science and Technology”, which has been jointly organized by COMSATS and COMSTECH in collaboration with the Higher Education Commission of Pakistan. I am grateful to COMSTECH, Higher Education Commission and CIIT for their help and cooperation to COMSATS in convening this meeting.

As we have mentioned in our various verbal and written communications to you that the meeting is going to be participant-centric and Pakistan-specific, which makes it somewhat unique in character and significant in importance. Unlike many typical seminars and symposia which are usually tilted heavily towards the speakers, the present meeting will have its centre of gravity towards the young participants. This format will enable us to understand the views and opinions of the younger generation on the socio-economic challenges being faced by Pakistan and find out their possible solutions with the help of powerful tools of science and technology. We are keenly looking forward to see how our younger participants create viable bridges between the two.

Ladies and Gentlemen!

The organizers of the meeting have given a high degree of importance to the process of selection of the participants and the format to be adopted in the technical sessions. In order to ensure that we pick the right people for the meeting, we first invited concept papers of one to two pages in the areas of interest of the prospective participants from all over the country. We received very encouraging response, much more than we had expected from a large number of young students, the faculty and the researchers who sent high-quality concept papers. From more than one hundred such inputs, the organizers were able to select around thirty persons who had an outstanding understanding of their respective subjects and the purpose of this meeting. Most of these young men and women are present in this gathering and we consider ourselves lucky to have them with us.

These brilliant youngsters who are here and are going to deliberate upon the major national socio-economic issues like education, energy, agriculture, health, economy, ICTs and media, will enjoy full freedom to express their views in relevant technical sessions, spread conveniently over the next three days, and come up with priority problem-areas and their S&T based solutions. Also, we have been fortunate to have some of Pakistan's most renowned subject experts who have very kindly taken some time out of their very busy schedules and agreed to act as resource persons to guide the discussants for achieving a focused and quality output. At the end of each technical session, the resource persons will prepare lists of agreed set of identified problems and their S&T led solutions. A proforma sheet has also been devised specifically for the purpose of this meeting, which will help the resource persons to record the recommendations in a concise and systematic manner. The meeting will be assisted by the rapporteurs in all the sessions.

Ladies and Gentlemen!

The meeting is not designed to remain confined only to discussions and preparation of recommendations but goes

much beyond that. We would like that the participants who have come from various distant parts of the country and represent all the four provinces of Pakistan, should keep the intellectual and social links intact for the future as well. We will seek the views of the youth gathered here on the possibility of creating a think tank out of this meeting. This think-tank could render a very useful service to the nation by carrying forward the cause of this meeting, creating more ideas in the future and helping the international organizations of the developing countries, like COMSATS and COMSTECH, to disseminate these ideas to the relevant quarters in the Member States. The organizers of this meeting will be glad if those interested young men and women who could not be selected for the present meeting, will get together and include themselves in the proposed think-tank. Another follow-up activity of this meeting could be the possibility of formulation of a project on the creation of a dedicated web-portal to provide an assured interconnectivity to the large number of young people to have a continued dialogue on the issues related to socio-economic challenges of Pakistan and their possible solutions through the applications of science and technology. The organizers will seek an agreement of the meeting on these two proposals. Needless to mention that the proceedings of this national meeting will be published as soon as possible.

I wish to take this opportunity to thank Dr. Imtihan Elahi Qureshi, Executive Director COMSATS; Prof. Atta-ur-Rahman, Coordinator General COMSTECH; Dr. S.M. Junaid Zaidi, Rector CIIT; and Dr. Anwar Nasim, Advisor Science COMSTECH, for their personal interest in this meeting. I also want to commend the hardwork done by the organizing teams of COMSATS and COMSTECH who have been endeavouring in difficult circumstances to make the meeting a real success. I sincerely hope that all the participants will enjoy their stay at COMSTECH. We shall be at your disposal for any assistance throughout the course of the meeting.

I thank you for your kind attention.

WELCOME ADDRESS

by
Dr. Anwar Nasim
Advisor Science
COMSTECH, Islamabad

It is great pleasure to welcome all the participants on behalf of Prof. Dr. Att-ur-Rahman, Coordinator General, OIC Standing Committee for Scientific and Technological Cooperation (COMSTECH), to this very important and timely workshop.

Three years ago COMSTECH initiated a programme of 'Interactive Thematic Workshops' on different cutting-edge technologies. In other parts of the world similar initiatives have been taken earlier. This has been the rationale for the special summer courses and workshops offered in USA (eg. Cold Spring Harbor (CSH) and Marine Biological Laboratory (MBL)) and by the European Molecular Biology Organization (EMBO) in Europe. The outstanding track record of these courses has established the soundness and long-term impact of this strategy.

In the developing world no such forum is presently available. It is the purpose of this project to establish this forum. The topics have been selected keeping in mind both the cutting-edge nature of the discipline as well as its relevance to the country/region. The major funding was provided by the Higher Education Commission of Pakistan (HEC). Initially the programme involved inviting 10 participants from OIC countries and 10 from Pakistan, as well as 6 resource persons from Pakistan and abroad. Some of the earlier selected topics included discussions on Bioinformatics, Industrial Biotechnology, Nanomedicine, Molecular Medicine, Stem Cell, RNAi, Bio Fertilizer and Gene Therapy. With the changed scenario the programme had to be revised and the more recent workshops have been focused primarily on participants from Pakistan.

A total of 19 workshops have been organized to benefit 341 Pakistanis and 106 researchers from OIC Member States, over a 3-year period. Execution of the project has generated information that will prescribe agenda for research in Biotechnology, Molecular Biology and Genetic Engineering, and in addition to other modern Technologies.

It has now been recognized by a number of science academies and other international organizations that the involvement of younger scientists is crucial for sustainability and continuity of the desired progress. One such example is the election of young TWAS fellow by the Academy of Sciences for the Developing World.

The present workshop, which has been organized in cooperation with the Commission on Science and Technology for Sustainable Development in the South (COMSATS), focuses on an extremely important topic "Challenges for Socio-economic Development in Pakistan: Role of Science and Technology". The areas chosen for discussion include Agriculture and Environment; Energy; ICTs and Media; Education; Health; Economy and S&T Issues. The main objective is to get an input from our younger scientists and researchers to identify aspects that merit special attention. The participants were very carefully selected based on merit from more than 100 applicants. This gathering will provide a very unique opportunity for younger researchers to interact with experienced resource persons.

Based on these discussions an attempt will be made to develop strategies for achieving socio-economic development of Pakistan using science and technology.

I wish you a very enjoyable and productive workshop. I would also like to express my sincere thanks to all members of the Organizing Committee for their untiring efforts and hardwork in organizing this event.

Dr. Anwar Nasim
Advisor Science,
COMSTECH

INAUGURAL SPEECH (SUMMARY)

by
Dr. Imtinan Elahi Qureshi
Executive Director COMSATS, Islamabad

In his inaugural speech, Dr. Imtinan Elahi Qureshi, Executive Director COMSATS, welcomed the participants and the resource persons on behalf of COMSATS, COMSTECH and the Higher Education Commission (HEC) of Pakistan. He praised the participants for taking keen interest in the joint national meeting and for coming to Islamabad from all parts of Pakistan. He gave his special thanks to the eminent resource persons for agreeing to assist the meeting with their highly knowledgeable inputs. Dr. Qureshi noted that the promotion of science and technology in the developing world for socio-economic progress was an extremely important policy objective of COMSATS, COMSTECH and the HEC, that was being pursued through events like this national meeting. Some of his observations are summarized below.

Pakistan like many developing countries in the world has low economic output. Competence in Science and Technology is the only way to break the barriers created by illiteracy, poverty, disease and backward looking mindset. The ranking of countries on the basis of Human Development, economic progress, good governance, and security environment, shows that Pakistan is among the group of countries with lowest level of performance. The countries who invested in education and scientific R&D, such as China, Korea, Singapore, and Malaysia, have acquired enviable position among the developing countries. Pakistan, like many member countries of COMSATS and COMSTECH, has the potential to harness the powers of knowledge to defeat the curse of economic backwardness. In this regard, the role of young educated people of Pakistan is of utmost importance. Pakistan's youth are the most valuable asset of the country. The destiny of a nation can be changed by the efforts of individuals. If each one of the participants of this meeting decides to work tirelessly for achieving excellence in his/her field of study, with the aim of contributing towards national development, things would definitely change for the better in the long run.

The essential ingredient of Pakistan's revival should be 'self-reliance'. No country has ever progressed by getting aid from abroad. In fact, the "aid" given by developed countries is a trap that erodes national will to progress and paralyses national institutions. Pakistan should devise 'aid-exit' strategy rather than looking for ever new avenues to get more aid. No self-respecting developing country should ever extend the begging bowl, because it is well-known that the aid by any country or agency under any circumstances comes with strings that impinge on national sovereignty. The aid does not solve developmental problems but makes nations addict to it. The only way to move forward on the road to socio-economic progress is self-help and creation of indigenous capacity in knowledge, science and technology with full faith in the future. COMSATS will always be ready to help the young participants of meeting in their patriotic activities aimed at national reconstruction and prosperity. COMSATS will be willing to carry forward the mission of the present national meeting by helping the participants to create a think-tank and to establish a dedicated web-site for facilitating their intellectual interactions.

He wished the participants, the resource persons and organizing teams of the national meeting an outstanding success.





EDUCATION**Subject Experts**

1. Dr. Inam ur Rahman
Scientist Emeritus,
Pakistan Atomic Energy Commission
Islamabad.
2. Dr. S.M. Junaid Zaidi
Rector
COMSATS Institute of Information
Technology (CIIT)
Islamabad.

Presentations by:

1. Ms. Zubda Rashid
Lecturer
Kinnaird College for Women
Lahore.
2. Dr. Dur-e-Nayab
Medical Officer
Pakistan Medical Research
Council (PMRC)
Peshawar.
3. Ms. Shaista Bibi
Lecturer
Fatima Jinnah Women
University (FJWU)
Rawalpindi.

KEYNOTE ADDRESS

by

Dr. Inam ur Rahman

Scientist Emeritus

Pakistan Atomic Energy Commission (PAEC), Islamabad.

Role of Science and Technology (Challenges for Socio-Economic Development of Pakistan)

The word 'Science' is derived from Latin words meaning 'having knowledge'. All the knowledge that we have today has been passed on from the thinkers and intellectuals of one generation to the next. The roots of science existed from the earliest ages of man. However, science as an institution or profession is a very recent development. It is only in the 20th century that the profession of science has come to compare in importance with the previously established professions. As a matter of fact the word 'scientist' appeared for the first time in 1840 in a book entitled 'Philosophy of Inductive Science' by William. In the book the author mentions:

"We need very much a name to describe the cultivator of science in general. I should incline to call him 'Scientist'".

Extremely rapid progress of science in the previous century has made professions like engineering & medicine more and more dependent on scientific discoveries and innovations. As a matter of fact, without a solid scientific base, industrial growth of a country is not very likely. Importance of science and technology for socio-economic development of a country becomes obvious by comparing the conditions of the countries that have laid great emphasis on and given top priority to education and development of science and technology, and those which are lagging behind in spite of having plenty of mineral resources and raw materials. A survey of developed and the underdeveloped countries makes it abundantly clear that the real source of prosperity lies no longer in raw materials, the uneducated manpower or imported equipment and machinery, but on having a very strong educated scientific and technological base.

A review of history clearly indicates that education (science-knowledge) has always played a very important role in determining the state of development of a nation. During the medieval times, America and Australia were not even known, and in Europe, Church completely dominated the state. Science and knowledge not connected with religion, were of no interest to learned people in Europe. The general attitude during the medieval times in Europe was 'if the greatest minds in history had explained all that was proper or necessary to know, why look any further'. In contrast, the position of Islamic Nations was quite different. Muslim scientist dominated all fields including natural sciences, life sciences, as well as social sciences from 750 A.D to 1400 A.D. Those were the times when Muslims were very keen regarding pursuit of knowledge. They were actually following the injunctions of Holy Quran, in which about 750 verses exhort the believers to study the things around us. When we ignored these teachings and stopped learning, our downfall became certain. The Muslim Ummah is now facing the same conditions that the western world was facing during the medieval times.

An equally important factor, responsible for the rise and fall of nations is ethics and morals. Science and technology alone cannot solve our problems and make this planet a better place for its inhabitants. It is something else also – the wisdom, the ethics, morals and human values, which are even more important than mere technical achievements. History has illustrated how some nations in spite of having highest literacy rate and being most advanced scientifically have destroyed themselves eventually. This is due to lack of emphasis on ethics and morals in education. Education is not merely about facts; it is about truth and to illuminate the struggle between right or wrong. Education institutions have in fact turned into factories, producing self-centered, selfish and soulless people. Somehow we have come to believe that one can be a good person without any training in goodness. We have succumbed to a myth that claims that morality comes naturally!

Sayings of some famous men on use and miss-use of science (knowledge) are reproduced here:

"The Stone Age may return on the gleaming wings of science, and what might now shower immeasurable material blessings on mankind may lead to its total destruction".

Winston Churchill

"Civilization is presented with a challenge more serious perhaps than ever before, and the fate of humanity will depend on its ability to unite in averting common dangers and jointly to reap the benefits from immense opportunities which the progress of science offers".

Niels Bohr

"Is it right to probe so deeply into Nature's Secrets? The question must be raised whether it will benefit mankind, or whether the knowledge will be harmful. Radium could be very dangerous in criminals' hands. Alfred Nobel's discoveries are characteristics; powerful explosives can help men perform admirable tasks. They are also a means to terrible destruction in the hands of the great criminals who lead people to war...."

**Noble Prize Oration of Pierre Curie for
discovery of Radium - 1903**

"Life consists not in pursuit of material success but in the quest for worthy spiritual growth... The failure of human consciousness deprived of its divine dimension, have been determining factor in all major crimes of this century".

Alexander Solzhenitsyn

We may conclude that two essential parameters for lasting peace and welfare as well as socio-economic development are pursuit of knowledge and becoming a good human being.

KEYNOTE ADDRESS (SUMMARY)

by

Dr. S.M. Junaid Zaidi

Rector

*COMSATS Institute of Information Technology (CIIT)
Islamabad.*

Dr. S.M. Junaid Zaidi, Rector COMSATS Institute of Information Technology (CIIT) emphasized the importance of purposeful and quality education in Pakistan in order to achieve prosperity and technical advancement. He pointed out that the present educational system was generally unable to prepare students who could render social service to the nation. It was necessary that modern scientific techniques should be employed in the class room for better understanding of the instructional contents by the students. It was equally important to modernize the curricula to bring the educational standard to international level. He gave examples of several countries which had swiftly transformed themselves from poor and backward economies to the most modern and world competitive economies. Dr. Zaidi asked the participants to come up with some very actionable and practicable suggestions to employ science and technology for the socio-economic betterment of Pakistan. In doing so, special care should be taken to devise ways and means to ensure implementation of the suggested proposals.

Investment in Education: Panacea for Pakistan

Zubda Rashid

INVESTMENT IN EDUCATION : PANACEA FOR PAKISTAN	
	PRESENTED BY ZUBDA RASHID

Pakistan's Socio-economic Condition:	

Pakistan's Socio-economic Condition:

1. Pakistan ranks 10th on the International Index List of the prospective failed states.
2. Our Economy is growing at an abysmally low rate of 2% per annum.
3. We are facing the worst power crisis that has impacted every sector of the economy.
4. The law and order situation of the country is flimsy.
5. Sectarianism, extremism, intolerance, frustration, economic disparities have jolted the nation.
6. We have an exploding population of around 151 million, more than half of which is a liability than an asset.

Pakistan's Socio-economic Condition:

7. 20% of the population has amassed 80% of the wealth.
8. Institutions of the state are weak because our rulers prefer a government of individuals to a government of laws.
9. Almost 75% of the poor in the country are clustered around the poverty line.
10. Pakistan's per capita income is \$ 1027 which renders inadequate amidst the double digit inflation hovering around 22%.
11. The unemployment rate is 8.5% which is huge when compared to that of India's i.e. 7.2% where population is 1.15 billion.

Pakistan's Socio-economic Condition:

12. Pakistan's adult literacy rate is 56.3 % and youth literacy rate is 53.9%, whereas that of India's is 66% for the adults and 82% for the youth. Sri Lanka who just won their age-old conflict with the Tamils this year, have the literacy rate of 92% for the adults and 98 % for the youth.
13. Pakistan being an agrarian economy is compelled to import wheat and rice.
14. The federating units lack harmony, giving birth to provincialism.

Pakistan's Socio-economic Condition:

15. The culture of references, nepotism, cronyism has plagued our society.
16. Justice is out of reach of the common man.
17. Health conditions are anything but satisfactory. Clean drinking water is a luxury for a majority of the population.
18. Medical facilities, are inadequate and are very expensive.

In a nutshell, the state every time, fails to deliver.

	What is the Root Cause of <u>ALL</u> these Problems?

What is the Root Cause of ALL these Problems?

The blatant answer is :

NEGLECTED EDUCATION SECTOR

1. Education is the least addressed sector in Pakistan.
2. Till this year, the budget allocated to this sector never exceeded 2% .The ministry of Education took up the heroic task of redesigning the education policy and came up with the 7% share of the budget for this sector. This 7% is to be allocated over the period of 6 years so, on average 1.16% of the budget would be spent on education every year.

	What is Education?

What is Education?

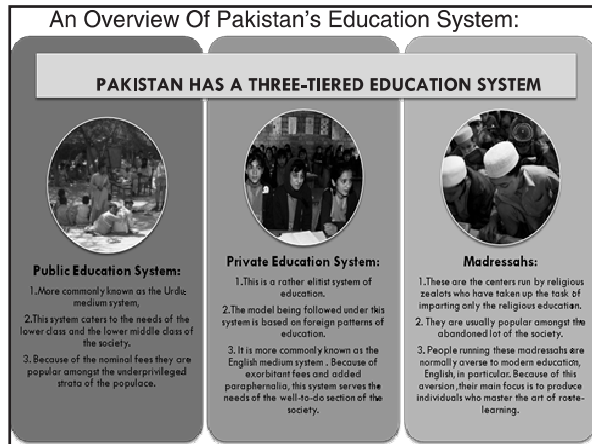
- Education is not just the delivery of knowledge, skills, information from a teacher to a student, it has a much wider scope.
- Education is a *process* of becoming an educated person.
- Educated person is the one who is capable of:
 1. Clear thinking
 2. Accurate perception
 3. Effective action for the achievement of self-selected goals.

Education is not restricted to the interaction between a teacher and a student within the boundary of a classroom. The environment is the biggest teacher and we all get educated from everything that is happening around us

Purpose of Education:

- 1.The process of education produces individuals who have access to optimal states of minds. They can easily navigate from the negative state of mind to the positive one.
2. Education lays the foundation of an aware society where individuals need information but are not totally dependant on information.
3. Education is a process that produces aware, pro-active and observant individuals who are capable of analytical and original thinking.
4. Education acts as the engine of sustainable long-term economic growth for any society.
5. Educated society is bound to have social and political stability.

	An Overview Of Pakistan's Education System:



Levels of Education In Pakistan:

- There are five levels of Education prevalent in Pakistan:
- Primary: Grade 1-Grade 5
- Middle : Grade 6 to Grade 8
- High: Grade 9 & 10 leading to Secondary School Certificate.
- Intermediate: Grades 11 & 12 leading to Higher Secondary School Certificate
- University Programs leading to Graduate and advanced Degrees.

Problems with the Primary and Secondary levels of Education in the Public Sector.

There are more than 150,000 public education institutions serving over 21 million people.

Condition of Education in the rural areas

- 1.71% of the primary and secondary schools are in the rural areas:
- 1. 1/6th of the schools are shelter less.
- Those with buildings have two rooms and verandas.
- Students usually sit on mats "Tatts"
- Low-esteem of students and teachers.
- Teachers are not well equipped with the reading materials and copies of curriculum.
- Salary packages of the teachers are highly inappropriate.

Problems with the Primary and Secondary levels of Education in the Public Sector.

- Drop rates are too high, 23.7% for the males and 24.6% for the females.
- Undue interference of the influential landlords and waderas.
- Lack of teacher training programmes.
- Hesitance of qualified teachers from urban areas to be posted to the rural areas.
- Unawareness of the parents.
- Lack of parent-child and parent teacher communication.
- Low enrollment rates.

Condition of Public Sector Education System In the Urban Areas:

- Only 22 percent of girls, compared to 47 percent boys, complete primary schooling.
- Only 30 percent of Pakistan's children receive secondary education.
 - Only 19 percent attend upper secondary schools.
- Curricula being taught in the public sector is not up to the standards being followed by the Private sector.
- Poverty and continuously rising inflation is a major deterrent to the education of the children of lower-middle class.
- Presence of ghost schools.

Condition of Public Sector Education System In the Urban Areas:

- Teachers appointed in the public schools are highly incompetent.
- Salary packages are unsatisfactory.
- Recruitment criteria for the teachers is not defined.
- Curricula are obsolete.
- Teaching and learning of English is look up to as a Herculean task.

**Condition Of Public Sector Education System
In the Urban Areas:**

- Most of the public schools train their students for rote learning.
- Emphasis is given on bookish knowledge.
- Textbooks and stationary are not provided to the schools.
- No training sessions and refresher courses are offered to the teachers.
- Teacher sand students absenteeism is a normal practice.
- One teacher seems to be teaching a number of subjects.

**Condition Of Public Sector Education System
In the Urban Areas:**

- Condition of the public schools is miserable.
- Enabling environment is not conducive to healthy learning.
- Least importance is given to character building and basic mannerism.
- Ruthless beating of students as a penalty , is a common practice.
- No formal system of examination and testing is prevalent. Because of the incompetence of teachers and inadequate attention to every student, most of the students end up repeating classes.

**Condition Of Public Sector Education
System In the Urban Areas:**

- Lack of government interest is reflected all over the public sector.
- Delay in disbursement of funds and wastage of funds in the public sector is an age-old practice.
- Reluctance of the authorities to take initiatives to address all the above mentioned issues.
- Apathy or indifference or high-handedness of the private sector to lend help.
- Element of insecurity amongst the students and teachers of the public sector.

**Characteristics and flaws in the Private Sector
Education System.**

The Flaws in the private Sector Institutions:

- Early education at the Montessori and kindergarten levels is extremely expensive.
- Status symbolism and Class consciousness attached to the early schools.
- Emphasis of abnormal proportions laid on the learning of English.
- Students are treated like fragile objects.
- At the Primary and secondary levels, they are taught the modern courses with least importance given to indigenous subjects.

**Characteristics and flaws in the Private
Sector Education System.**

- The contempt shown to the learning and teaching of Urdu Language and Urdu Literature is shameful.
- Curricula taught are usually lifted from the programmes of foreign institutes.
- The attributes of pomp and show , and materialism are inculcated in the students.

**Characteristics and flaws in the Private
Sector Education System.**

**Positive Characteristics of the Private Sector
institutions**

- Teachers are competent and they are paid good money.
- Regular teacher training programmes are arranged for.
- Regular revision of curricula takes place.
- Modern reading material and training kits are provided to the teachers.
- Huge representation is given to these schools.
- Graduates of the private sector schools bag positions both at national and international levels because of the amenities they spend huge money for.

Education System in Madressahs.

- Madressahs are usually free of cost.
- Their main focus is on the cramming of Quran without understanding Arabic.
- They usually cater to the abandoned children of the society.
- There are a very few madressahs teaching contemporary courses as well.
- Students in the madressahs are usually unkempt and sans civility.
- Teachers at these madressahs are usually local clerics and religious zealots.
- Most of these madressahs are imparting the lessons of hatred extremism and intolerance to the students.

Major Issues with the Higher Education:

1. Weak Base:

- Pakistan inherited just one university at the time of independence.

2. Bifurcation of Secondary higher Education from Degree Classes:

- It is the combination of tertiary and higher secondary levels of education which are provided at the university levels, which should be the responsibility of the Schools.
- This leads to the diffusion of resources allocated for higher education to the low levels.

Major Issues with the Higher Education:

3. Non-recognition of Pakistani degrees abroad:

- The main reason is the short duration of the degree courses. All over the world 16 yrs bachelor programme is being offered whereas we still have students come with a 14 yrs degree.

4. Limited access of Higher Education to the students:

- Because of the flaws in the primary and secondary education, very few people make it to the higher education.

Major Issues with the Higher Education:

5. Immense preference for Arts Education than Science:

- Because of unawareness, students generally prefer opting for Arts subjects.
- Lack of Science graduates is one of the major reasons for the under development of this country.
- General lethargy and inability to realize the need of the hour is also one of the reasons why our students prefer graduating in the discipline of Arts.

Major Issues with the Higher Education:

6. Lack of qualified and competent faculty:

- Because of little importance given to research, our universities lack qualified professors who could uplift the standards of education
- The system of promotions and meager salary packages also serves as a huge obstacle in the Public Universities.
- Lack of Training Facilities for the teachers.

Major Issues with the Higher Education:

7. Outdated Curricula:

- Curricula being taught is not up to the international standards.
- More emphasis is laid on imparting bookish knowledge instead of conceptual education.
- Revision of curricula on regular basis is still not a norm in Pakistan.
- Lack of competent faculty to teach challenging and modern curricula.

Major Issues with the Higher Education:

8. Huge divide between the Public universities and the Private Universities.

- Public universities because of a lot of bottlenecks attract mediocre students and faculty, whereas private universities because of adequate financial resources and patronage of the influential lot bag importance and the intelligent lot amongst the students and the faculty.

9. Lack of Research.

Major Issues with the Higher Education:

10. Wastage of the foreign aid and scholarships granted for Higher Education.

- Delay in the release of funds.
- Misallocation of funds.
- Funds disbursement on the basis of contacts and cronyism.
- Scholarships are granted not on the merit basis but on the criteria that is not known to the commoners.

Major Issues with the Higher Education:

11. Political influences in Universities.

- Political lobbyism has amongst the university students has played havoc.
- Students union, instead of working for the academic motives are driven by the political agendas of some major parties.

12. Lack of Job opportunities for The graduates:

- This is one major reason that puts the students off, and they feel that investing in education would ultimately be futile.

Major Issues with the Higher Education:

13. Lack of public-private partnerships.

- Because of the huge divide between the public and private institutes, both the sectors are hesitant to initiate, in unison, some projects so that they could benefit from each others' expertise.

14. Lack of Vocational training at the higher Education Level.

- Less than 8 percent of the work force receives formal training

Major Issues with the Higher Education:

15. Lack of emphasis given to Tertiary education.

- Tertiary enrollment rates are less than 5 percent of the eligible age cohort (17-23).

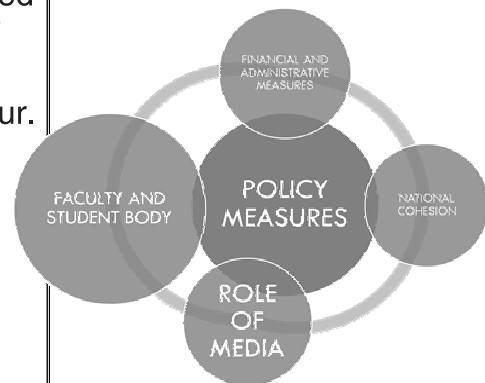
16. Lack of Infrastructural Facilities.

Bail-Out Plan for Pakistan's Education System:

Need of the Hour.

- Clarity of the Vision.
- Independent Thinking .
- Knowledge based economies are ruling the world.
- Acquisition of modern knowledge and pedagogical skills is imperative.
- Development of an educated work force.
- Transformation of the liabilities into assets for the economy.
- Education to be made attractive for all the stake-holders.
- Brain drain to be curbed.
- To inculcate in ourselves the zeal to work for Pakistan.

Need OF the Hour.



Bail-Out Plan for Pakistan's Education System:

Policy Measures

- We need to know the definition of education.
- We have to define what we aim to achieve through education.
- Pakistani Expert educationists and academicians to be consulted in making the education policy.
- Case studies of education systems of various countries to be undertaken.
- No need to waste time on making new models to revamp this sector, the existing policies and the paper work should be revised and without any delay, policies should be implemented.

Bail-Out Plan for Pakistan's Education System:

- Primary education should be made free and secondary education should be subsidized.
- Education till intermediate should be made compulsory for everybody, across the board.
- Science and technology and R & D should be given more importance.
- Public-private ventures to be taken up.
- The aim of all the efforts should be to attain national cohesion.

Bail-Out Plan for Pakistan's Education System:

Financial and Administrative Measures

- Every new born should be registered and he should be entitled to education by the state.
- Adequate percentage of the budget to be allocated to restructure the education system.
- Strict investigation and supervision needed for the disbursement and proper allocation of funds.
- Transparency in the allocation and usage of funds and grants from the international and local donors.

Bail-Out Plan for Pakistan's Education System:

- Removal of implementation gaps.
- Measures to reduce the disparities between the public and private sectors through taxation.
- Subsidies to be given to the public schools .
- Monitoring teams to be formulated to evaluate the performance of the public schools availing the subsidies.
- Exchange programme between private and public schools to be made mandatory. And penalties to be imposed on the violators.
- Standard of Public schools to be raised through financial aids, technical training programmes, student counseling and awareness through media.

Bail-Out Plan for Pakistan's Education System:

- Removal of ghost schools.
- Allotment of trained faculty and councilors for the rural areas.
- Madressahs should be registered. All those suspected to be involved in spurious activities should be banned immediately.
- They should be made part of the main stream education system.
- Sincerity, dedication, commitment at all levels, can turn our fate around.

Bail-Out Plan for Pakistan's Education System:**Measures for the faculty**

- Respect to be given to the teachers.
- Teachers should take pride in their profession.
- Recruitment criteria to be defined.
- Teachers should realize the magnitude of responsibility on their shoulders.
- They should act as the agent of change.
- They can either develop or destruct a child's mind.

Bail-Out Plan for Pakistan's Education System:

- Remuneration scales to be made attractive.
- Regular teacher training programmes to be arranged.
- Teachers to be involved in policy making.
- Private and public sector teachers to have interaction on regular basis. Both should be exposed to each other's enabling environments.
- Postings and transfers and promotions of the teachers to be made on merit basis.
- Concerted efforts to be made to filter out the incompetent staff, and replace them with honest, diligent and competent people.

Bail-Out Plan for Pakistan's Education System:**Education leading to national cohesion**

- The disparities between the private and public education system to be minimized.
- Curricula need to be revised and made homogenous for both the public and private schools.
- Huge emphasis to be laid on the character building of the students.
- Awareness classes to be arranged both for the faculty and the students.
- Community services programmes to be arranged by both the government and the people.

Bail-Out Plan for Pakistan's Education System:**Role of the Media**

- Media to be used not for publicizing political gimmicks such as "Parha Likha Punjab," but for communicating the actual measures being taken by the government.
- Media to play a n instrumental role in galvanizing the philanthropists and the volunteers to come forward and render their services.
- Students to be apprised of any activities being arranged at the national or international levels,
- Role of a teacher to be appreciated and acknowledged.
- Parents to be addressed and apprised of the need to send their children to schools.

A Review of National Educational Policy of Pakistan

Dur-e-Nayab



Constitution of Pakistan on Education

State shall be:-

“responsible for eradication of illiteracy and provision of *free and compulsory* education *upto secondary level*, within minimum possible time”

(Article 37-B, Constitution of Pakistan)

THE CHANGING WORLD

The World Today

- ☼ Over 6 billion people inhabit the earth, an increase of 140 per cent over the past fifty years
- ☼ One Fifth of humanity survive on less than one dollar a day
- ☼ About 1.1 billion people lack access to safe drinking water
- ☼ 7.7 million children die before their first birthday
- ☼ 25% of 4,630 mammal species and 11% of 9,675 bird species are on the verge of complete extinction
- ☼ 20-30% population of Sub-Saharan Africa is HIV positive.

The World in Next 50 Years

- ☼ Population 9.5 Billion by 2050
- ☼ Fossil Fuel Resources 80% Reduction by 2050
- ☼ Rain Forests 45% Reduction by 2050
- ☼ Life Expectancy Closer to 100 years
- ☼ Urban Population More than 60% globally

Living in a Changing World-----

the only constant is change

New biology is decoding the blue print of life, learning to manage the placement and expression of genes and mobilizing microorganisms to do our work for the production of new products

New innovations are altering and expanding the notions of development.

Living in a Changing World

Technology is the great divider---
the rich are getting richer and the poor, poorer

World is inflicted with poverty,
hunger, disease, conflicts, violence,
& economic uncertainty



Socio-Economic Development



Pakistan---A Promising Program

- S&T Budget increased 6000%!!!
- Higher Education budget increased 1,200%!!!
- Full support from President of Pakistan
- A real beginning after 50 years of lip service

OUR EDUCATION POLICY

Salient Features of National Education Policy (1998-2010)

- **Universal Primary Education**
- **Diversification of General Education**
- **Decentralization of Education**
- **Modernization of Curricula at all levels**
- **Madaris Education**
- **Public-Private Partnership**
- **Quality Assurance**
- **Gender Responsive Education**

1. Universal Primary Education:

- a. More than 7 million primary school age (5-9) children are left out.
- b. Approximately 45% children drop out of school at primary level.
- c. About one-fourth of primary school teachers are untrained.
- d. Learning materials are inadequate and of poor quality. Teaching methods are harsh and uncongenial for learning and motivating pupils and
- e. Character building, which is the basic and fundamental objective of education and training; is neglected; creating serious problems both for the individual and the nation.

[<< Back](#)

2. Decentralization in Education:

- a. Meager resources for education seek amelioration in more transparent, accountable and efficient management.
- b. Moving the decision making process as close to the source of action as possible.
- c. Demand for increasing local participation in choosing and managing education by the communities and the students.

[<< Back](#)

3. Madaris Education:

- a. To evolve an integrated system of national education by bringing Deeni Madaris and modern schools closer to mainstream in curriculum and the contents of education.
- b. To eradicate sectarianism and enhance prospects of employment.

[<< Back](#)

4. Public Private Partnership:

- a. Strengthening the delivery of education services through greater NGOs and Private Sector involvement.
- b. Restructuring and reorganizing the National and Provincial Education Foundations in their targeting and resource mechanism in support of private sector and NGO initiative in needy area.
- c. Forming regulatory Bodies to regulate activities and smooth functioning of privately managed schools and institutions of Higher Education through proper Rules and Regulations.

[<< Back](#)

5. Quality Assurance:

- a. Improvement in provision of infrastructure and human resources for primary education.
- b. Provision of improved curriculum and teaching-learning materials.
- c. Improving the quality of teaching-learning process.
- d. Attention to continuous professional development.
- e. Establishment of Educational Assessment System.
- f. Strengthening and upgradation of Teacher Training institutions.
- g. Setting-up Academic Audit through linkage of cash awards / incentives with quality.
- h. Developing a National Strategy for Information Communication Technologies (ICTs).

[<< Back](#)

Future Plans

1. Tripartite Partnership:

- The role of family, the community and the State. All need to be mobilized.

2. Free Education Up to Matriculation:

3. Provision of Free Textbooks:

4. Grant of Scholarships and Incentives to Girl Students:

5. Availability and Accessibility of Schools Particularly in Rural Areas.

Continue...

6. Teacher's Status and Recruitment of Female Teachers:

- Better status and pay for teachers.
- Experience has demonstrated that schools with female teachers function well particularly at Primary level.

7. Improvement in Learning Environment:

- Better infrastructure through School Management Councils.

8. Technical / Vocational Education:

- It is important to provide demand related skills.

9. Instructional Methods:

- Emphasis must be given on development of analytical faculties of the students.

Continue...

10. Teachers' Training and Knowledge:

- To improve teachers' knowledge of the subject and equip them with a wide repertoire of teaching skills.

11. English Language:

- Introduction of English from Class – I.
- Future policy reforms will emphasize the teaching of science subjects in English at public secondary schools.

EDUCATION FOR ALL

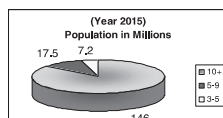
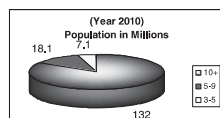
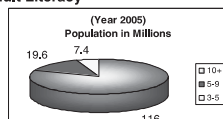
Salient Features of National Plan of Action

Population Structure/Distribution (3+ Age Groups)

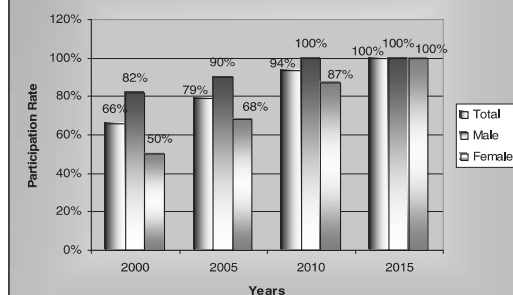
3-5 Age Group - Early Childhood Education

5-9 Age Group - Primary Education

10+ Age Group- Adult Literacy

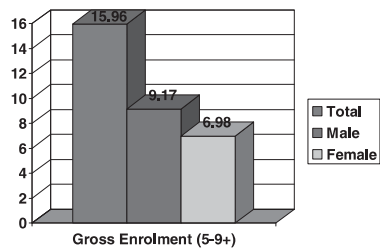


Primary Education - Net Participation Rate Targets (Selected Years)



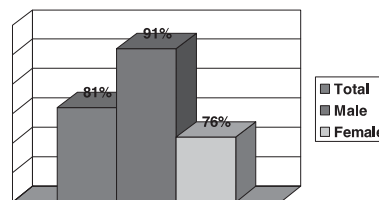
PRIMARY EDUCATION (5-9+ Age Group) Gross Enrolment 2005

■ Total	=	15.96 million
- Male	=	9.17 million
- Female	=	6.98 million

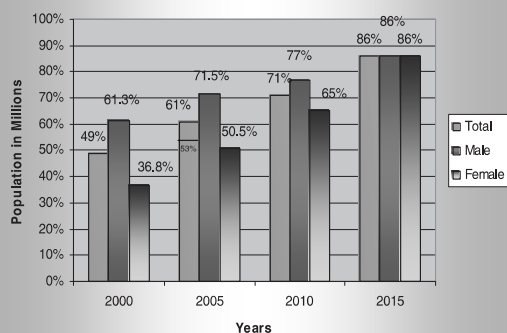


Primary Education (2004-05) Gross Participation Rate (5-9+ Age Group)

■ Total	=	81%
- Male	=	91%
- Female	=	76%

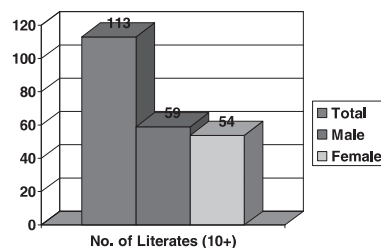


Adult Literacy Rate Targets



ADULT LITERACY (10 + Age Group) (2004-05)

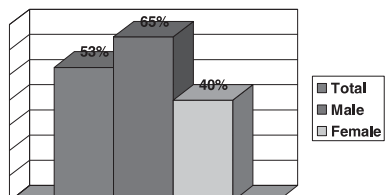
■ Number of literates (10+)	=	113 million
- Male	=	59 million
- Female	=	54 million



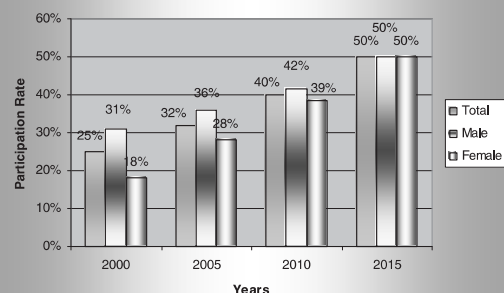
Adult Literacy (10+ Age Group) Gross Participation Rate (2004-05)

■ Adult Literacy Rate(5-9+)	=	53%
- Male	=	65%
- Female	=	40%

Gross Participation Rate

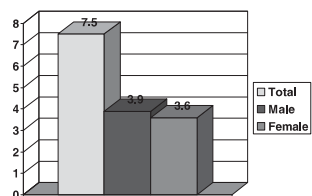


Early Childhood Education - Net Participation Rate Targets (Selected Years)



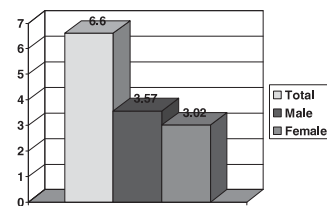
Early Childhood Education Population (2004-2005)

- Total = 7.5 million
- Male = 3.9 million
- Female = 3.6 million



Early Childhood Education Gross Enrolment 2005

- Total = 6.60 million
- Male = 3.57 million
- Female = 3.02 million



Keys to Success

- **Courage to dream great dreams** — and hard work/tenacity to transform them in to reality
- Identifying and **grooming the brightest manpower** ---merit based system
- Focusing on **cutting edge technologies in market oriented disciplines**
- **Moving fast!** but--- sense of urgency must be combined with striving for perfection
- **Optimism** ---Taking failures as challenges
- **Focus---Focus-----Focus !!**

THANK YOU

Strengthening Classroom Instructions

Shaista Bibi

Challenges for Socio Economic Development in Pakistan:
Role of Science and Technology

Strengthening Classroom Instructions



By
Shaista Bibi

Fatima Jinnah Women University
Rawalpindi

Background

- Socio Economic Development of Pakistan: A challenge for the nation
- Manpower: A key to the socio economic development of a country
- There is a need to make the manpower stronger
- Education is a key to the development of manpower and to the development of a nation

A famous saying...

- “Upon the education of the people of this country, the fate of this country depends”.

Benjamin Disraeli
(A British Prime Minister)

Development

Manpower

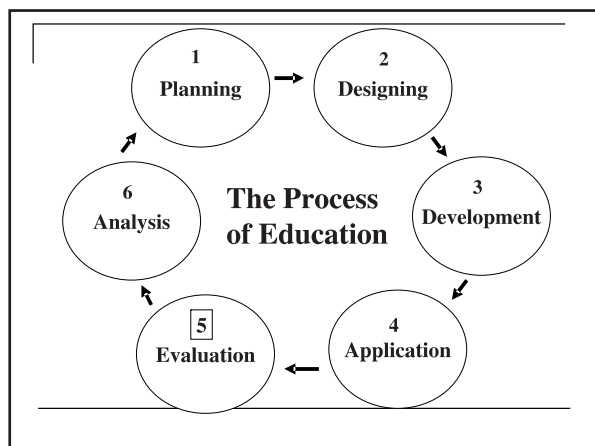
Education

Education: Issues and Challenges

- Every body needs his/her basic rights to be fulfilled
- Education: one of the basic rights of human beings
- A great number of Manpower in this country is not getting its this basic right
- Those who are getting education, are not attaining it in its true sense
- So we are unable to produce strong manpower

Education in its real sense

- Education is not one or two day process comprising limited activities
- But it is a complete life long process
- To produce stronger manpower it is necessary to make the process of education stronger
- If the process is not strong, the product will not be strong
- We misunderstand the process of education by confusing it with the term “Instruction”



Problems in the Field of Education

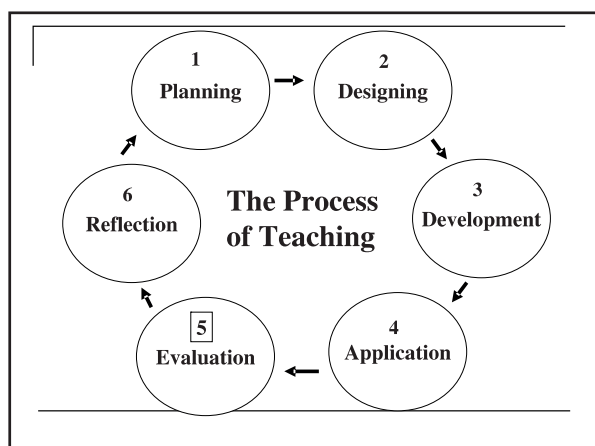
- All of the stages of Education Process are interdependent
- The problems that we encounter in the field of education actually lie in any of the following stages of educational process:
 - Planning
 - Designing
 - Development
 - Implementation
 - Evaluation
 - Analysis

Problems continued...

- Problem in one field can affect all the others
- Due to the low quality of educational process, the following problems may appear:
 - low quality curriculum
 - faculty without specialization or proper training
 - poor quality instructions
 - low enrollment rates in schools,
 - more drop out rates,
 - gender disparity in education,
 - lack of resources (human & non-human),
 - lack of facilities,
 - many other problems depending upon institute to institute

How to overcome these problems?

- Involvement of the stakeholders in complete process of education especially the teachers
- But in present times the teachers are directly involved with the implementation process which is classroom instruction
- So the teachers must strengthen the implementation process i.e. classroom instructions



Classroom Instructions

- A great number of teachers are not aware of the actual teaching process
- From planning to evaluation teachers are not aware of the requirement of each stage
- They cannot design the objectives, which can fulfill the requirements of the learners
- They cannot create a balance between the curriculum and instructions.

Continued...

- They cannot utilize from the instructional technologies to improve their instructions.
- They hesitate to adopt new teaching methodologies and resources by considering them as wastage of their time and efforts
- They cannot evaluate the progress of the students in the light of the objectives.

Continued...

- They do not conduct action researches to improve the quality of their instructions.
- They hesitate to accept their weaknesses and they also hesitate to share their experiences with their seniors, juniors and other colleagues.
- There may be one or more than one of the above problems in the teaching learning process, which can affect the quality of teaching and learning process

Recommendations

- There is a dire need to adopt the process in its real sense and to make the other people aware of these processes.
- Collaborative action research among all these stakeholders is required to be conducted so that they can get benefit from the experiences of one another.
- The results of these action researches may be shared on broad levels.

Continued...

- Training workshops and seminars for these teachers may be arranged and they will be encouraged to publish their productive work.
- We talk about solutions on different forums, we discuss different solutions and decide one of them to be implemented, but when we return to our home institutions we forget all the decisions made.
- This is the major reason for most of the educational problems. If we avoid this practice, it can be certainly said that we will be able to overcome most of our problems.

Thank You

OUTCOME (TECHNICAL SESSION - I)

Theme: Education

Subject Experts: 1. Dr. Inam ur Rahman
2. Dr. S.M. Junaid Zaidi

Presentations by: 1. Ms. Zubda Rashid
2. Ms. Dur-e-Nayab
3. Ms. Shaista Bibi

Problems-identified in the Session	S&T-led solutions
Education is seen in a limited perspective, i.e., a transfer of knowledge from teacher to student	Implement the broader aspect of education to enhance creative thinking capacity and create a critical approach with the help of S&T.
Utter disconnect prevails between different systems of education. There is an obvious divide between public, private institutes and madrassas. (3 tiers)	Minimize disparity by initiating public-private partnerships to harmonize the different tiers. Uniform S&T curricula for all.
Dearth of trained S&T teaching staff, improper remuneration, less productive manpower. Number of failed public schools, particularly those teaching science, is rapidly increasing.	- National cohesion of faculty and students using S&T (orientate and expand programmes). - Training on new instructional and classroom technologies. - Workshops and seminars for science and teachers' training in rural areas. - Failed public schools to be handed over to private educational organizations.
Low quality/obsolete curriculum, not competitive with international standards, lack of well equipped laboratories.	- Uniform curricula development, empowering individuals to make use of S&T based solutions. - Curricula should be aimed at empowering the individuals. The main focus should be on S&T rather than other disciplines. Stakeholders and teachers should be involved in designing curriculum. - Introduce English language in schools at first grade level. - Collaborative action-oriented research should be conducted to improve the curriculum

Unavailability of skilled technical labour in Pakistan	Purposeful education; technical colleges should be established at two levels, i.e., after primary and after matriculation for developing skills and skilled workers, e.g., skilled plumbers, electricians, mechanics licensed to work rather than learning by hit-and-trial methods.
Low enrollment and high drop-outs	Financial incentives for education, technology-based classroom instructions, and additional I.T. education.
Hesitation in technology adoption.	Recent technology development makes technology-based education and training easier to design, develop and deliver, than was possible before. Promotion of awareness to adopt technology is necessary.
Rural areas grossly neglected for education.	Set-up multipurpose tele-centres, link them with Virtual University programmes. These tele-centres should not be mixed up with internet clubs. Media should play its due role in extensively promoting educational programmes through web-based radio and TV channels.
Lack of finances for S&T-led solutions. Average budget spent for the last few years is the same, although the population is increasing.	Increase in budget for education and teacher-training programmes. Introduction of new concept-clearing technologies.

At the conclusion of the discussions of the technical session on 'Education', Dr. Samar Mubarakmand, the Member Science and Technology, Planning Commission of Pakistan, addressed the participants. He advised the young discussants to develop quest for knowledge and habit of experimentation, build self-confidence and set high goals for life. He emphasized the need to find S&T based solutions for socio-economic problems. He pointed out that Pakistan's precious mineral resources should be exploited with new scientific techniques and local R&D work. In this regard, the country's energy crisis could be dealt with by using Thar coal as fuel in electric power plants. The abundant coal resources in the country could suffice to meet energy requirements for several decades. Similarly, there are huge gold and copper deposits in Balochistan that can bring wealth and prosperity to Pakistan, if exploited and value-added by utilizing Pakistan's own scientific and technical resources. He urged the youth of the country to give importance to these types of beneficial endeavours in their future careers.

HEALTH

Subject Experts

1. Dr. Birjees Mazher Kazi
Executive Director
National Institute of Health (NIH)
Islamabad.
2. Dr. Sania Nishtar
Founder President and Executive Director
HeartFile, Pakistan
Islamabad.

Presentations by:

1. Ms. Hina Fazal
Scientific Officer
PCSIR Complex
Peshawar.
2. Ms. Safia Bibi
Research Officer
Pakistan Medical Research
Council (PMRC)
Jinnah Post-graduate Medical Centre
Karachi.
3. Dr. Saira Bashir
Medical Officer
Pakistan Medical Research
Council (PMRC)
Fatima Jinnah Medical College
Lahore.

KEYNOTE ADDRESS

by

Dr. Birjees Mazhar Kazi

Executive Director

National Institute of Health (NIH), Islamabad

Noted Scientists, Ladies and Gentlemen; it provides me a welcome opportunity to extend heart-felt gratitude to the organizers and especially Dr. Imtihan Elahi Sahib and Dr. Hasibullah Sahib who personally visited NIH to update about this activity and kindly invited me as resource person for the session on health.

Ladies and Gentlemen let us once again refresh our memories with the meanings of the key words used in today's theme. Please forgive me for a while for taking up basics. This I believe is crucial for a more logical and eventful discussion. I am forced to do so in the backdrop of finding role of science and technology vis-a-vis challenges for socio-economic development in Pakistan. We shall then see where and how health enters this scenario.

According to Oxford Dictionary the word Social means; relating to society or its organization. And Society, the sums of human conditions and activity regarded as a whole, functioning interdependently. The word Economy, means the wealth and resources of a community, especially in terms of production and consumption of goods and services.

Human activity for the sake of a society is inter-dependent, but finally measured as a whole and quite obviously the wealth and resources of a community in terms of production and consumption of goods and services has, therefore, a direct link with the human activity. At this point one finds comfortably placed concluding that the simultaneous use of term socio-economic development is quite logical.

What crucial connections science has with Socio-Economic Development? What is Science and what is Technology. Science, according to Oxford Dictionary means a branch of knowledge conducted on objective principles involving the systematized observation of an experiment with phenomenon, esp. concerned with the material and functions of the physical universe. The Technology, means, the study or use of the mechanical arts and applied sciences. It becomes therefore evident that the systematized observations of experiments on the use of mechanical arts and applied sciences contribute meaningfully in prosperity and overall growth of a society.

The level of socio-economic growth in a society at a given point in time can be measured mathematically by working on three indicators of famous HDI i.e. Human Development Index. These indicators include the life expectancy, educational attainment and the per capita real income (or purchasing power parity). It is important to note that educational attainment is different from literacy, as literacy enables an individual to explore knowledge and information, while education prepares the mind to use this knowledge and information for future. Therefore education attainment is a combination of adult literacy rate and primary, secondary as well as tertiary school enrolment ratios. The HDI sets the level of ideal per capita real income around US\$5,000 per annum. Given the basic necessities of life, and a clean and healthy environment, the life expectancy should be around 85 years according to the human development index.

Long-life and good health of course demands structured scientific efforts and healthy life styles adopted as a result of awareness about oneself and the environment. The diseases, whether pre-or post-transitional overcome individuals and communities when they find space to do so. This may happen because of weakening immune systems or elimination of natural barriers, like shelter, availability of clean water and food between humans and diseases. The genetic diseases, like diabetes and hypertension may unmask themselves at an early age because of life styles, whereas communicable diseases like HIV and some forms of hepatitis could also be caught because of certain behaviour and life styles. However, finally we have to be aware of the fact that adding life in to years is wiser than adding years in to life.

The health and population scenario in Pakistan is characterized by high fertility, low life expectancy, high maternal and child mortality, high incidence of communicable diseases, and malnutrition. "Health" in Pakistan is a provincial subject and is independently dealt by provinces for operational purposes. For the purpose of institutional management, the Federal Ministry of Health is responsible for some institutions in Islamabad, Karachi, Lahore and airport/sea/boarder health authorities, besides dealing with matters relating to policy coordination, major vertical public health programmes and disease surveillance. Capital investment in health is financed through Annual Development Programme (ADP) that also includes external funding. The Federal Government also substantially finances provincial development budgets.

Existing health services in Pakistan have been inadequate in terms of coverage and effectiveness. The resources have mostly been skewed towards curative services rather than the preventive measures. Some federal programmes do have a large/essential component of preventive health care but they lack a horizontal coordination. The private sector's role despite its enormity is generally deficient on preventive medicine.

The communicable diseases (CD) and public health threats have always posed mammoth challenges for the health authorities and governments all over the world. Only a few of CDs hang about in the country where detected first; the majority of micro-organisms cross geographical barriers, generating mutant and more resistant strains. The global traffic and trade, catastrophes, wars, urbanization, poor water management, inadequate waste disposal and sanitation systems, ecological changes and droughts are paving ways for appearance of new microbes and re-emergence of old diseases. The preventable health risks like antimicrobial resistance mainly because of under/over and misuse of antibiotics, food-borne illnesses and environmental threats also merit full attention.

The focused surveillance and control measures can effectively check the spread of CDs and public health threats. This would however be effective only if complemented by timely and accurate laboratory diagnoses and reporting. Good quality laboratory results are also critical for establishing readily available information data base about the occurrence and pattern of communicable diseases to ensure the success of disease surveillance, forecasting, planning, resource allocation, preparedness, prevention and control by the relevant health authorities and disease control programmes functional at national and international levels.

The communicable diseases, when occur as outbreaks, epidemics and /or pandemics, devastate social fabric causing colossal economic damages to the societies, which are more lasting and adverse for developing and under developed communities. The non communicable diseases like cardiovascular, Reproductive health, injuries, nutritional deficiencies, psychological disorders are also on the increase mainly because of life styles, bad food-taking habits, lack of awareness, illiteracy, hurries and worries associated with modern day life.

We are living in the era of Science, and according to Galileo, science is not about opening your yes to wisdom but closing eyes to ignorance, and Hippocrates said that "There are in fact two things, science and opinion, the former begets knowledge, the later ignorance". To produce knowledge and facts, we revert back to science. Science insists on argument and thoughtfulness. Your group here and many more outside this room will make the future of our country. With the guidance of the experience of their seniors this young cohort will take up this challenge and propose how to begin since someone said *"successful people don't plan results, they only plan beginning"*. **Einstein** once said that "I am not afraid of future, it comes soon".

The life skills, which youth require for attaining their goals and set the ball rolling as good beginning in a smooth and calm manner are:

1. Decision-making
2. Problem solving
3. Coping with stress
4. Confronting with pressure
5. Assertiveness
6. Communication
7. Negotiation

Role of Taxonomy of Medicinal Plants in the Socio-economic Uplift of Pakistan

Hina Fazal

"ROLE OF TAXONOMY OF MEDICINAL PLANTS IN THE SOCIO-ECONOMIC UPLIFT OF PAKISTAN"

by
HINA FAZAL
M.Phil Scholar
Dept. of Plant Sciences
QAU, Islamabad

SCIENTIFIC OFFICER
MEDICINAL BOTANIC CENTRE
PCSIR LABS.COMPLEX
PESHAWAR

TAXONOMY

- Identification
- Nomenclature
- Classification

MEDICINAL PLANT

- Plants used directly or indirectly in the extraction of drugs for the treatment of ailments
- Trend of Investigation/Isolation of constituents of medicinal plants started in 19th century
- Finally treatment with pure constituents completely replaced crude natural drugs

AREAS SUPPORTED BY TAXONOMY

- | | |
|--|---|
| <ul style="list-style-type: none">• EXPLORATION & EXPLOITATION
Identification of plant resources
New & Novel Taxa
To introduce new plant like <i>Stevia</i> spp | <ul style="list-style-type: none">• TRADE
To check Adulterations/ Substitution/ Contamination
Value addition
Substitution
Authenticity/ Standardization of Folk MAPs |
| <ul style="list-style-type: none">• FLORA OF PAKISTAN
Fulfill the gaps in flora
Documentation of Ethnobotanical data
Herbarium/Gene bank development | <ul style="list-style-type: none">• CONSERVATION (In-Situ/Ex-Situ)• CULTIVATION TECHNOLOGIES
MAPs as cash crop
Botanical Gardens/ Experimental Farms |

MAJOR ISSUES

- Thorough traverse for identification of new & novel taxa lacking
- Hundreds of species still waiting to be investigated/ documented
- Accessibility to the said areas difficult, because little data available regarding their ecological and ethno botanical aspects
- Flora of Pakistan is not compiled yet
- Lack of Applied Research
- MAPs available in trade have ambiguous identification (Adulteration/ Substitution)
- Labels on the herbal products do not mention correct plant species due to lack of taxonomical expert in industries

Cont...

- Benefit is not taken of the indigenous resources through value addition
- Despite the technical competence available for standardization of product has not been witnessed in manufacturing industries
- Indigenous Materia Medica often wasted/not utilized for product development or industrial utilization
- Rely upon import on the cost of valuable foreign exchange
- Lack of Interaction of Academia-Industry-Govt.
- Gap in the knowledge of processing of Materia Medica in accordance with the required international standards of quality, purity and safety
- Depletion of Plant Resources (Conservation)
- Lack of development of cultivation technologies of MAPs

WHY EXPLORATION?

BIODIVERSITY

- About 300,000 species world wide
- Aquatic species: 500,000
- Estimates of higher plants is 200,000 - 250,000
300 families & 10,500 Genera (Trease & Evans, 2005)
- 5 - 10% acknowledged through scientific evaluation
- Approx. 5 - 100 million yet to be discovered
- Specially in the developing countries like Pakistan
- Living in the world since 100s of years
- Disable to identify them or give them names

AGRARIAN ECONOMY AND WORKFORCE OF PAKISTAN

Geographical Area	79.1	(million hectares)
Mountains and Desert	40.50	(million hectares)
Forest	03.79	(million hectares)
Cultivable Area	22.16	(million hectares)
Irrigation System Covers	15.80	(million hectares)
Total Plants	5700-6000 (Nasir & Ali 1970)	
Medicinal Plants	1010	
Endemic plants	410-420	
Total Population	171 million	
Rural	70%	
Urban	30%	
Farmers and related Laborers	51 million (approximately)	
Herbs collectors (Forests)	10,000 (approximately)	

GEOGRAPHICAL SIGNIFICANCE OF PAKISTAN FOR PLANTS

- Earth is divided into 238 eco regions (United Nation, National Geographic Society with WWF)
- Five of them in Pakistan
- Global eco regions of Pakistan are:
Rann of Kutch flooded grasslands
Tibetan Plateau
Western Himalayan Temperate Forests
Indus Delta Ecosystem
Arabian Sea

DON'T YOU THINK
PAKISTAN
NEEDS EXPLORATION
FOR
MORE?

PLANT BIODIVERSITY IN PAKISTAN

- Included elements of the 6 phytogeographic regions
- 7.8% species are endemic to Pakistan
- Kashmir Himalayas identified as global centre of plant diversity/endemism
- 80% endemics found in the northern and western mountains (Ali & Qaiser, 1986)
- Families with more than 20 recorded endemics are

Papilionaceae	57
Asteraceae	49
Umbelliferae	34
Poaceae	32
Brassicaceae	20

EXAMPLE OF ENDEMISM

FAMILY: PAPILIONACEAE
GENUS: *ASTRAGALUS* L.
SPECIES: 2500-3000 (Worldwide)
PAKISTAN: 139 spp.

FLORA OF PAKISTAN

PHASES OF FLORISTIC/ TAXONOMIC STUDIES

- Pioneer phase
(Tropics & Developing countries)
- Consolidation phase
(Southern Europe & Near East)
- Biosystematic phase
(North Western & Central Europe, North America & Japan)
- Encyclopaedic phase

CURRENT STATUS OF FLORA OF PAKISTAN

- 214 Families are published so far with the support of other countries
- Last published (2005) by S.I. Ali
 - Asphodelaceae
 - Convallariaceae
 - Hemerocallidaceae
 - Hyacinthaceae
- 25% of the species in Pakistan, yet to be treated

CURRENT STATUS OF FLORA OF PAKISTAN

- That include notably complex and spacious groups like
(approx. number of genera/species):
 - Cactaceae (2/7) Liliaceae (25/63)
 - Asteraceae (130/615) 3 tribes published
 - Myrtaceae (7/13) Rosaceae (26/159)
 - Scrophulariaceae (37/162)
- Remaining treatments are as yet unassigned
- Work require fieldwork and travel to foreign herbaria

QUESTION?

Whether Taxonomists will record
the remaining unclassified organisms
before
other people succeed in
DESTROYING
Them?

TRADE OF MAPS

TRADE OF MAPs

- According to WHO 80% of the world population depends on traditional medicines (Akerle 1993)
- Annual world requirement of herbal drugs exceeds US \$ 11 billion
- In USA 25% drugs of plant origin, imported from developing countries
- Increasing interest in herbal remedies, global trade volume of approx. 60 billion US \$ — US \$ 5 trillion (2050) (Karki 2002)
- Pakistan is amongst the eight leading countries that export medicinal plants

TRADE OF MAPs

- Various regions of Pakistan like Dir, Swat, Chitral, Kashmir, Northern area, Kaghan & Gallies forest entering as crude materials in international trade day by day
- 400 Manufacturing Units of Herbal Medicine are existing in the Country, receiving Materia Medica from 1300 Suppliers, Collector, Traders, Shopkeepers and Whole Sellers
- Indigenous trade volume was Rs:5 billion (products of 400 herbal industries)
- According to the EPB (1999) 8,500 tons of crude medicinal herbs were exported which fetched \$ 6 million (Crude drugs, Products)

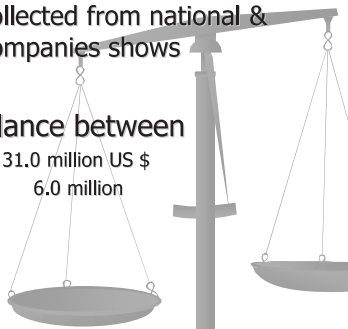
INDUSTRY	EXPORT VOLUME US \$ (Million)
•Hamdard Laboratories	1.450
•Herbion Pvt. Ltd.	0.900
•Hashmi Pvt. Ltd.	0.135
•Qarshi Pvt. Ltd.	0.050
•Tayyabi Dawakhana	0.020
•Marhaba Pvt. Ltd.	0.020
•Medics Pvt. Ltd.	0.015
•Others	0.800
Total	3.390

EXPORT versus IMPORT 6% : 31%

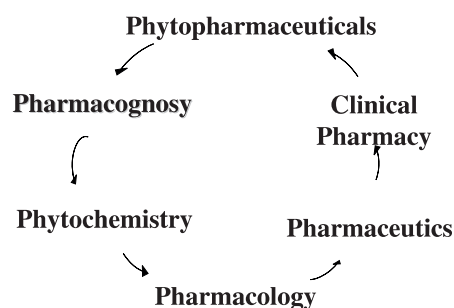
- In 1999 data collected from national & multinational companies shows

Imbalance between

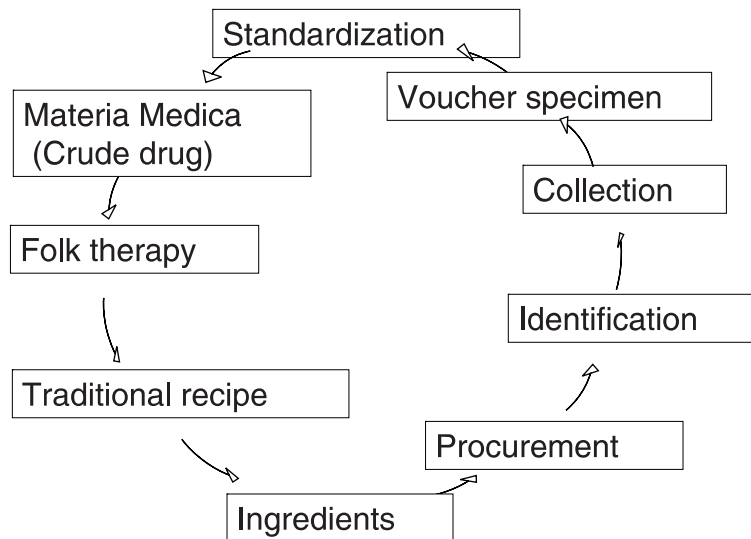
- Import bill 31.0 million US \$
- Export bill 6.0 million



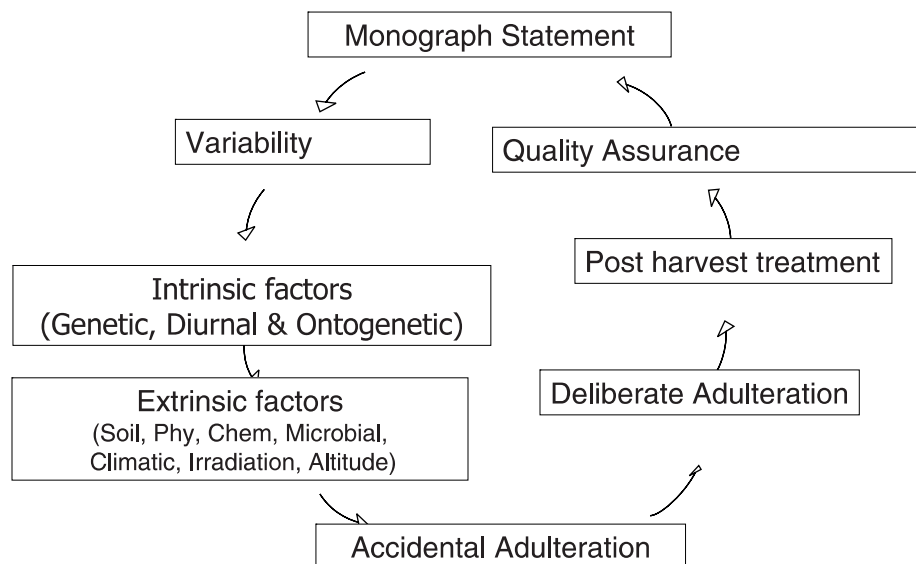
Development of Herbs into Traditional Medicine Inputs Required



Pharmacognosy



Standardization of Traditional Materia Medica



TAXONOMY CHECK ADULTERATIONS & SUBSTITUTION

TRADE NAME	Real species/ Official drug (Unani sys)	Adulteration/Substitution
Banafsha	<i>Viola odorata</i>	<i>Viola canescens</i> , <i>Viola kashmiriana</i> , <i>Viola pilosa</i> <i>Viola stocksii</i> , <i>Viola rupestris</i>
Gul-e-Babuna	<i>Matricaria recutita</i>	<i>Microcephala lamellata</i> , <i>Tripleurospermum disciforme</i> , <i>Parthenium hysterophorus</i> , <i>Pulicari spp.</i>
Gul e Gozaban	<i>Echium amoenum</i>	<i>Onosma bracteatum</i>
Gul-e-Ghafiz	<i>Gentianodes olivieri</i>	<i>Delphinium zalil</i>
Gul-e-Khaira	<i>Althaea officinalis</i>	<i>Alcea rosea</i>
Samandar Sok	<i>Salvia plebeia</i>	<i>Argyrei speciosa</i>
Zafran	<i>Crocus sativa</i>	<i>Raphanus sativa</i>

VALUE ADDITION

- Dry, soft and fluid extracts of the medicinal herbs traded on the global level
- Used in the traditional systems of medicine for the treatment of myriad illnesses

Artichoke	Astragalus	Billberry
Bladderwrack	Boldo	Butcher's broom
Chamomile	Centella	Echinacea
Eleutherococcus	FrangoSelect	Gentian
Ginseng	Guarana	Harpagophytum
Hawthorn	Horsechestnut	Kola
Lespedeza	Lobelia	Melilotus
Passion flower	Peruvian bark	Perselect
Rhubarb	St. John's wort	Senna
Silymarin	Turmeric	Uva-ursi
Valerian	Aloe	Calendula
Capsicum	Polygala	



Species: *Echinacea purpurea*
 Common name: Echinacea
 Contents required: 5 % echinacoside
 Form required : Dry Extract
 Medicinal Uses: Increase body resistance to diseases, Boils, Cancer, Antiseptic, Aphrodisiac, Diphtheria, Putrid Fever



Species: *Silybum marianum*
 Common name: Milk thistle, Unt katara
 Contents required: 70% flavonoids, Silymarin
 Form required : Dry Extract
 Medicinal Uses: Jaundice, Demulcent in catarrh, Anticancer, Snake-bites, Hydrophobia, Dropsy, Blood Cleaner, Liver cirrhosis, Sudorific



Species: *Matricaria chamomilla*
 Common name: Chamomile
 Contents required: 1.0 % total apigenin and 0.5% essential oil
 Form required : Dry Extract
 Medicinal Uses: Carminative, Sedative, Tonic, Nerve sedative, Tonic upon gastrointestinal canal, Earache



Species: *Aesculus hippocastanum*
 Common name: Horse chestnut
 Contents required: 20% triterpene saponins calculated as Aescin
 Form required: Dry Extract
 Medicinal Uses: Tonic, Narcotic, Febrifuge, intermittent fever, ulcer, Rheumatism, Renal complaints

SUBSTITUTION GENUS: *ASTRAGALUS* L.

SPECIES	ENDEMISM LOCALITY	USES OF RELATED SPECIES
<i>Astragalus affghanus</i>	Chitral, Baluchistan	1. <i>A. hamosus</i> (Purtuk) Plant is emollient, demulcent, laxative etc
<i>Astragalus brahuicus</i>	Baluchistan	
<i>Astragalus chitralensis</i>	Chitral	2. <i>A. heratensis</i> (Gabina) Subs. For tragacanth gum
<i>Astragalus clarkeanus</i>	Karakorum	
<i>Astragalus flemingii</i>	Punjab	3. <i>A. multicep</i> (Kandiara). Seeds given for leprosy, demulcent, emollient
<i>Astragalus gahiratensis</i>	Chitral	
<i>Astragalus gilgitensis</i>	Gilgit	4. <i>A. strobiliferous</i> (Kon/ Jib) Gum is subs. For tragacanth
<i>Astragalus khalefatensis</i>	Baluchistan	
<i>Astragalus nicharensis</i>	Baluchistan	5. <i>A. tribuloides</i> (Ogai) Seeds demulcent, emollient
<i>Astragalus spp. A</i>	Chitral	
<i>Astragalus laspurensis</i>	Chitral	
<i>Astragalus lowarensis</i>	Chitral	
<i>Astragalus rhizecephalus</i>	Baluchistan	
<i>Astragalus toppianianus</i>	Chitral	

CONSERVATION

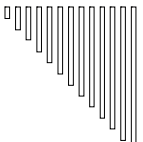
- 580-650 plant species (c. 12% of the flora) threatened or endangered
- Number would increase before work on the Flora is completed
- Natural hazards /Various anthropochores leading our precious flora to the verge of extinction
- Introduction of alien/ non-indigenous e.g *Broussonetia papyrifera*
- Lack of interest of new generation for documentation of traditional knowledge of plants
- Wastage of resources due to in-appropriate
 - Collection
 - Harvesting
 - Post-harvest treatment

POTENTIAL OF PAKISTAN

Pakistan has presently

- 225 Protected Areas
- 14 National Parks
- 99 Wildlife Sanctuaries
- 96 Game Reserves

Are these quite enough for conservation?

CULTIVATION OF MEDICINAL PLANTS				
 ☐ Pakistan is as agriculture country but cultivation of Medicinal Plants is very intermittent ☐ Based on the healthcare, precious natural resource and economic value in trade, efforts of cultivating them as minor crop are required	BOT. NAME	LOCAL NAME	PART USED	PRICE/KG
	<i>Matricaria chamomila</i>	Gul-e-Babuna	Flowers	Rs: 1500
	<i>Rauwolfia serpentina</i>	Chooti Chandan	Root	Rs: 720
	<i>Silybum marianum</i>	Unt katara, Poli	Seeds	Rs: 300
	<i>Achillea millefolium</i>	Baranjasaf	Herb	Rs: 192
	<i>Origanum vulgare</i>	Saatar	Herb	Rs: 160
	<i>Andropogon muricatus</i>	Khas	Aerial parts	Rs: 160
	<i>Gymnema sylvestre</i>	Gurhmaar	root	Rs: 128
	<i>Acorus calamus</i>	Bach	Rhizome	Rs: 120
	<i>Nigella sativa</i>	Kalonji	Seeds	Rs: 100
	<i>Psoralea corylifolia</i>	Babchi	Seeds	Rs: 80
	<i>Oryza sativa</i>	Chawal	Grain	Rs: 50-80
	<i>Triticum aestivum</i>	Gandam	Seeds	Rs: 30
	<i>Zea mays</i>	Makai	Grain	Rs: 20

PAKISTANI MATERIA MEDICA UTILIZATION IN INDUSTRY

COMMON NAME	BOTANICAL NAME	PART USED	TOTAL KG CONSUMP	MEDICINAL USES
Sana	<i>Cassia angustifolia</i>	Leaves	120,000	Laxative, Purgative
Amla Khushk	<i>Phyllanthus emblica</i>	Fruit	100,000	Cooling, Refrigerant, Diuretic, Laxative, Diarrhea, Jaundice, Dyspepsia
Haliara Zard	<i>Terminalia chebula</i>	Fruit	100,000	Astringent, Chronic ulcers & wounds, Gum diseases. Bark diuretic, Cardio-tonic
Kali Mirch	<i>Piper nigrum</i>	Seed	50,000	Aromatic, Cholera, Coma, Malarial fever, Sore throat, Piles, Stomachic
Amaltas	<i>Cassia fistula</i>	Legume	50,000	Laxative, Snake bites, Astringent, Tonic, Febrifuge
Saunf	<i>Foeniculum vulgare</i>	Seed	60,000	Aromatic, Stomachic, Vermicide, Purgative
Baranjasaf	<i>Achillea millifolium</i>	Flower	60,000	Diaphoretic, Stimulant, Tonic, Obstructed perspiration

SOLUTIONS

- Investigation of the unexplored areas
- Botanical & Chemical survey of medicinal plants / Commercial exploitation of MAPs
- Documentation of the flora of Pakistan
- Organization of scientific data (ethno botany of MAPs) in Black & White
- Promotion of use of indigenous resources instead of relying upon import
- Establishment of Taxonomy discipline in univ./ Scientific organizations/ Industries covering all branches of taxonomy
- Studies to develop isolation techniques/ indigenous technology

SOLUTIONS

- Develop new products & processes based on indigenous raw material
- Set up quality control standards in order to standardize herbal pharmaceutical industry
- Experimental cultivation of MAPs in appropriate ecological zones to get qualitative & quantitative improvement
- Identification and introduction of Cultivable MAPs/ substitutes for specific areas
- Development of cultivation, harvesting and post harvest technologies
- Transfer of technologies to the farmers/local communities
- Introduction of MAP's as cash crop to the local communities by bringing the barren lands under cultivation

SOLUTIONS

- Funding of plants related projects by Govt. / Special attention for exploration and conservation before extinction
- Awareness of local community on the importance of MAP's through training workshops/lectures/ brochures/ Pamphlets in local languages
- Sustainable use/ Relying on alternative fuel, forage and food resources
- Introduction of the threatened species in botanic gardens/ farms/ centers
- Improvement of substandard drugs by checking adulteration/ substitutions and contamination through taxonomic markers
- Traditional medicines should be given scientific lines on the pattern of Traditional Chinese medicine (TCM)

Yes, we think taxonomy is important,
But what can you
REALLY
offer the country?

OFFERS TO PAKISTAN

- Jobs Creation/ Employment
- Poverty alleviation
- Saving of valuable foreign exchange
- Import substitution
- Export boost
- National ex decker burden will be lessen
- Commercial exploitation will lead to the trade of those herbs which are currently in use by neighboring countries
- Addition in the overall competitiveness of Pakistan

LITERATURE

- Lajber Khan 2007. Country Paper for International Training Workshop on useful technology of TCM, Jinin, China. PCSIR, Peshawar
- Export Promotion Bureau of Pakistan 1999 & 2002
- Madhav Karki 2002. Medicinal & Aromatic Plants Programme in Asia IDRC/SARO. New Dehli India
- Chopra, R.N. *et al.* 1956. Council of Scientific & Industrial Research New Dehli, Glossary of Indian Medicinal plants.
- M. Grieve 1979. A modern herbal, London
- Mughal, M.S. 2006. Compendium on scientific, local, English names, Pakistan Forest Institute, Peshawar
- Aurangzeb Hassan *et al.* 2007. Authenticity of Folk Medicinal Plants of Pakistan
- Nasir, E. *et al.* (Eds). 1970-2002. Flora of Pakistan Fascicles 1 – 207.
- Maryum Akram 2004. Taxonomic Evaluation of Market samples of Medicinal Plant Parts used in Traditional Medicine in Pakistan. Ph.D Thesis
- Dr. Muhammad Aslam 2002. *Project on* Introduction of Medicinal Herbs and Spices as Crops (IMHSC), Islamabad

Thanks for your kind
patience

Health Issues Hurting Socio-economic Well being of Pakistan and their Possible Solutions

Safia Bibi

HEALTH ISSUES HURTING SOCIOECONOMIC WELL BEING OF PAKISTAN AND THEIR POSSIBLE SOLUTIONS.

Safia Bibi
Research Officer
PMRC Research Center
JPMC, Karachi

Socio economic development

may be defined as

continuous process of betterment of life quality through achieving goals in human resource development, building infrastructure (physical and institutional), developing capacities in science and technology and achieving standards in health, education and social sector (gender equality, life expectancy etc.).

HEALTH & SOCIOECONOMIC DEVELOPMENT

WHO

defines health as

“Not merely the absence of illness rather it’s the state of complete physical and social well being”

Gross man (1972) described Health in two ways:

☐ *Consumption good*

health is a utility function as people enjoy being healthy.

☐ *Capital good*

Health reduces the number of days spent ill, increasing the number of days available for market and non-market activities

The results of the analysis of the direct relationship between health and growth in Mexico, from 1970-1995,

“ Health is a causal factor responsible for approximately one third of the long-term economic growth in Mexico.”

So Until now.....

No longer a by-product rather a key determinant of economic development.

Healthy population is the human asset of a country which in turn contributes efficiently to the economic and social development

On contrary ill health hampers a country's social and economic development by triggering a vicious cycle of unsustainable resource use.

WHERE DO WE STAND?

Although Pakistan has made a note able progress in some key health indicators yet Pakistan's social and health indicators rank among the worst in the world

CURRENT CHALLENGES

*Population explosion
Higher infant and maternal mortality rates
Communicable diseases
Non communicable diseases
Nutritional deficiencies*

Ref: THE NEWS Oct 14,2009

Population explosion

- ✓ *Average annual percent change in the population*
- ✓ *Higher PGR results in scarcity of resources*
- ✓ *PGR of developed nations is < 1%*
- ✓ *PGR in Pakistan=1.995%*
- ✓ *Poverty, lack of awareness and resistance from religious sector to adopt family planning*

• Infant/Maternal mortality rates

- *Each year 400,000 children die before celebrating their 1st birthday*
- *16500 women die because of pregnancy related disease*

IMR = 78/1000

world average = 52

MMR = 270/10000

Economic survey 2008-2009

COMMUNICABLE DISEASES

- ✓ *30% of the total mortality is contributed by communicable diseases in Pakistan.*
- ✓ *Include Diarrhea, Typhoid, Malaria, Tuberculosis, Hepatitis B & C*
- ✓ *Emerging resistance to treatment is further worsening the situation*
- ✓ *Poverty, poor sanitation and hygiene, illiteracy, crowding malnutrition, and low immunization coverage are contributory factors*

NON-COMMUNICABLE DISEASES

- *NCDs impose heavy economic burden on individuals and health systems of Pakistan.*
- *Rank amongst the top ten causes of mortality and morbidity within the country*
- *Contribute 4.9% of the total deaths.*
- *These include Diabetes, Heart disease, Cancers etc*

NUTRITIONAL DEFICIENCIES

- *Alarmingly high level of malnutrition.*
- *24% (37.5 million) of the population is undernourished (average for developing countries is 17).*
- *A/C to UNs Standing Committee on Nutrition, just 3- types of malnutrition (Iodine, Iron and protein) are responsible for 3-4% of GDP loss/year in Pakistan.*
- *Main causative factors include poverty, low consumption of food and foods with low nutritional value.*

Triple bottom line May 17,2008

BARRIERS TO BETTER HEALTH

- *Lack of awareness on community level*
- *Poor infrastructure of Health institutions*
- *Lack of epidemiological/surveillance data*
- *Failure to adopt recent technological advances*
- *Lack of Political will towards resolving health issues*

POSSIBLE SOLUTIONS TO HEALTH PROBLEMS

AWARENESS CAMPAIGNS

- *The most cost effective way to improve health is to help people prevent/avoid illness*
 - ✓ *Hygienic and healthy lifestyle*
 - ✓ *Get Vaccinated*
 - ✓ *Combat superstition*
 - ✓ *Seek prompt and proper treatment*
 - ✓ *Family planning*

PUBLIC GOODS

- ***Availability and quality of public goods in a society are reflection of importance assigned to improving quality of life. So community must be provides with***
 - ✓ Adequate sanitation facilities
 - ✓ Safe water
 - ✓ Safe food

STRENGTHENING INSTITUTIONS

- ***Priority should be given to strengthen and expand instituions which are able to create synergy between medical research, teaching and medical practice.***
- ***Formation of networks within health could be beneficial in order to Improve the healthcare system, Reestablish the confidence on public sector, Provide collective information about a variety of illnesses, Implement national and provincial policies***

CAPACITY BUILDING

- ***Capacity building at individual and institutional level is crucial.***
- ***While the developed nations have attained higher standards in health sectors exploiting S&T we are still lacking in that.***
- ***National and International training programs for health care workers should be organized to update their knowledge about emerging strategies about prevention, surveillance, diagnosis and treatment***

Thanks

Role of Science and Technology: Health Challenges of Pakistan

Saira Bashir

Role of Science and Technology: Health Challenges of Pakistan

Dr Saira Bashir
Medical Officer
PMRC Research Centre
Fatima Jinnah Medical College,
Sir Ganga Ram Hospital
Lahore

“Science education, in the broad sense is a fundamental pre-requisite for democracy and for ensuring sustainable development.”

Demography of Pakistan

Pakistan is a South Asian developing country with its borders meeting India, China, Afghanistan and Iran covering an area of 803940 sq km with population of 150 million and literacy rate is around 48.7%.

Pakistan is facing vital socio-economical challenges in almost every sector.

Like many other countries science and technology is being considered as a source of economical growth and faster competitive advantages in Pakistan as well.

Health Status in Pakistan

WHO data shows that Pakistan is ranked 9th in the group of 11 Asian countries on the basis of life expectancy at birth.

Challenges Faced by Pakistan

Pakistan faces a number of critical challenges in developing its human resources as a basis for sustained growth and poverty reduction as well as to close the social and gender gaps.

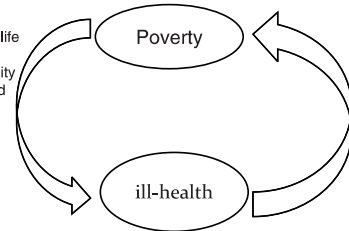
Failures to develop human capital contributed to the recent malaise of the economy.

The slowdown in growth and poverty reduction during the last decade in turn led to further stagnation in human development indicators.

In order to break this cycle of poverty, public policy must focus above all on measures to improve education and health outcomes.

Socio-economical Condition & Health

- Diminished quality of life
- Reduced productivity
- Lowered learning ability
- Diminished household savings, debts



- Increased personal and environmental risks
- Increased malnutrition
- Less access to knowledge, information
- Diminished ability to access

Condition of Developing Countries

Health:

- 968 million people without access to improved water source .
- 2.4 billion people without access to basic sanitation .
- 3.4 million people living with HIV/AIDS .
- 2.2 million people dying annually from indoor pollution .

Children

63 million underweight children under age five .

11 million children under five dying annually from preventable causes .

Where Pakistan Stands?

- Poverty in Pakistan has remained fairly stable.
- The poor have a high dependency ratio, with large number of children and single earning member.
- Average number of births by a poor woman (married and of age 15-49) is almost five, compared to four for a non-poor woman.

- The poor are characterized by relatively low access to health related infrastructure, like sanitation. While 76% of the poor live in the households with no toilet with flush, compared to 53% of the non-poor.
- Relatively poor communities also seem to have less access to health facilities and immunization coverage; 45% of the children in poor households aged 1-5 years have been fully immunized as against 58% in non-poor households.

Role of Science & Technology

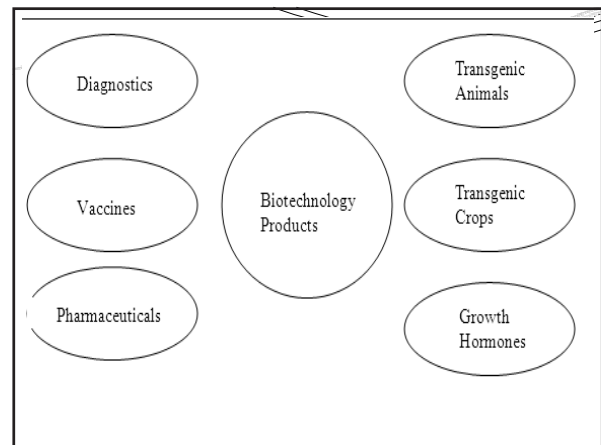
- Scientific knowledge provides economic value when it solves problems or is incorporated in technology and products.
- A national infrastructures is needed which link science with technology with satisfaction of societal need (Defense, environmental protection, health provision, transport, energy systems).
- Science & Technology can improve the quality of human life through preventive and therapeutic medicine (genetics, chemistry, biology, materials sciences, statistics, mathematics, computer science, physics, and nuclear medicine).

Role of Science & Technology in Health

Currently, genetic modification is playing its role in:

- Produce new and safer vaccines.
- Treat some genetic diseases.
- Provide new and better medicines.
- Increase crop yields and decrease production costs.

- Improve food nutritional value.
- Increase livestock productivity.
- Develop biodegradable plastics.
- Decrease water and air pollution.



Diabetes Mellitus

Diabetes Mellitus is defined as a syndrome of persistent hyperglycemia due to absolute or relative deficiency of insulin.

It is one of the systemic metabolic disorder leading to lots of complications and among the most common chronic non-communicable diseases effecting the economy.

Types of Diabetes

Diabetes is basically classified as:

- Type - I
- Type - II
- Gestational diabetes

- According to world health organization (WHO) estimates approximately 135 million people world wide currently have diabetes.
- Type 2 accounts for around 90% of these cases.
- By year 2025, WHO predicts that 300 million people will have this disorder.

Growing Diabetic Population Pakistan

Global diabetic population

Year 2007 **246 million**

Year 2025 **380 million**

Top 10 countries: Number of People with Diabetes

Country	2007	Country	2025
1. India	40.9	1. India	69.9
2. China	39.8	2. China	59.3
3. USA	19.2	3. USA	25.4
4. Russia	9.8	4. Brazil	17.6
5. Germany	7.4	5. Pakistan	11.5
6. Japan	7.0	6. Mexico	10.8
7. Pakistan	6.9	7. Russia	10.3
8. Brazil	6.9	8. Germany	8.1
9. Mexico	6.1	9. Egypt	7.6
10. Egypt	4.4	10. Bangladesh	7.4

Pakistan is no 7th largest country with 6.9 million diabetics in the world.

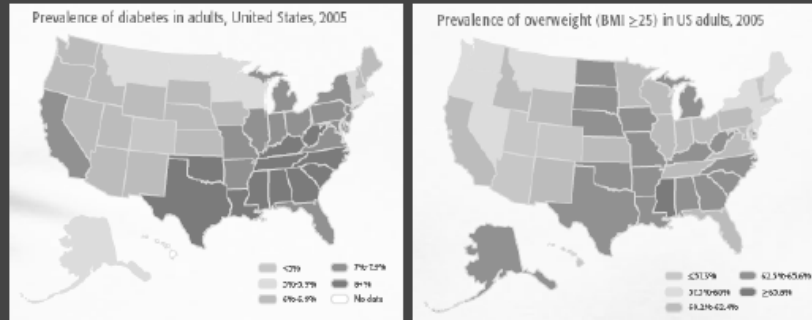
By 2025, IDF estimates Pakistan to be the number 5th largest country with 11.5 million number of people with diabetes

IDF Atlas 3rd Edition 2006 (age group: 20-79 years)

Byetta®
everable injection

Escalating Epidemic of Type 2 Diabetes

- Overweight rates are fueling the diabetes epidemic^{1,2}

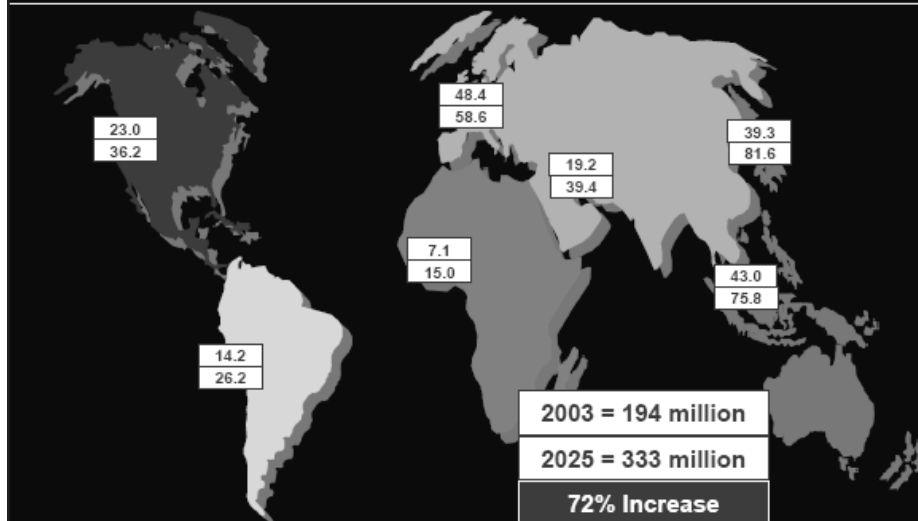


References: 1. CDC Data and trends; 2. CDC Prevalence data.

Byetta[®]
everolimus injection

5

Global Projections for the Diabetes Epidemic: 2003-2025 (in Millions)



Sicree R, et al. In: Gan D, ed. *Diabetes Atlas*, 2nd ed. Brussels: International Diabetes Federation; 2003:15-71.; Zimmet P. *Am J Med*. 2005;118(suppl 2):38-85.

Diabetes Today – An AMS Epidemic

Country	2000	2030
Bangladesh	3,196,000	11,140,000
Brunei	18,000	49,000
Indonesia	8,426,000	21,257,000
Malaysia	942,000	2,479,000
Philippines	2,770,000	7,798,000
Singapore	328,000	695,000
Thailand	1,536,000	2,739,000
Vietnam	792,000	2,343,000
Pakistan	5,217,000	13,853,000

***Hongkong – prevalence of 6-8% in 2007**

AMS REGION DIABETES
Year 2000 – 23.2 million people,
by 2030 – 62.35 million people
(not including Hongkong)

With the statistics mentioned above Diabetes is proving itself a challenge to health and socioeconomic development in Pakistan.

WHO projects that deaths due to diabetes will increase by more than 50% in the next 10 years without urgent action.

Complications and disasters with diabetes

Diabetes a major problem to the diabetic patient itself and a threat to the economy of country due to its after effects disabilities and complications leading to a huge burden on the economy of country.

Diabetes is a cumbersome disease should treated equivalent to MI.

Impact of diabetes in next 24 hours..

- 2200 new patients will be diagnosed
- 512 diabetics will die
- 66 Blind
- 77 ESRD
- 153 other complications

- Data collected by PMRC showed the following complication rate among diabetic patients

System Involved	Complication at last follow-up	Incidence rate per 100 per area
Cardiovascular	666(55%)	4.44
Eye	711(58%)	5.16
CNS	641(53%)	4.67
Renal	638(52.7%)	4.44
Skin	618(51.1%)	3.87
respiratory	209(17.3%)	1.30
GIT and other(dental, joints)	803(66.4%)	5.68

How Science and Technology can help to Decrease Diabetic Burden?

Objectives

- To highlight the issues dealing with the preventive measure for diabetes reducing its morbidity and economical burden.
- To introduce new treatment strategies and use of new drugs in control of diabetes to decrease the complication rates among diabetic population.

Proposed Solutions

1. Role of Government

Policy makers should include diabetes prevention program in their priority areas.

Develops norms and standards for diabetes care:

2. Identification of Diabetic Population

High risk groups for diabetes (having family history, obesity, etc) should be identified and registered to reduce the morbidity rates among general population due to diabetes.

3. Awareness Programs

Awareness programs at national level for educating the diabetic population and general public about diet and life style should be launched to make people aware of this life threatening disorder.

Provides scientific guidelines for diabetes prevention at the BHU levels.

Training of Health Professionals

Lady health worker should be trained about the preventive measures regarding diabetes. they can play a pivotal role in educating housewives ,thereby can play a major role in preventing diabetic complications.

Refresher courses for health workers should be arranged to educate them about new treatment strategies

Food and life style

- Diet
- Obesity
- Lifestyle

Statistics of Diabetes

Statistics of diabetes should be maintained and updated on yearly basis to know about the effectiveness of medicines and prevention programs.

Conducts surveillance of diabetes and its risk factors.

Use of newer medicines

- Recombinant technology
- Beta cells transplants for type I and type II patients.
- Newer Insulin formulation for better control.

OUTCOME (TECHNICAL SESSION - 2)

Theme: Health

Subject Experts: 1. Dr. Birjees Mazhar Kazi
2. Dr. Sania Nishtar

Presentations by: 1. Ms. Hina Fazal
2. Ms. Safia Bibi
3. Ms. Saira Bashir

Problems-identified in the Session	S&T-led solutions
There is no proper record of Pakistan's medicinal plants. Hundreds of species need to be documented.	Unexplored areas should be investigated and flora of Pakistan should be adequately documented. Database of these plants should be maintained in Pakistan. Institutions like ICCBS (Karachi) and Drugs Control & Traditional Medicine Division of National Institute of Health (Islamabad), can take lead and provide research facilities to students and industry.
Our resources go wasted because of inappropriate collection, harvesting and post-harvesting treatment techniques of medicinal plants.	Cultivation, harvesting and post-harvest technologies should be developed and transferred to the farmers and local communities.
Health is not given due importance.	S&T should be used efficiently in meeting the needs of health sector. We can use S&T to develop the preventive (vaccines) and curative (medicines) aspects of the health system.
Preventable diseases like diarrhea, malaria still result in high mortality rates.	S&T should be used to upgrade the health system. Records should be kept and surveillance carried out using authentic database.
The diagnostic methods being used are cumbersome, time consuming and expensive.	Molecular-diagnostic techniques that have become important element in fighting diseases must be deployed.
People are inclined towards self-medication irrespective of what the repercussions might be.	- The concept of prescription-based medicine should be introduced. - A central repository (database) of medicines available in Pakistan must be created and made available to drugstores. - A government plan is needed to hire qualified/authorized pharmacists to work at the drugstores to sell medicines. - Law must be implemented by the government with full force.

Non-communicable diseases, such as diabetes, are a major challenge to health and socio-economic development.	Diabetes prevention/ awareness programmes should be made a focus-area by the policy makers.
The people of rural areas lack accessibility to health facilities.	• Basic-Healthcare Units (BHUs) should be established in remote and rural areas. • Tele-health solutions must be developed, whereby a specialist sitting in big hospitals can see the diagnostic reports of a patient in a remote area and suggest treatments through the physicians available at the BHUs.
Most of the vaccines are imported and therefore are very expensive.	Serious consideration should be given to the development and production of vaccines. Following points should be given importance: • There should be repositories for indigenous bacteria and viruses. • Development of vaccines, both for the human and animal use, requires strategic R&D setup through public sector investments by the government in the shape of good labs. These labs should have qualified biotechnologists that are given attractive remunerations to research on indigenous viruses and bacteria maintained in the lab's repositories. • Mass scale production of vaccines is a purely commercial endeavour; the private sector must play its role in local production of vaccines, and the public sector should focus on R&D activities.
Inappropriate means to disease surveillance and inadequate/ineffective generation of timely reports and information.	• Mechanisms for timely detection/ diagnosis to accelerate the response-time for meeting the potential threats of any pandemic. Public health-awareness campaigns can also help in this regard. • The Health Management Information System (HMIS), already being used by the Ministry of Health, should be further developed. • Sectors other than health, such as livestock, should play their role more meaningfully to combat diseases at human-livestock interface. • Civil bodies and other concerned departments, like WASA, should come forward for the availability of clean water, food and environment.

	• Food adulteration should be checked and stopped through new law making and its enforcement. • Manufacturing of spurious drugs and low-quality drugs must be stopped. More S&T facilities should be created for controlling such drugs.
Addressing specific problems of underdeveloped areas being largely neglected.	• The Health Management Information System (HMIS) data over the years provides an indication regarding trends of various diseases that recur every year at the same time. This can also help identify inappropriate social practices (e.g. use of unclean drinking water or improper latrines), as well as influence of seasonal events (drought or flooding) that affect the environment. Counseling by community-based health-workers can significantly reduce the burden of communicable diseases. The consultation should aim at educating people to improve living conditions and hygiene.

INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs)

Subject Experts

1. Dr. Arshad Ali
Director General
School of Electrical Engineering and
Computer Sciences (SEECs)
NUST
Islamabad.
2. Dr. Khalid Rashid
Advisor
COMSATS Institute of Information
Technology (CIIT)
Islamabad.

Presentations by:

1. Ms. Saadia Ishtiaq
Lecturer
Fatima Jinnah Women University (FJWU)
Rawalpindi.
2. Mr. M. Iqbal
Assistant Manager
Small and Medium Size Enterprise
Development Authority (SMEDA)
Quetta.
3. Ms. Tahira Yasmeen
Student
COMSATS Institute of Information
Technology (CIIT)
Islamabad.

KEYNOTE ADDRESS

by

Dr. Arshad Ali

Director General

*School of Electrical Engineering and Computer Sciences (SEECs),
NUST, Islamabad.*

In 2007, Gartner released a report titled, “Analysis of Pakistan as an Offshore Service Location”, placed the country in the First Category destinations and also acknowledged Pakistan’s labour costs to be 30% lower than India’s, with Telecom costs the lowest of any outsourcing destination. In the same year, a World Bank report on ease of doing business ranked Pakistan at number 2 in South Asia and at number 74 globally out of 159 countries. Besides telecom and lower costs for highly skilled HR, there are some key competitive advantages that Pakistan enjoys that have put it on the fast track as an upcoming global destination for technology product and services.

To its global clientele, the industry offers a vast and growing skilled English-speaking population, an impressive HR development programme, a conducive policy environment, a 100 per cent ownership of equity and repatriation of the foreign investors’ profits, as well as tax exemption on these investments and exported software until 2016. In Pakistan, the cost of setting up and doing a business is relatively low, lower than China and India. The country is also investing heavily in developing human resource to meet the needs of the future and has one of the world’s most ambitious programmes to invest in higher education (30,000 private sector university graduates, 150,000 total university graduates a year). From a macroeconomic perspective, the country has shown solid fundamentals during the last five years with strong GDP growth, averaging more than 6% per annum. The Karachi Stock Exchange, with more than 600 listed securities and an active trading history, boasts of the lowest listing costs in the region.

Attracted by the country’s strong economic sectors and demographic fundamentals, a number of multinationals, venture capitalists and angel investors have been attracted to the country. A multinational angels network, with roots in Boston and Karachi, has been launched and a number of venture funded cross-border transactions realized. Direct foreign investment is booming. Companies like Etisalat – the state-owned Telecom provider of the UAE and one of the leading brands in the Middle East acquired a majority stake in the country’s largest telecom company, PTCL for US\$2.6 billion in 2007. Other companies entering or expanding in Pakistan include Orascom of Egypt, OmanTel, Telenor of Norway, CISCO, Dell and China Telecom, Bank Nomura, Barclays, Standard Chartered Bank, IBM, Oracle, SAP, HP, Microsoft, NCR and Terrada.

KEYNOTE ADDRESS (SUMMARY)

by

Dr. Khalid Rashid

Advisor

*COMSATS Institute of Information Technology (CIIT)
Islamabad.*

Modern ICTs have evolved in a comparatively shorter span of time and opportunities have been brought to the masses. Acquiring knowledge is essential to make any progress in the socio-economic domain by the developing nations. Now there is a tremendous possibility of accessibility to the modern tools of communication and their utilization in a large number of professions. Special advantages exist for students not only in gaining access to the knowledge world over but also for the purpose of research and development. It is necessary that benefits of ICTs should reach marginalized communities also. One of the main objectives of this meeting should be to find out ways and means to easily disseminate information and its benefits to the masses of Pakistan. If we achieve this objective we will be successful in helping put our society on the path of development. He advised the participants of the session to focus on the core issues related to ICTs widen spread in Pakistan by undertaking fruitful discussions and dialogue.

Role of Science and Technology in Media Development

Saadia Ishtiaq

Role of Science and Technology in Media Development

Ms. Saadia Ishtiaq
Lecturer – Communication Sciences
Fatima Jinnah Women University, Rawalpindi

Role of Media in Society

Functions of Media

1. Acts as a Surveillance tool for the Society
2. Interprets News/Information
3. Creates Transnational /International Linkages
4. Is a transmitter of Values for the Society
5. Provides Entertainment

Background of the Topic

- One of the most influential and deciding factor in the process of development whether social or economical is proper and effective usage of Information .
- The pace of science and technology throughout the world is the same but, the development because of Science and Technology is not. It is very important to understand its reasons.

Present Media Challenges

Two aspects of Pakistani Media

1. Media Curriculum (Academics)
2. Practical Journalism

Present Media Challenges (Media Curriculum)

- Not updated with the emergence of latest technologies.
- Less / lack of research contribution
- Diversity of the subject is not given proper consideration.
- Teaching media without teaching media technologies does not meet the current requirements.

Present Media Challenges (Practical Journalism)

- Credibility of news
- Lack of content
- Dearth of professional staff
- No proper training on modern journalism
- Lack of ICT related trainings
- Propaganda tool
- Information overload

Resulting Situation

No Academic Institution/ university in Pakistan is preparing up – to the mark media professionals because

- a. The university's departmental faculty itself is not trained in the required advance skills i.e. advance usage of ICT's,
- b. Resulting in dependence on either computer science and engineering department for their website development, electronic communications etc.
- c. journalists reporting on developmental projects are unable to convey the whole picture because of lack information or skill of a particular field.
- d. No famous science & technology program on-air

Possible solution

- Serious academic reforms in existing curriculum.
- Integration of communication studies and science and technology studies.
- New discipline should be given the name Communication Sciences with focus on three areas
 - a) Notions about causality in technology-society relationships.
 - b) Process of technology development
 - c) Social consequences of technological change.

Thank You

Role of Information and Communication Technology in Entrepreneurship Development

M. Iqbal

Role of Information and Communication Technology in Entrepreneurship Development

Muhammad Iqbal
SMEDA, Balochistan

Information and Communication Technologies (ICT)

ICT includes all mediums used to:

- ❑ Record information
- ❑ Manipulate information
- ❑ Broadcast/communicate information in written, voice or image form

ICT Infrastructure includes :

- ❑ Electronic Devices, Telephone, Fax, Mobile Phone etc.
- ❑ Computers
- ❑ Networks (LAN, WAN, Internet, Cellular)
- ❑ Mass Electronic Media (Tv, Cable TV, FM Radio etc.)

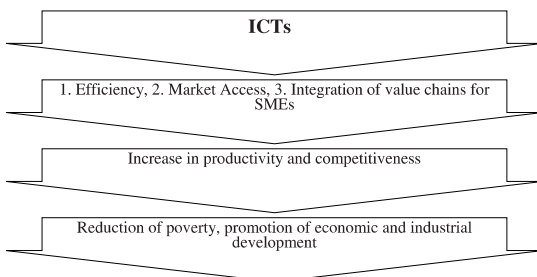
ICT in Pakistan

- The ICT has developed very fast over the recent past contributing towards growth in production, employment and investment.
- Low taxes, availability of unbranded computers and import of used systems has exponentially increased the number of personal computers in the country.
- The cellular industry has made rapid growth during past few years. It is estimated that by 2006-07 over 89% of the population had access to cellular industry.
- A wide range of broad band services including DSL, optic fiber and wireless services are available.
- Electronic media including TV, Cable TV and FM Radio also has shown considerable growth in recent years.

Small & Medium Enterprises (SMEs) in Pakistan

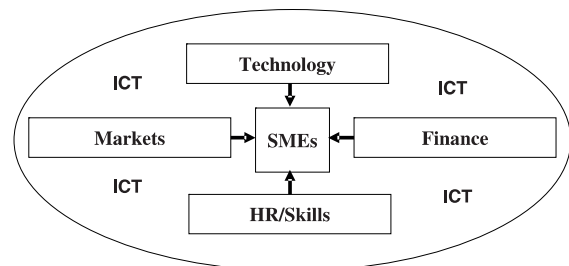
- SMEs constitute about 90% of all private enterprises
- Employ approximately 78% of non agriculture labor force
- Contribute over 30% to GDP
- Contribute 25% in export earnings
- Share 35% in manufacturing value addition.

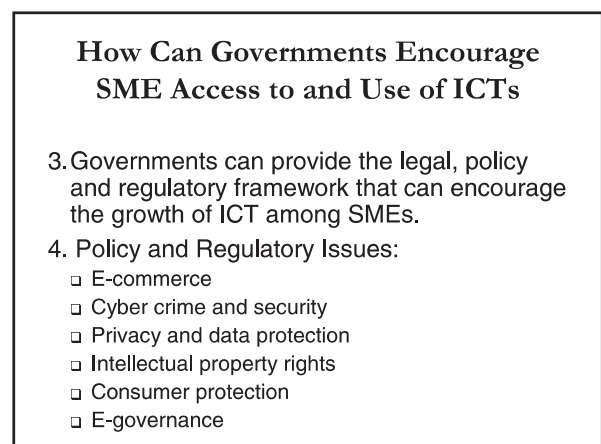
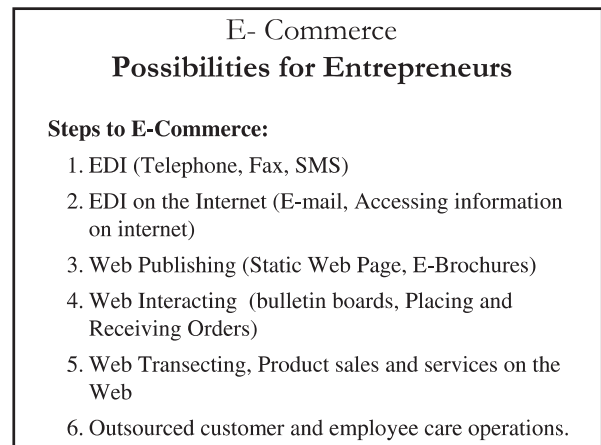
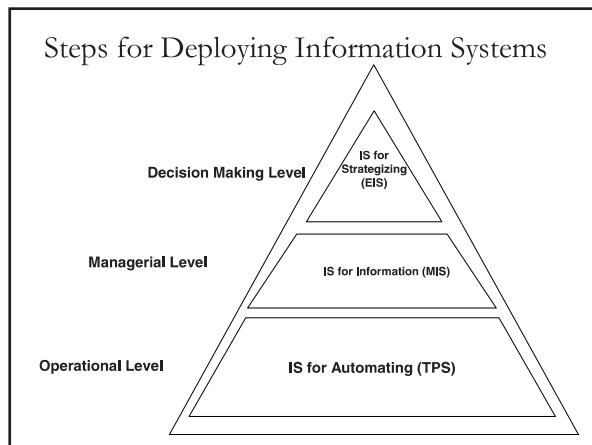
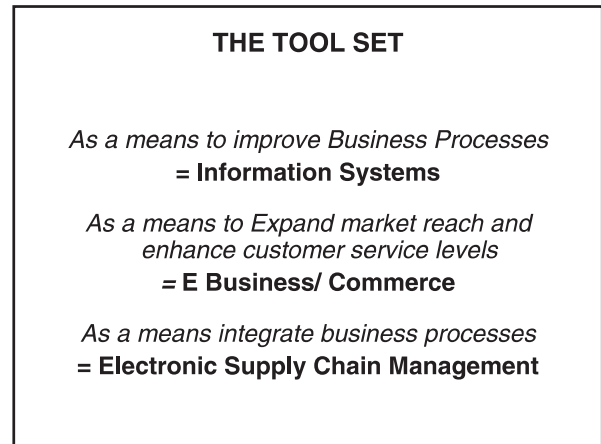
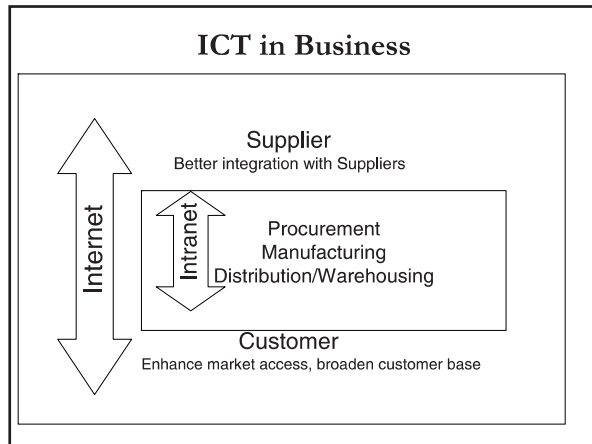
Importance of ICTs to SMEs and National Economy



The information needs of SMEs

- The main weakness of SMEs is isolation
 - ❑ Lack of access to information
 - ❑ Inability to process available information





Key Policy Measures

Business Environment

Policies that make it easy for people to set up, operate (and dissolve) businesses, it requires:

- Transparent and competitive business framework
- Clear independent rule of law
- Easy set up and dissolution of businesses
- Simple and accessible corporate regulations
- Equal and stable legal treatment

Key Policy Measures

Network Infrastructure and Broadband Deployment

- Promote effective competition through liberalization in infrastructure and network services
- Encourage investment in new technological infrastructure and applications
- Public financial assistance to expand coverage for remote areas

Key Policy Measures

Human Capital Development and Skills Enhancement

- Lack of ICT skills and business skills are hindering ICT implementation by private sector
- Governments have major roles in providing basic ICT skills in primary and secondary schooling
- Government also have an important role in providing ICT skills at higher levels and in vocational training

Key Policy Measures

Information on benefits of ICT

- Small firms may lack objective information regarding the benefits and costs of adoption of ICTs.
- The private sector (e.g. business associations) and governments can provide information on the benefits of adoption and use of ICTs.

Key Policy Measures

e-Governance

- Online provision of government information and services can increase the efficiency and coverage of public service delivery to SMEs.
- As model user of broadband, governments can demonstrate the potential as well as the benefits of ICT adoption by small firms
- Provision of government services to businesses can potentially benefit from the use of ICT and should be given priority in government strategies.

Key Policy Measures

Public-Private Partnerships

- Partnership with the private sector is key to developing effective e-business policies for SMEs.
- Governments' primary role is to provide an enabling policy, legal and regulatory environment.
- Ultimately the private sector is better positioned to undertake its implementation.

Summary

- Last decade has witnessed technological transformation mainly led by ICT.
- ICT is helping Entrepreneurs to grab business opportunities locally and globally.
- In Pakistan use of ICT is restricted to the big cities and multinational corporations.
- There is tremendous potential for Pakistani SMEs for deploying ICT and become an important player in the information age.

Summary

- With ICT tools, SME sector can increase their efficiency improve its operations and become more competitive.
- This will also help SME businesses not only to sustain in present competition but will also provide a platform to grow in future.
- Developing countries can learn from ICT experience of developed countries, but will have to innovate their own models.

Role of Information Technology in the Development of Pakistan

Tahira Yasmeen

Role of Information Technology in the Development of Pakistan

TAHIRA YASMEEN

Tahira Yasmeen
CIIT, Islamabad

Socio-economics

Socioeconomics or **socio-economics** is the study of the relationship between economic activity and social life. The field is often considered multidisciplinary, using theories and methods from sociology, economics, history, psychology, and many others

Economic Development

is the increase in the standard of living of a nation's population associated with sustained growth from a simple, low-income economy to a modern, high income economy.

Its scope includes the process and policies by which a nation improves the economic, political, and social well-being of its people.

Economic development typically involves improvements in a variety of indicators such as literacy rates, life expectancy, and poverty rates.

The socio economic development

Challenges faced by Pakistan

- Poor Economic condition of Pakistan
- Terrorism
- Low literacy rate
- Unemployment
- Shortage of Basic needs
 - source of energy (Electricity and natural gas)
 - Food Hospitals
 - Water Education

ROLE OF INFORMATION TECHNOLOGY IN THE DEVELOPMENT OF PAKISTAN

1. Birth & Growth of Information Technology in Pakistan
2. Development Factors For Pakistan
3. IT As A Tool To Achieve The Development Factors:
 - a. Good Governance and Strategic management
 - b. Economic Stability
 - c. High Agricultural Yield
 - d. Industrial Energy
 - e. Poverty Alleviation
 - f. Positive Impact on International Foreign Policies
4. Pakistan and Information Technology (Present)

Birth & Growth of Information Technology in Pakistan

The computers came to Pakistan in mid 60's when second-generation computer was installed at Karachi. Presently, there are over 1800 mainframe and minicomputers, about half of which are in the government sector.

The growth in the number of computers during the last ten years was over 35%. This has been possible due the governments liberal import policy and reduction/removal of duties. It is estimated that there are roughly 450,000 new computers every year in Pakistan.

Development Factors for Pakistan

- a. Good Governance and Strategic management
- b. Economic Stability
- c. High Agricultural Yield
- d. Industrial Energy
- e. Poverty Alleviation
- f. Positive Impact on International Foreign policies
- g. Advancement in Education

IT as A Tool to Achieve the Development Factors

Today's best technology to manage and process data is the Information Technology.

Information Technology implementation is one of the ways to fulfill and execute the development factors on the right way, which will help the nation to grow in peace and prosperity, which will create a momentum that will result the development of Pakistan.

Good Governance and Strategic management

IT must be seen as an investment and not an expense. It requires vision and bold leadership to employ IT as a tool, but it must be coupled with sincere commitment to good Governance.

Governance is the manner in which power is exercised by government in the management of the country's social and economic resources,

while good governance is the exercise of power by various levels of government that is effective, honest, equitable, transparent, and accountable, good governance

A state, often has three separate branches under a constitution, namely: Legislature, Judiciary and Executive.

Legislative, an important institution of the state provides - for the benefit of citizens -

the information regarding what is being said, debated and legislated for them. Towards this, IT has been employed to record all the speeches as well as all laws presented and enacted by the legislature basically in the form of texts and scripts but given the current available technology as voice or video recording available on the Internet.

Judiciary has long benefited from IT by having case laws available to judges and to lawyers. Libraries for any professions are extremely important in terms of quality of work. The electronic library has revolutionized the world and professionalism. The central database for various reference laws has provided the service to professionals, which has in turn brought the speedy and inexpensive justice to the citizens.

Executive

the major interface of citizens with the state has the responsibility of planning, execution and monitoring. With a large population and widespread territory, IT becomes a natural ally for planning and delivering the needed services to the citizens.

Database of all citizens is therefore fundamental to sound planning and delivery of social services like education and health, utility services like water and electricity, infrastructure like roads network are best provided by IT. In addition, economic planning is inconceivable without IT.

Economic Stability

The importance of information technology in the present world can not be underestimated as it has dominated almost all the fields of business and industry including the service sector and one having no touch with this technology would not be able to make any progress in the century to come.

The role of IT in a financial services in

Supporting operational efficiencies — and that simply means doing routine tasks better, faster, or cheaper.

Facilitating customer services delivery — increasing customer touch points, extending the duration of service, improving service delivery.

Risk management — providing the capability to manage identify, assess and control the bank's risk and exposure, whether related to operations, credit, assets, market risk and so on.

High Agricultural Yield

An Agricultural Expert System is a Decision Support System for Agricultural Extension Agents who has to decide what advice to be offered to farmers who have to decide what action to take based on it.

GRAIN MARKETING ADVISOR is an expert system for determining marketing alternatives and supports grain producers in finding optimal strategies.

COMAX provides information on integrated crop management in cotton. It is designed for use by farmers, farm managers, country and soil conservation agents.

Industrial Energy

Industry is the back bone of any country. Pakistan is exporting 68% of the export from its textile industry which is obviously contributing a major part in Pakistan economy.

Energy Load Management is the concept of managing loads at the demand side in order to run the energy system more efficiently. The very basic principle is to try to move load from expensive to less expensive time period.

Poverty Alleviation

The problem of poverty can only be solved through improving the total economic and social opportunities and equitable distributions of the benefits of growth to all particularly the poor thereby providing security to people who are unable to

participate in the contribution of economic growth and governance.

Education in Pakistan

is divided into five levels: primary (grades one through five) middle (grades six through eight); high (grades nine and ten, leading to the Secondary School Certificate); intermediate (grades eleven and twelve, leading to a Higher Secondary School Certificate); and university programs leading to graduate and advanced degrees.

Spending on Education

As a percentage of GDP, Pakistan spends only 2% of it on Education. However, the government recently approved the new national education policy, which would result in education being allocated 7% of the GDP. An idea, first suggested by the Punjab Government. The government plans to raise the literacy rate to 85% by 2015. In accordance with the target set by the Millennium Development Goals for Pakistan.

Application of Science and Technology to Education

Information and Communication Technology (ICT) in Education can be understood as the application of digital equipment to all aspects of teaching and learning.

With the arrival of the Internet and the broadband connections to all institutions, the application of IT knowledge, skills and understanding in all subjects became a reality. This change in emphasis has resulted in a change of name from Information Technology (I.T) to Information and Communication Technology (ICT)

Tools of ICT In Education

The generic tools include use of

- Communication
 - Internet
 - Video Conferencing
 - Educational Channels (through Satellite)
- Digital library (DL)
- LMS (Learning management system)
- Student portal

Thank You

OUTCOME (TECHNICAL SESSION - 3)

Theme : ICTs

Subject Experts: 1. Dr. Arshad Ali
2. Dr. Khalid Rashid

Presentations by: 1. Ms. Saadia Ishtiaq
2. Mr. M. Iqbal
3. Ms. Tahira Yasmeen

Problems-Identified in the Session	S&T-led solutions
Media (mass communication) education not compatible with present socio-economic requirements.	An updated curriculum of media-studies should be designed that is commensurate with the emergence of latest technologies and other subjects.
Latest technologies are not being fully used to their potential by media personnel and journalists.	Journalism and mass-communication departments of universities require serious upgradation, incorporating latest ICTs. Internship programmes should also be introduced at graduate-level.
SMEs often lack the necessary resources to effectively up-scale and manage their business.	The effective use of ICTs by enterprises can result in greater productivity leading to greater competitiveness and, thus, sustainable economic growth. Government can encourage economic activity by giving incentives to SMEs for using e-commerce platforms.
Rural areas lack accessibility to ICTs.	Multi-purpose tele-centres should be set up for spreading education in rural areas.
People are generally unaware of the new developments in science and technology.	S&T newspapers, magazines and web-portals can help in disseminating the news related to S&T. They will also help in identifying the problems related to S&T.
Security problems are creating a serious set-back for socio-economic activities in the country.	ICTs can effectively help in security-surveillance and record-keeping. Customized softwares can be used for managing information.
Lack creativity and competitiveness for the proper use of ICTs.	Curriculum should be upgraded giving due importance to ICTs.
To set-up a software-industry is fraught with problems.	Government should provide incentives, e.g., tax exemptions, to those willing to establish software-houses.
Several social-sectors suffer due to old working procedures.	Modern platforms of e-commerce, telehealth and e-governance should be extensively utilized in public sector. The use of web-based radio and TV channels in universities could be beneficial.

There is a serious lack of linkages between universities and the industry for promoting economic activities.	ICTs to be introduced extensively to create such linkages.
--	--

At the conclusion of the technical session on ICTs, Prof. Dr. Atta-ur-Rahman, Coordinator General COMSTECH joined the meeting and addressed the young participants. He informed the participants that despite efforts of the last six decades we are still far behind in S&T education compared to many developing countries. The main impediment is the serious shortage of high quality manpower. He advised the meeting to take the challenges of life with courage and dignity, work for national reconstruction and develop the habit of questioning everything. In order to inspire the students, he gave a detailed account of how he achieved prominent position as a researcher and raised the level of his research centre as one of the best in the world. He also recounted his efforts in enhancing the role of ICTs and higher education, in general, during his tenures as Minister of Information Technology, Minister of S&T and Chairman HEC. He was of the belief that there was a vast terrain of science and technology that the youth of the country should explore for better possibilities and scope through hard work and commitment. He informed the meeting that presently 157 projects are going on in 57 Muslim countries through the platform of COMSTECH. Later he answered several questions by the students participants related to HEC's scholarship schemes.









ECONOMY AND S&T ISSUES**Subject Experts**

1. Dr. Tariq-ur-Rahman
Chairman
Pakistan Council for Science and
Technology (PCST)
Islamabad.
2. Dr. Asad Ali Shah
Former Member
Planning Commission on Infrastructure
Islamabad.

Presentations by:

1. Mr. Wahid Bux Mangrio
Student
Mehran University Institute of Science
and Technology Department (MUISTD)
Jamshoro.
2. Mr. Asad Raza
Lecturer
Military College of Signals (MCS)
NUST
Islamabad.
3. Ms. Samar Min Allah
Student
School of Civil and Environmental
Engineering (SCEE)
NUST
Islamabad.
4. Mr. Aamir Muhammad
Mining Engineering
Dimension Stones Centre
PCSIR Complex
Peshawar.

5. Mr. M. Jawad Qarni
Research Associate
Ghulam Ishaq Khan Institute (GIKI)
Topi-Swabi.
6. Mr. Syed Qudratullah
Student
Balochistan University of Information
Technology
Engineering and Management
Sciences (BUIEMS)
Quetta.
7. Mr. M Kashif Munir
Research Officer
Pakistan Medical Research
Council (PMRC)
T.B. Research Centre, Mayo Hospital
Lahore.
8. Mr. Syed Safwan Khalid
Lecturer
Department of Electrical Engineering
COMSATS Institute of Information
Technology (CIIT)
Islamabad.
9. Dr. Khalid Latif
Lecturer
School of Electrical Engineering and
Computer Sciences(SEECS)
NUST
Islamabad.

Keynote Presentation

by
Dr. Tariq-ur-Rahman
Chairman, Pakistan Council for Science and Technology (PCST)

Challenges for Socio-economic Development in Pakistan Role of Science and Technology

Session: Economy and S&T
Issues

27th October 2009

Dr. Tariq-Ur-Rahman
Chairman, Pakistan Council for Science & Technology

S&T Capabilities of a Nation

- Ability to produce indigenous solutions to its problems
 - provide clean water, good health care, adequate infrastructure and safe food to its people
- Capability to develop and utilize its natural resources in an **optimal and sustainable** manner

Pakistan – Current Status

- Scientific and Industrial Capability
 - Scientifically developing country
 - Fair scientific and industrial base
- Developed educational institutions & research institutions
- Appropriate industries – local and imported raw materials

... Cont'd

Pakistan – Current Status

- Research in isolation from industrial sector
- Human Development Index
 - Medium HDI (0.799 – 0.5)

Human Resource Development

- Bedrock for building
 - infrastructure of the S&T system
 - industrial and technological base
- Education system should produce
 - competent doctors, engineers, architects etc
 - scientists capable of working at the leading edge of research.
- Universities should be centers for **creating new knowledge**

Industrial & Technological Base

- We need to develop our I&T base as prime end-user of
 - S&T manpower
 - output of R&D organizations
 - Otherwise, investment in HRD will lead to increased brain drain
- Technology foresight exercise to identify niche markets – using our strengths

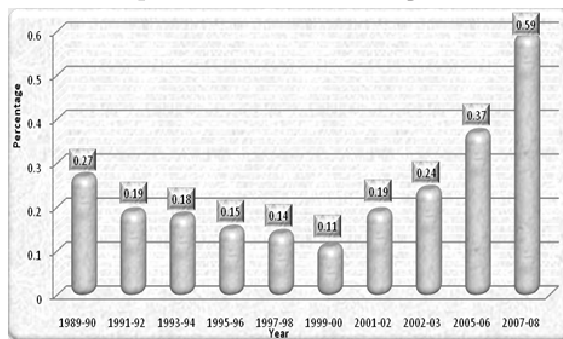
Linkage with Industry

- R&D system should be geared to the needs of the industrial sector
- Special incentives for industrial units to establish R&D setups
- Incentives to scientists to actively seek collaboration with industry

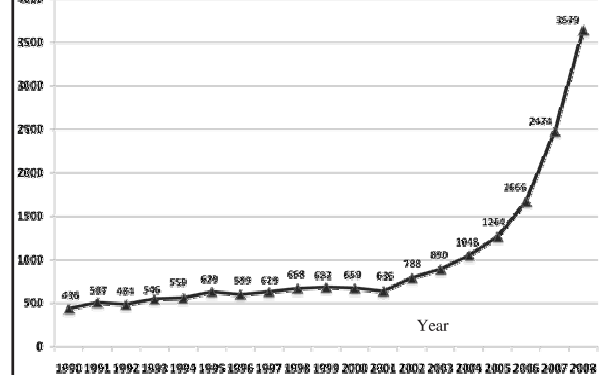
Increase in Research Expenditure

- R&D spending should increase to 1% of GDP – currently 0.59%
 - Share of industrial sector in R&D expenditure should increase
 - Increased expenditure only by Government will not lead to indigenous development of new technology

R&D Expenditure as Percentage of GDP



Number of International Research Publications



Policy Measures (1)

- Incentives for development of technology
 - Tax breaks, preferential government procurement of local goods etc
- Facilitation of SMEs
 - Technology and business incubators
- Development of basic infrastructure
 - Transport, communications, utilities etc.

Policy Measures (2)

- Facilitation of venture capital
 - Critical role in development of SMEs
 - Groom SMEs to grow into MNCs
- Participation in international trade (WTO)
 - Facilities for product testing, quality assessment and certification
 - Protection of IPR

Policy Measures (3)

- Innovation fund
 - Encourage the inherent innovative capabilities of the people to develop indigenous technology
- Universities as agents of development
 - Help industry to improve products
 - Technology parks; Entrepreneurial training;
 - Address social needs of the community

Sustainable Development - Environment

- Environment – major casualty of industrial development
- Sustainable development using natural resources
 - Fulfill the needs of the present generation without compromising the needs of future generations.
 - Special programmes for the preservation of woodlands, wetlands, biodiversity, fisheries and aquatic resources etc
 - Index of Sustainable Economic Welfare instead of GDP

Millennium Development Goals

- Eight goals – 18 targets
 - Eradicate extreme hunger and poverty (2)
 - Achieve universal primary education (1)
 - Promote gender equality and empower women (1)
 - Reduce child mortality (1)
 - Improve maternal health (1)
 - Combat HIV/AIDS, malaria and other diseases (2)
 - Ensure environmental sustainability (3)
 - Develop a global partnership for development (7)
- Target date: 2015

Millennium Development Goals

- We are committed to achieving the MDG
- Achievement of MDG can be facilitated by the use of Science and Technology
- Business as usual – serious risk of missing targets

Achieving MDGs

- Priority Areas
 - Water, Energy, Health, Agriculture, Biodiversity (WEHAB)
- Special attention to needs of marginalized segments of population
 - Tend to be neglected in allocation of development funds
 - Minor interventions can lead to significant changes

Primary Aim

- We need to develop our S&T system – not as an end, but as a means to an end

Social and Economic Development of the People

KEYNOTE ADDRESS

by

Dr. Asad Ali Shah

*Former Member (Infrastructure)
Planning Commission of Pakistan, Islamabad.*

Dr. Hasibullah, Advisor (International Affairs) COMSATS & Coordinator of the National Meeting,
Experts and participants,
Ladies and gentlemen!

I am delighted to be here today with you to share some thoughts on economy and related S&T issues and to benefit from the presentations that will be made in this session with the objective of identification of problems and their S&T-based solutions.

As you all know, Pakistan's Vision 2030, launched in 2007, calls for a "developed, industrialized, just and prosperous Pakistan through rapid and sustainable development in a resource-constrained economy by deploying knowledge inputs". In the formulation of Vision 2030, stress was laid on knowledge and innovation as key drivers of future progress. Science and technology are central to the core competencies that can provide the required skills and enhance productivity to transform agriculture, industry and service sectors in the coming years.

The Vision 2030 is based on a GDP growth of 7 - 8 per cent per year to achieve an income of US\$ 4000 per capita by 2030. As a result of the recent global financial crisis and its impact on Pakistan, Vision 2030 needs to be revisited, taking into account the relatively low growth-rates during 2008 and 2009. High growth-rates of Pakistan in the coming years can be sustained through developing our human resources, and by developing the necessary physical and technological infrastructure. Knowledge, technology and skills will be the tools to managing this immense transformation, enhancing employability, reducing poverty and for better productivity and competitiveness. This task will also demand preparing for the dynamics of growth of large cities, urban concentrations and expected internal and international migration. We would need to leverage the country's locational advantage for developing multiple corridors of regional cooperation, involving energy, industry, trade and transportation. It will require harnessing the tide of globalization and making Pakistan an attractive destination for local and foreign investment. Another imperative in this process would be developing sustainable societies through provision of quality education, basic health, clean water supply and sanitation and other social services to maintain social cohesion. Our quest for better life must be characterized by a quest for excellence and converting knowledge to socio-economic enterprise. The challenges of economic growth, employment and employability must be addressed by harnessing technology with enhanced competitiveness.

In the coming years, Pakistan's natural resources will be severely depleted and stressed, especially water, land and forests. These will be accentuated by the looming climate change. There will be need to manage the water resources through an integrated approach and aggressively pursue all resource conservation technologies. In the agriculture sector, bio-technology will play an important role. Continuing increase in energy demand will need to be managed by diversification of the energy mix and enhancing energy efficiencies. In order to build competitive advantage, there is need to place the infrastructure and instruments to deal with the emergence of 24/7 working society. We would need to bridge the increasing digital divide between Pakistan and the global leaders. This will require the establishment of an excellent, low-cost physical and electronic connectivity with the rest of the world. The physical and technological infrastructure will need to be strengthened to ensure that bottlenecks do not impede the envisaged growth and competitiveness. The comprehensive infrastructure improvement programme under the National Trade Corridor Initiative, to overhaul the entire logistics chain, physical connectivity and related processes, must be continued at rapid speed and efficiency to bring them at par with international standards. Likewise, ICT infrastructure should be enhanced to meet the challenges of technology convergence in order to cater to the present and future needs.

An important building block for achieving our vision will be building an innovative society with the teacher at the center of educational reforms. The techno-socio-economic revolution of the 21st century will have to focus on technologies relating to energy, materials, biology, nanotechnology and computational power. In assessing our challenges and opportunities, we must take into account the global imperatives. A new economic landscape is being created globally that highlights a shift from geographical industrial clusters to virtual clusters, driven by digital innovation. For Pakistan, it is a challenge to operate the next generation communication networks, which combine convergence with speech, stability, security, and flexibility. Some key features of this economy are short product life-cycles, global competition and supply chains, and processes which focus on the entire value chain and not just on internal processes. Pakistan will need to address the challenges of a changing workplace, changing demand for skills, and a flexible gender inclusive workforce. As we build our future together, there will be need to enhance knowledge, information, and skill-levels, as well as competence in, and assimilation of technology; the scale, quality and efficiency of physical infrastructure; and the stability of the macroeconomic environment.

Economic development is a complex phenomenon, which is the outcome of economic, social, and institutional determinance, capital stock, natural resources, technology levels, entrepreneurship, and infrastructure. Sustainability and the trickle down of growth benefits to the poor remain major challenges. Pakistan would need to rely more on growth in productivity than on the accumulation of inputs. In order to attract investments into Pakistan, there would be need to reduce business costs, improve infrastructure, develop legal and regulatory framework, and enhance public-private partnerships.

As the economy continues to modernize, there would be a need for diversification of the manufacturing sector. Vision 2030 envisages the share of the manufacturing sector to increase from the current 18% of GDP to nearly 30%. Pakistan will need to make the accumulation of knowledge and collective competence the major drivers of its economic growth. Important ingredients of this knowledge economy will be high technological activities, such as machinery, bio-technology, telecommunications, space research and advanced financial services. In doing so, Pakistan will have to build competitive advantage against the challenge of competition. This can only be done with a quest for excellence and an academic environment which promotes thinking minds. Science, technology and innovation would be the important pillar on which the economy of Pakistan can grow in the future. Accordingly, much more effort will need to be devoted to research and emerging areas.

Cities are increasingly becoming engines of economic growth, and centers of economic activity, knowledge and influence. Urbanization offers some positive opportunities to Pakistan, which must be exploited. The structural transformation of the economy will result in increasing levels of urbanization. It is important to channel this ongoing urbanization towards a positive impact on economic efficiency. I am glad that this national meeting is focusing on the young and bright Pakistanis. This emphasis on young people is timely because these vibrant and confident Pakistanis, possessing higher expectations and skills than their forebearers, are no longer willing to settle for the second best. I would like to complement COMSATS and COMSTECH for this initiative which is so important in achieving our vision for a productive and progressive Pakistan. I look forward to the presentations and concrete proposals for addressing the challenges that confront Pakistan.

University-Industry-Government Inter-linkages in Pakistan

Wahid Bux Mangrio

University-Industry-Government Inter-linkages in Pakistan

Wahid Bux Mangrio

Mehran University Institute of Science & Technology Development
(MUISTD)

Mehran University of Engineering & Technology, Jamshoro

COMSATS-COMSTech National Meeting on
"Challenges for Socio-economic Development in Pakistan: Role of Science Technology
26-28 Oct, 2009 – COMSTech Islamabad

Structure of Presentation

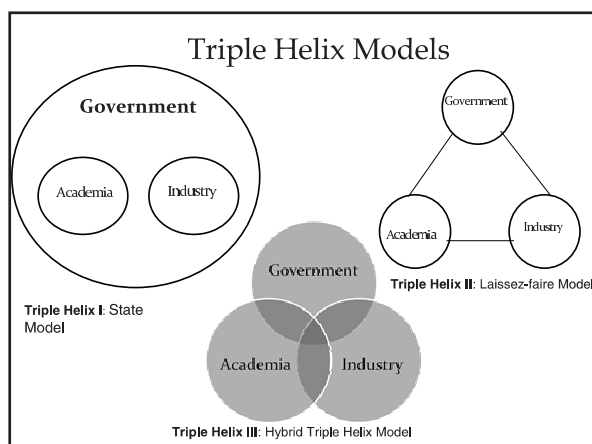
- Introduction
- University-Industry-Government (Triple Helix) Linkages
- Triple Helix Linkages in Pakistan
- Recommendations

Introduction

- To generate, disseminate and apply knowledge is imperative for future economic development (World Bank, 2000; UNDP, 2001)
- Creation and development of linkages between different stakeholders is very crucial
- Performance of innovation system depend on intensity and effectiveness of interaction between university, industry and government
- These links encourage and promote the innovation and production

University, Industry and Government Linkages

- These linkages are best described in Triple Helix Model
- To stimulate the knowledge based economic development
- University can play an enhanced role in innovation in increasingly knowledge-based societies
- Most countries and regions are presently trying to attain some form of Triple Helix III



Triple Helix Linkages in Pakistan

- Weak relations among government, academia and industry (Bashir, 2003; Qureshi, 2006; Naqvi, 2006 and Mangrio, 2009)
- Absence of effective linkages was major obstacle for innovation and technology development
- Only few universities and research institution were able to establish links with industry (Qureshi, 2006)
- Companies don't feel the need of interaction with universities for improving their technological capabilities (Bashir, 2003)

Reason for weak linkages

• Government

- Little domestic effort on science and technology (Qureshi, 2006)
- Meager R&D funding and incentives to S&T manpower
- Lack of policies continuity or policies were not properly implemented

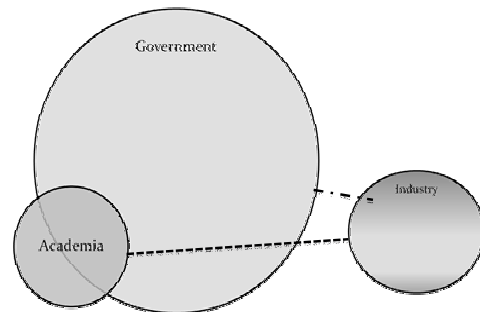
• Industry

- Operating at low technology (Bashir, 2003)
- Private sector don't contributing in R&D

• Universities and Research Institutes

- Development of R&D efforts neglected
- Mainly focusing on education (Teaching)

Triple Helix Linkages in Pakistan



Recommendations

• Government

- Establish high-tech parks
- Enormous funding R&D; preferably joint R&D

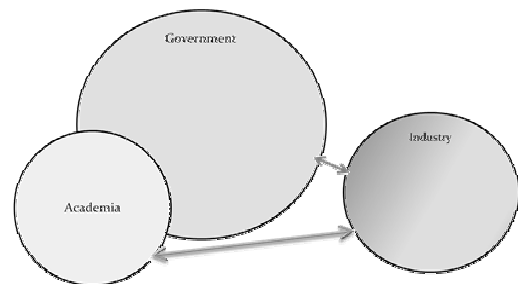
• Universities

- Must build their academic capabilities (Functional & Organizational)
- Redefine aims, objectives and functions

• Industry

- Establishing R&D Labs
- Strong liaison with universities for research input

Triple Helix Linkages in Pakistan



Benefits of S&T Parks

- The overall goal for the development of S&T Parks is to enhance the economic growth
- Contribute to the growth of technology-based manufacturing and services
- Playing a major role in the development of knowledge based industries
- High standard infrastructure to attract more foreign firms
- Increase high technology exports

References

- Bashir, T. (2003). *University – Industry Linkages in Pakistan: A web-based study*, Pakistan Council for Science and Technology, Islamabad.
- Mangrio, W.B., (2009), Role of Science and Technology Parks in establishing University – Industry Linkages: *Case Study of Software Technology Parks of Islamabad*, MS Thesis, Mehran University of Engineering & Technology Jamshoro
- Naqvi, I. B. (2006). Bridging the Gap among Academia, Industry and Government – IT Policy of Pakistan. Workshop on ICT-Public Policy: Bridging the Gap Among Academia, Industry and Government. Mehran University of Engineering and Technology, Jamshoro, Pakistan, 16 September 2006.
- Qureshi, S.M. (2006). Building Triple Helix Relations in Pakistan. Conference on Triple Helix Paradigm for Development: Strategies for Cooperation and Exchange of Good Practice, Univ. of the West England, Bristol, U.K, 17-18-19 September 2006.
- UNDP (2001), "Human Development Report 2001 Making the New Technologies Work for Human Development," United Nation Development Programme, New York.
- World Bank (2002), "Constructing Knowledge Societies: New Challenges for Tertiary Education." Washington, DC: World Bank.

Role of S&T in Economic Issues

Asad Raza

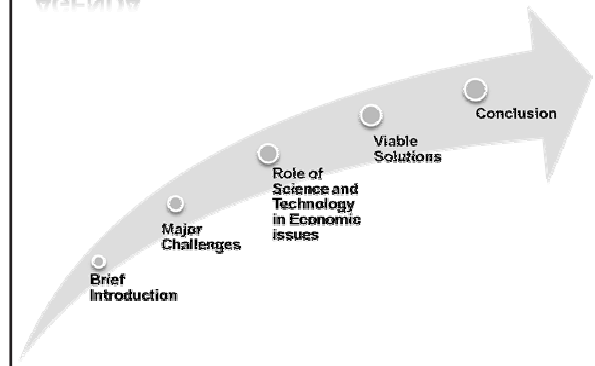
ROLE OF SCIENCE AND TECHNOLOGY IN ECONOMIC ISSUES

By

Asad Raza

National University of Science and Technology

AGENDA



BRIEF INTRODUCTION

- ✖ Economic development is a life necessity for lesser developed countries
- ✖ Strategies for economic development stress the importance of science and technology in accomplishing such goals
- ✖ Achievement of socio-economic development of any country or region calls for a multi-dimensional action plan that encompasses all the significant factors.
- ✖ Science, technology and innovation are now key to improving economic performance and social well-being.

MAJOR CHALLENGES

Poverty Alleviation

- S&T widening the GAP between rich and poor
- Mobilize S&T in rural areas
- Developing a comprehensive database for demographics and locations
- Distribution of available funds and resources

Illiteracy

- Need to develop MCT(Multipurpose community telecentres). E.g (eChoupal)
- Facilitation of remote and off-campus education
- Technology should be used to make it accessible and affordable
- Short trainings and crash courses
- Focus on technical education
- Cell phones can be utilized for educating and publicizing vocational trainings

MAJOR CHALLENGES

Unemployment

- More than 7% of our people are unemployed
- Employment organizations should be launched in separate regions
- Create an online national data bank for unemployed personals
- Notifying the employer as well as prospective employee

Agriculture Development

- Pakistan has over 19 million hectares of irrigated area which is about 8% of the world's total irrigated area
- Introduction of cooperative farming methodology
- Lack of funds in agriculture research

ACCESS TO GLOBAL ECONOMY



Economy is increasingly coordinated and reliant on high quality broadband Internet access

- Broadband deployment is a particular challenge in rural areas
- Rural areas can benefit from both tele-medicine and tele-education, which can provide top-notch services to underserved areas
- Education opportunities can be realized through broadband
- A 2001 report by the Brookings Institution estimated that widespread adoption of broadband could add \$500 million to the national economy and create 1.2 million jobs per year
- For every dollar invested in broadband the economy sees a ten-fold return on that investment.

INVESTMENT IN INTANGIBLE ASSETS



Object Oriented Research & Development

- Target oriented R&D in rural areas
- We need mentors
- Funded projects and internships in remote areas



Agricultural Research Service

- Our agricultural sector is still labour-intensive
- PARC needs to work on research for development
- Viable methods of farming with less funds should be introduced



University Research facilities

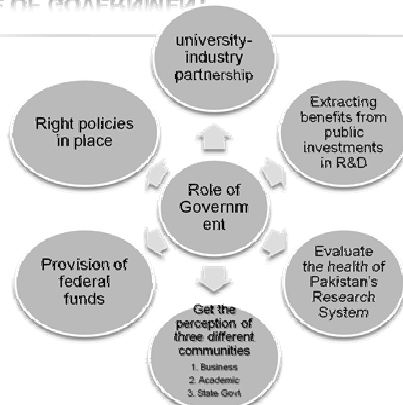
- Task oriented institutes
- State of the art equipment and facilities
- Introducing University-industry partnership
- Establishing a trust relationship between industry & Universities

CONVERTING SEMINARIES IN PROGRESSIVE SCHOOLS



- Over 30,000 seminaries in Pakistan
- Producing counter productive Human Resource
- Build a database for these seminaries
- Converting the seminaries into enlightened and progressive schools
- Students can grow into workable and useable commodity

ROLE OF GOVERNMENT



Productivity

Samar Min Allah

Economy and S&T Issues

PRODUCTIVITY

Samar Min Allah
NUST Institute of Civil Engineering

General Statistics

• Population (millions), 2008	167.0
• GDP (US\$ billions), 2008	167.6
• GDP per capita (US\$), 2008	1,044.5
• GDP per capita (rank out of 121), 2008	96
• Real GDP growth (percent), 2008	6.0
• Current account balance (share of GDP), 2008	-8.4
• Total exports (US\$ millions)	20,058.5
• Total exports (rank out of 121)	65
• Total imports (US\$ millions)	40,999.0
• Total imports (rank out of 121)	52

(Source: The Global Enabling Trade Report 2009 © 2009 World Economic Forum)

Samar Min Allah

Exports and Imports by Sector, 2007

Samar Min Allah

Problems faced by Pakistan's Economy

- Heavily populated country
- Lack of skilled labor
- Internal political instability
- Phases of military dictatorship
- Inefficient, corrupt government rule
- Law and order problems
- Outdated infrastructure
- Power shortages
- Lack of industrial development
- Low productivity of the existing industries

Samar Min Allah

Productivity

S&T

↓

PRODUCTIVITY

↓

ECONOMY

What is Productivity

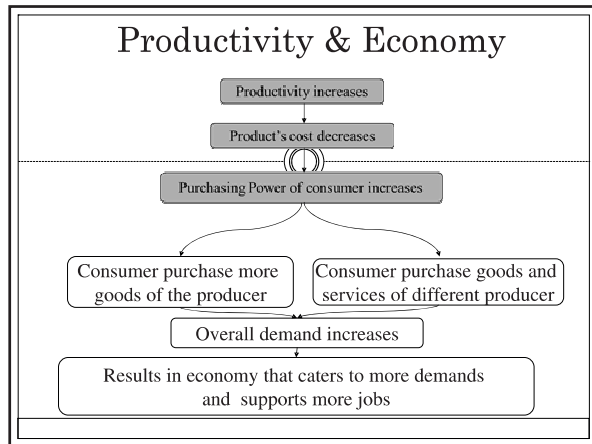
➤ An appropriate measure to determine health and growth of an economy.

“Ratio of output of goods and services to the required input.”

Measures

- i. Total Factor Productivity (TFP) – total output by all applicable inputs → measures efficiency of an economy's productive process
- ii. Labor Productivity (LP) – output per unit of labor (i.e. worker, labor hours etc)

Samar Min Allah



Technology & Productivity

8

"Technology is the engine of economic growth. In the US, technological advance has been responsible for as much as two thirds of productivity growth since the Depression."

Technology Policy Paper (President Clinton)

- Geotechnical and Mechanical Engineering to improve mines productivity
- Technology to improve Pakistan's manufactured products and agriculture industry.

Sumar Min Allah

Mining in Pakistan

9

- The Salt Range in Punjab has the largest deposit of pure salt found anywhere in the world.
- Baluchistan's Reko Diq area has among the world's top seven copper reserves.
- The Reko Diq project is estimated to produce 200,000 tons of copper and 400,000 ounces of gold per year, at an estimated value of \$1.25 billion at current market prices.
- According to the current market price, the value of the deposits has been estimated at about \$65 billion.
- Pakistan has some of the finest and purest grades of marble, granite and slate reserves in the world.

Sumar Min Allah

Agricultural Products & Manufactures

12

- Automation in industries
 - Synchronization,
 - Quality,
 - Quantity,
 - Time
- Genetically engineered seeds
- Seeding, cultivating and harvesting using agricultural machinery
 - Increase productivity by consuming less time, reduce loss of material
- Machinery in textile industry.
 - Quality of machine woven cloth is better hence better reputation in international market and more demand

Sumar Min Allah



Agricultural Products & Manufactures

12

- Automation in industries
 - Synchronization,
 - Quality,
 - Quantity,
 - Time
- Genetically engineered seeds
- Seeding, cultivating and harvesting using agricultural machinery
 - Increase productivity by consuming less time, reduce loss of material
- Machinery in textile industry.
 - Quality of machine woven cloth is better hence better reputation in international market and more demand

Sumar Min Allah

Use of Expansion Materials in Block Mining of Marble Granite

Aamir Muhammad

USE OF EXPANSION MATERIALS IN BLOCK MINING OF MARBLE GRANITE



By

Engr. **Aamir
Muhammad**
M.Sc Mining Engg
DIMENSION STONES
CENTRE PCSIR
PESHAWAR

DIMENSION STONES



■ All stones including marble, granite and slate, which can be cut to sizes, polished and used for construction and decoration purposed are called dimension stones

PRESENT METHODS OF MINING



- Use of dynamites
- Use of mining chisels

DRAWBACKS OF THESE METHODS

(contd...)



- Undesirable waste produced

DRAWBACKS OF THESE METHODS

(contd...)



- Irregular shaped blocks produced

DRAWBACKS OF THESE METHODS

(contd...)



- Micro cracks developed in strata

DRAWBACKS OF THESE METHODS



(contd...)

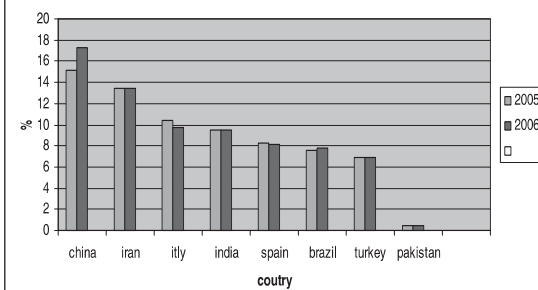
- High working face developed (which is difficult to handle)

INTERNATIONAL QUALITY STANDARD

- Regular shaped blocks
- No use of explosive
- No micro cracks

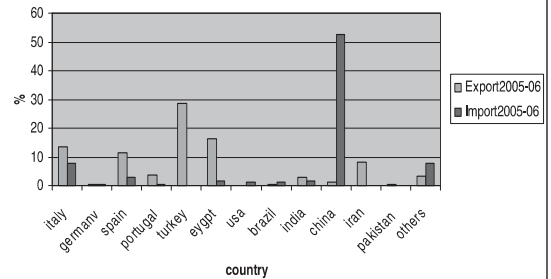
Source: Marble -stat 2007

Principal producer countries



Source: marble state 2007

Marble and limestone in blocks and raw slabs



Source: marble state 2007

WHAT IS CRACKING POWDER???



- Dry imported Chemical
- Different Chemical composition
- Oxides of Calcium, silicon and aluminum
- Available in different packing

WHAT ACTUALLY HAPPENS???



- Up to 18000 PSI expanding strength
- Work through drill lines of different dia and pattern
- Expansion then breakage phenomena

WHY CRACKING POWDER???



- Non explosive product
- Soundless , No Gases
- No vibration
- No micro cracks
- No Flying Rocks
- No waste produced
- Good quarry maintenance
- Health friendly
- Environment friendly
- Cost effective

HOW CRACKING POWDER MIX& Poured??



- Mix with common water

HOW CRACKING POWDER MIX & Poured

(contd...)



- Ratio
- 1:3
- 1 (water)
- 3 (cracking powder)

HOW CRACKING POWDER MIX& Poured??



- Quickly poured after mixing
- If late fluidity will be loosed
- Use bucket with spout of funnel
- For horizontal hole use grout pump
- Drill horizontal holes with some slope

CRACKING MECHANISM???

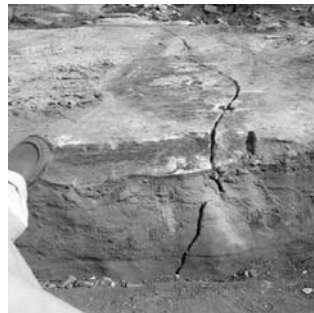
(contd....)



- Crack initiation
- Crack propagation
- Increase in crack width

CRACKING MECHANISM???

(contd....)



- Crack initiation

CRACKING MECHANISM???



(contd....)

- Crack propagation

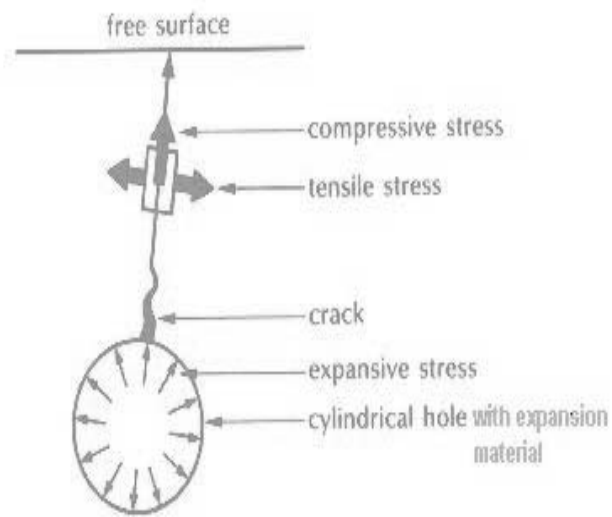
CRACKING MECHANISM???



- Increase in crack width

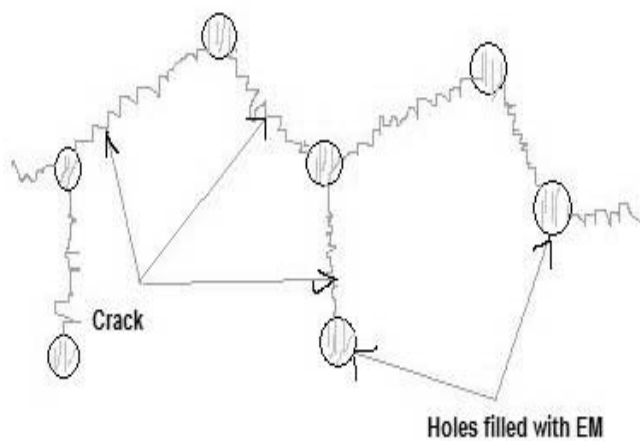
CRACKING MECHANISM???

(contd....)



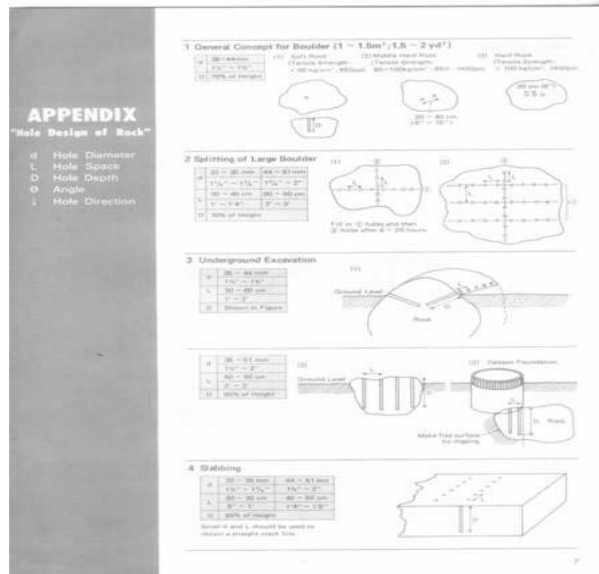
Crack
initiation

CRACKING MECHANISM???



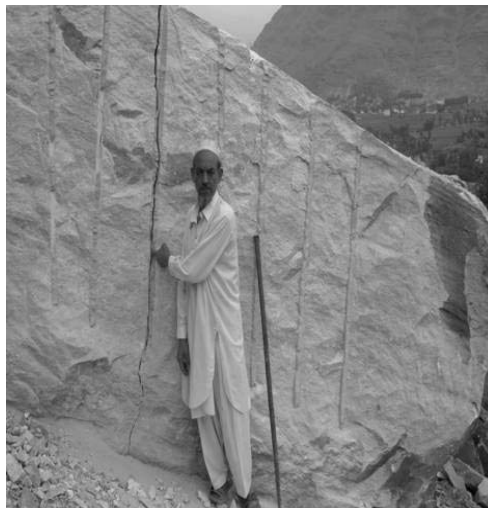
■ Crack
propagation

FACTORES AFFECTING CRACKING MECHANISM???



- Hole dia
- Drilling pattern
- Spacing b/w holes
- Hole depth
- Temperature
- Humidity
- Rock strength
- Filling time

APPLICATIONS



- Quarrying/mining
- Rock breaking
- Rock trenching
- Reinforced concrete breaking
- Underwater rock/concrete breaking

CONTROL BLASTING V/S CRACKING POWDER



March 2009 Data

Site name: Al-Aziz mine
Malakand
Block dimensions: 50 x 18 x 7.5

Total area: 6750 cubic ft

No. of drill holes: 60
Depth of hole: 6.5ft
Total drilling: 390 liner feet
Drilling cost: 390 x 40 =
Rs15600/-
Cracking powder =155kg =
31000/-
Total net cost = Rs. 46600/-

Total production= 489 MTons

2003-04 Data

Site name: united mine bunair
Block dimension: 40x16x11
and 26x13x11

Total area: 10758 cubic ft

No. of drill holes: 29
Depth of hole: 16ft and 13ft
Total drilling: 431 liner feet
Drilling cost: 431 x 20 = 8620/-
Explosive cost = 5010/-
Total cost = Rs.13630/-

Total production= 470 MTons

With No Kanda and No Waste.
Pricing:
Irregular Block Rates = 800/ MTon
Cubic Block Rates = 2000/ MTon

Block= 470Tons x 2000= 940000
Bolder =19Tons x 400=5700
Total net production= Rs: **945700**

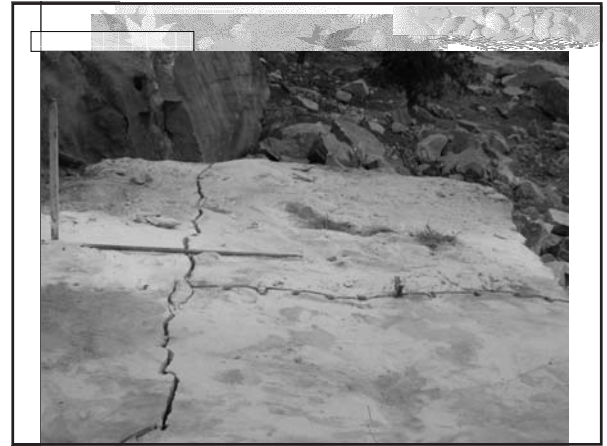
With a lot of Kanda and Waste
blocks=22 loads x20 = 440
MTons
Semi Blocks 2 loads
x20=30MTons
Pricing :
Irregular Bolck Rates =400/Mton
Semi Block Rates = 200/Mton
blocks =176,000/-
semi block =8000/-
Total net
production=176,000+8000=
Rs. 184000/-

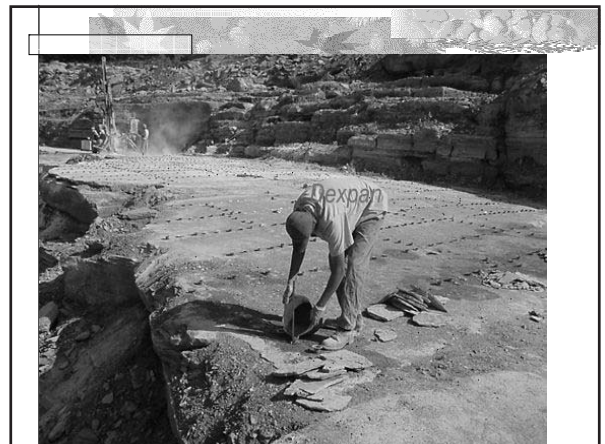
**With Cracking Powder Its
Block Rate Should be >1800/T**

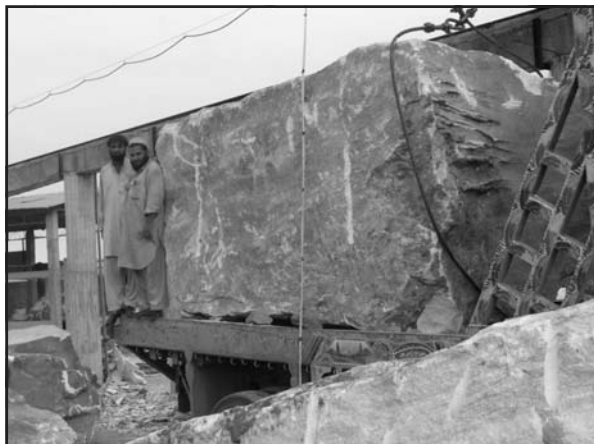
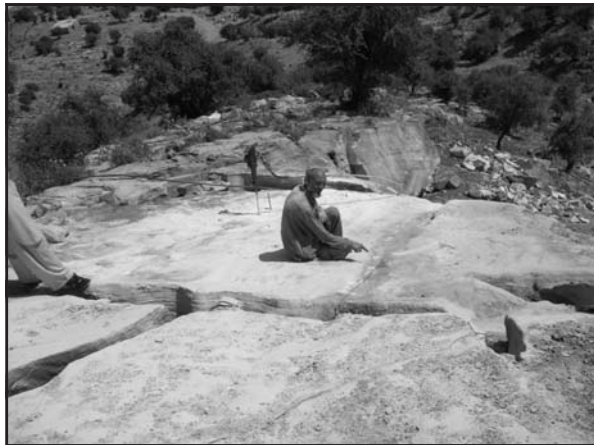
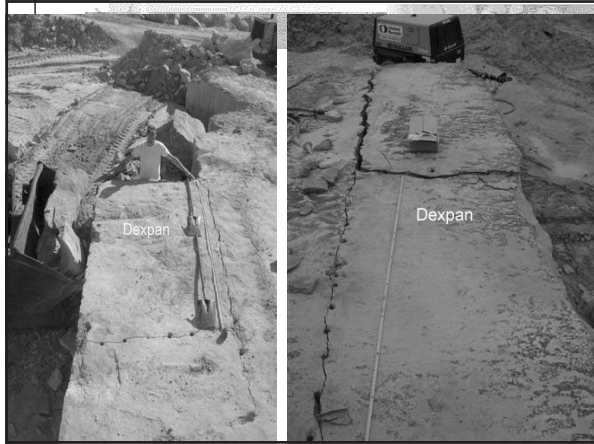


Al-aziz mining pvt. Ltd.
Cracking Powder











SPECIAL THANKS TO:

- Dexpan® Non-Explosive Controlled Demolition Agent
- China Chemicals China
- Bustar demolition technologies
- Crack mite international
- Report on development and application of extraction techniques for mining of dimensional blocks of mining (Mining engineering department UET Peshawar)
- Management of PCSIR Peshawar
- Alaziz mining company for support and coordination

Socio-economic Development of Pakistan: Role of Engineering and Technology

M. Jawad Qarni

Socio-Economic Development of Pakistan

ROLE OF ENGINEERING & TECHNOLOGY



By: Muhammad Jawad Qarni
Faculty of Mechanical Engineering
Ghulam Ishaq Khan Institute of Engg. Sciences & Tech.

Outline of The Presentation

- Introduction – Economy of Pakistan
- GDP of Pakistan
- Performance of the Major Sectors
 - Agriculture
 - Energy
 - Engineering
 - Education
- Conclusion

2

Present Economy - Introduction

Pakistan economy is currently faced with unprecedented challenges.

Factors:

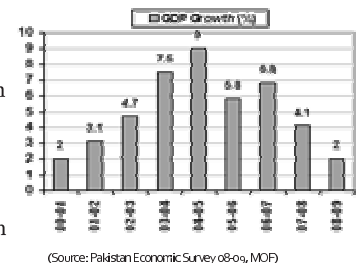
- War on Terror
- Lower inflows of Foreign Investment
- Power shortage
- Higher Inflation
- Spike in Food Prices
- Contraction in Large Scale Manufacturing



3

GDP of Pakistan

- The cumulative effects of the mentioned challenges have been a significant loss of growth momentum in the economy.
- Figure shows the percentage growth in GDP from 2001 to 2009.



Comparison to Rest of the World

Comparative Real GDP Growth Rates (%) [World economic outlook (IMF), April 2009]					
Region/Country	2005-2006	2006-2007	2007-2008	2008-2009	Diff (09-08)
World GDP	5.1	5.2	3.2	-1.3	-4.5
Euro Area	2.9	2.7	0.9	-4.2	-5.1
US	2.8	2.0	1.1	-2.8	-3.9
Japan	2.0	2.4	-0.6	-6.2	-5.6
Germany	3.0	2.5	1.3	-5.6	-6.9
China	10.4	10.7	10.4	10.7	0.3
Singapore	8.4	7.8	1.1	-10.0	-11.1
South Asia and Middle East					
India	9.8	9.3	7.3	4.5	-2.8
Pakistan	5.8	6.8	4.1	2.4	-1.7
Bangladesh	6.5	6.3	5.6	5.0	-0.6
Saudi-Arabia	3.0	3.5	4.6	-0.9	-5.5
Iran	5.8	7.8	4.5	3.2	-3.6

Performance of the Major Sectors

The following are the most important drivers:

- Agriculture
- Energy
- Manufacturing
- Education

6

Agriculture Sector - Overview

- Agriculture is still the largest sector of the Pakistan's economy.
- Source of the livelihood of almost 44.7% of the total employed labor force.
- With present contribution to GDP at 21.8%.



Thus the importance of this sector cannot be ignored

7

Agriculture Sector – Root Causes

- High cost of production** due to **low productivity** attributed to the inefficient farming practices.
- Farm operations demand precision to optimize the efficiencies of agricultural input for higher productivity.
- Supply of irrigation water.



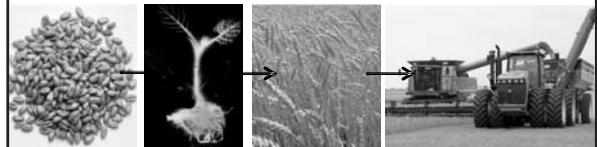
8

Period	Kharif	Rabi	Total	%age incr/derc
Avg. sys usage	67.1	36.4	103.5	-
2002-03	62.8	25.0	87.8	-15.2
2003-04	65.9	31.5	97.4	-5.9
2004-05	57.1	23.1	82.2	-20.6
2005-06	70.8	30.1	100.9	-2.5
2006-07	63.1	31.2	94.3	-8.9
2007-08	70.8	27.9	98.7	-4.6
2008-09	66.9	24.9	91.8	-11.3

Source: Indus River System Authority

Agriculture Sector – Solution

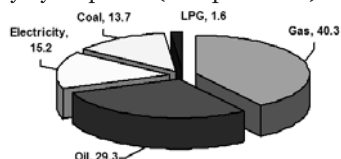
- Accelerated **farm mechanization** is an important ingredient of the strategy to accelerate growth rate in the agriculture sector.
- Effective use of **improved seed and fertilizer** can result in higher agricultural production.



10

Energy Sector – Overview

- The energy sector is the **backbone** of all economic activities.
- On going **energy crisis** has effected all sectors.
- Large scale manufacturing suffered a **decline of 7.7%** (mainly attributed to power shortage).
- Currently **only 33%** of the total electricity demand is met by hydel power (cheapest form).



11

Table 2: Total installed generation capacity (MW)

Sr. #	Power Company	Installed Capacity	Share %
1	WAPDA	11,454	58.0
	Hydel	6,555	57.2*
	Thermal	4,899	42.8*
2	IPPs	5,954	30.1
3	Nuclear	462	2.3
4	KESC	1,884	9.5
	Total	19,754	100.0

Source: Hydrocarbon development institute of Pakistan

Energy Sector – Root Causes

- **Very few hydro-electricity plant** and even **lower water levels** in the dams.
- Most of the power demand is met by thermal sources (diesel etc) which is very costly.
- Frequent breakdowns and scheduled maintenance.



13

Energy Sector – Solution

Alternative Sources of Energy*

1. Wind Energy
2. Solar Energy
3. Coal Power Plants
4. Bio-Gas and Bio-Diesel

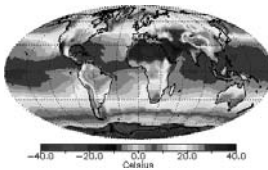


(*Note: Even though these source cannot be a replacement for the hydel power generation, but building a dam require many year of planning and even more years in building, Therefore alternative sources of energy should be explored).

14

Solar Energy

- Pakistan is an exceptional **sunny country**.
- The map shows the average temperature in celcius for the month of July.
- The energy of the sun should be harnessed to produce power.



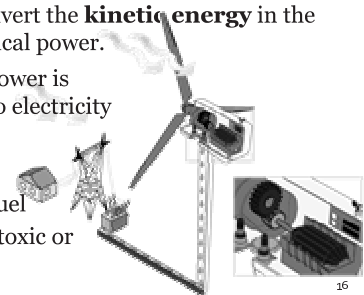
15

Wind Energy an Introduction

- Wind is used to generate **mechanical power** or **electricity**.
- Wind turbines convert the **kinetic energy** in the wind into mechanical power.
- This mechanical power is converted by a into electricity

Advantages:

- Pollution-free
- Does not require fuel
- Does not produce toxic or radioactive waste

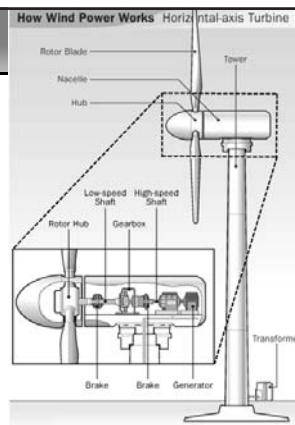


16

Wind Energy an Introduction

Wind Turbine Components:

- Rotor blades
- Shaft
- Gearbox
- Generator
- Yaw controller (not shown)
- Brakes
- Tower
- Electrical equipment



17

Engineering Sector - Overview

- **Second largest sector** of the economy. It contributes 18.4% of the GDP.
- However during 2008-09 it posted a decline of 7.7%.
- The table shows some of the sectors with the overall decline.

Electrical	Automobile	Steel Products	Petroleum Products
-31.3%	-39.0%	-5.6%	-9.2%

Source: Federal bureau of Statistics



Engineering Sector – Root Causes



This sluggish growth in large scale engineering during the current fiscal year is mainly caused by:

- The impact of severe energy shortages
- Deterioration in domestic law and order situation
- Sharp depreciation of national currency against US dollar

39

Engineering Sector



- Engineering sector accounts for around **63%** share in world trade.
- Achieving any significant share of this market will require major reforms.
- Concerted efforts is required in gearing up the **universities, poly-technical schools and factories** for the kind of manufacturing competitiveness and **design required by the world market**.
- Proven techniques of **operation management** and **quality control**.
- University and industry liaison should be increased

20

Education Sector



- Education is extensively regarded as a **route to economic prosperity** being the key to **scientific and technological development**.
- It also **combat unemployment**, confirms sound foundation of social equity, **awareness**, tolerance and it originate confidence which **empowers people to defend their rights**.



Education Sector



- Education plays a pivotal role in human capital formation and a necessary tool for sustainable socio-economic growth.
- It raises the **productivity** and **efficiency** of individuals and thus produces **skilled manpower** capable for leading the economy towards the path of economic development.
- However despite the multifaceted impact of education, education sector have always been neglected in budgetary allocations. Its allocation in the GDP is the lowest (**2.1% during 2008-09**).

22

The Challenging Economic Problems and their Solutions

Syed Qudratullah

The Challenging Economic Problems & Their Recommended Solutions

By: Syed Qudratullah

From:

**Balochistan University of Information Technology,
Engineering & Management Sciences, Quetta.**

Out Line:

- Law & Order Situation (Terrorism)
- Severe Energy Crisis
- Agriculture Backwardness
- Export Import Deficit
- Low Literacy Rate
- Shortage of Capital
- Brain Drain
- Unskilled Human Resource
- Recommendations

1. Law & Order Situation (Terrorism)

- Self invited curse jeopardized the existence of the country.
- This situation drastically discourage national as well as foreign investment in the country.
- Severely damaged the tourism industry.

2. Severe Energy Crisis

- Today Pakistan is facing a deficit of 4,500 mega watts.
- Situation is so severe that in big cities power cuts last for 12 of every 24 hours, with one hour on, and one hour off.
- Its quite embracing that in last 7 years a single extra unit is not produced.

3. Agriculture Backwardness

- Being an agrarian economy we are unable even to feed our own nation (Flores and Sugar).
- Extremely backward sector: primitive techniques of production, rotten seeds and traditional equipments.
- Ignorance of Govt.

4. Export Import Deficit

- High level of imports and low level of exports.
- Poor Quality products and lack of direct access to the international markets due to which we always run out of our foreign reserves.

5. Low Literacy Rate

- 58% of literacy rate including those as well who can only read and write.

6. Shortage of Capital

- Low level of savings of the masses (Poverty).

7. Brain Drain

- We are losing our best, the skilled and high qualified people are leaving the country.

8. Unskilled Human Resource

- Due to lack of technical institutions the productivity level of our labor force is very low.

Recommendations

- Modern and sophisticated weapons and equipments should be given to security forces in order to tackle terrorism.
- The utilization of coal reserves for removal of energy crisis as well as nuclear and wind energy.
- Modern and improved seeds should be introduced for increasing per acre yield.
- More research centers and cold storages equipped with modern technology should be provided to agri. Sector.
- For better development of agriculture sector we will have to take the help of Bio-technology.
- Research and innovation should be common so that everyone could approach to that.
- The subject of science and technology should be introduced at primary level.

Thank you
For your attention

Factors Influencing the Socio-economic Development of Pakistan

M. Kashif Munir



Muhammad Kashif Munir

Research Officer
PMRC TB Research Centre
KEMU Mayo Hospital Lahore

Factors influencing the socio-economic development of Pakistan: Role of Science and Technology

Pakistan is suffering from severe socio-economic inequalities that brings about the failure in development.

Cultural boundaries, behavior of the society and politics are identified as big barriers to the notion of development.

Challenges for the socio-economic development of Pakistan are enlisted and discussed as follows.

➤ Population:

- Pakistan stands 6th among the most populous states with a population of almost 175 million.
- High growth rate of 1.9% per annum.
- 60% of the population based on youngsters.

➤ Rising Trend of Poverty & Inflation

- About 6 million families living below the poverty line.
- Unemployment that was 36% in 2005 poses an increasing trend.
- Rural urban migration has a great threat to the economic, social and physical conditions.
- Inflation has also an additive effect on poverty that act as to rub the salt on soar.

➤ Poverty & Inflation



➤Poverty & Inflation



➤Poverty & Inflation



➤Agricultural land utilization & Industrialization

- Agriculture sector lacks solid planning.
- Agricultural land near cities is diminished.
- No-cultivated land has not been utilized as residential & industrial area.
- Industry that acts as back bone in the development of any country has low progress than required.

➤Health and Education

- These are the most important factors.
- High rates of infant child and maternal mortality.
- No strength to facilitate the rural dwellers in the basic health units.
- Literacy rate is 49%, however less than 12% in many rural areas.

➤Health and Education



➤Health and Education



➤ Environment

- Environmental problems like soil, water and air pollutions have exceeded beyond the prescribed level due to
 - i. Rural urban migration.
 - ii. Poor standards of sanitation.
 - iii. Lack of proper waste collection.
 - iv. Non disposal of industrial waste.
 - v. Dramatic increase in vehicles

➤ Environment



➤ Economy & Electric power generation

- Economy of any country greatly depends upon the electric power generation.
- Industries, markets and all the machines are useless without electric power.
- Economy is demolished by loan giving agencies that in turn remain on draining our national resources.

➤ Other Influencing Factors

- Sociology and journalism.
- Entrepreneurship.
- Governance & economic development.
- War on terror.
- Rehabilitation of refugees.

➤ War on terror & Rehabilitation



➤ Role of Science & Technology

- Science & technology (S&T) can contribute in every field of life like health & education, research, agriculture, economy and employment.
- Socio-economical challenges need to have clear understanding of technological innovation in Pakistan.

➤ Role of Science & Technology

❖ Three Basic Elements

- Need approach methodology should be applied to show the important technologies from society's need prospective.
- Relationship of S&T with socio-economic challenges need to recognize the importance of systematic analysis approach to the issues.
- Necessary priority settings of future societal needs for analysis of S&T.
- Role of S&T can be discussed as follows.

➤ Role of Science & Technology

- 1) **Economic Stability;** no desired economic development of any country is possible without adopting the Information Technology (IT) that helps the financial services broadly by
 - supporting operational efficiencies,
 - Facilitating customer services delivery,
 - Risk management & Decision support.

➤ Role of Science & Technology

- 2) **High Agricultural Yield:**
 - Expert System; Forecasts the future decisions.
 - a) **Grain Marketing Advisor;** Expert to determine marketing alternatives, Farm condition, price level & trend, and timing for input data.
 - b) **COMAX;** Inform integrated crop management in cotton.
 - c) **GOSSYM;** It require weather data, soil fertility & physiology and pest management information.

➤ Role of Science & Technology

- 3) **Industrial Energy & Power Generation:**
 - Energy Load Management; at the demanding side to run the energy system more efficiently.
 - Move load from expensive to less expensive side.
 - Adopt the energy generation methods other than Dams e. g. Solar energy and Uranium etc.

➤ Role of Science & Technology

- 4) **Poverty Alleviation;** can be solved by
 - a) Improving the total social & economic opportunities.
 - b) Equitable distribution of benefits.
 - c) Support the handycap people.
 - d) Educate and train the work force to international standards.
 - e) Incorporate IT in every field.
 - f) Focus to upgrade the technical and managerial skills of people.

➤ Role of Science & Technology

- Need to do
 - Quality Scientific research based on
 - i. Health Sciences.
 - ii. Industrial Science.
 - iii. Environmental & Natural Sciences.
 - iv. Applied & Agricultural Sciences.
 - Involvement of youth in every field of S&T especially females.

➤ **Role of Science & Technology**

➤ **Need to do**

- **Unleash the talented & creative youth by S&T.**
- **Scientists must be strengthen by patent and intellectual Laws.**
- **Scientists must be encouraged to publish and patent their major findings.**
- **Dissemination and utilization of scientific results.**
- **Multidisciplinary research by S&T budget.**
- **Priority of Health & Education at any level.**
- **Primary education level should be upgraded.**

➤ **Role of Science & Technology**

➤ **Need to do**

- Madressah Education shouldn't be discouraged as it provides class rooms, residence & food to poor students and provide primary education and govt. should;
 - i. Register all the madressahs
 - ii. Appoint educated & trained teachers to teach other subjects.

➤ **Role of Science & Technology**

➤ **Need to do**

- Ensure the presence of Doctors at BHU,s.
- Control the birth rate & Inflation.
- Establishment of Maternity homes at least the BHU level.
- Promote the IT professionals.
- Quick response to the natural disasters.

In my opinion

IT is the current choice of many developing & developed countries to upgrade their economies and to become competitive in the global market.

Quote by Nalsen Mandela

Action without vision is only passing time,
Vision without action is only day dreaming,
but vision with action can change the world.

Thanks.....

Freedom of Information: A Tool for Accountability

Syed Safwan Khalid

Freedom of Information: A Tool for Accountability

Presented by
Safwan Khalid

Outline

- State of Corruption in Pakistan
- Freedom of Information
- Electronic Freedom of Information
- Status of IT in Pakistan
- Data Mining
- Conclusion

State of Corruption in Pakistan

- By a report of Transparency International Pakistan is ranked 41st in corruption among 179 countries in 2007.
- Worldwide Governance Indicators of World Bank state that Pakistan has a percentile rank of 25% in control of corruption in 2008.
- TI's Global Corruption Barometer 2007 shows Pakistan to be one of the countries most affected by petty bribery.

State of Corruption in Pakistan

- The World Economic Forum's Global Competitiveness Report (2007-08) identifies corruption as the third greatest problem for companies doing business in Pakistan.
- Roughly 40 percent of companies in Pakistan feel that corruption is one of their major concerns.
- Doing Business Survey of the World Bank, has shown the country slipping two places to 76 out of 178 countries in 2008.

State of Corruption in Pakistan

- TI Pakistan's survey of government customers recognizes "Lack of Accountability" as the largest factor attributed to corruption.
- National Anti Corruption Strategy (2002) suggests giving citizens the legal right of access to government documents as the most fundamental anti-corruption tool.

Freedom of Information Legislation

- Freedom of information legislation represents the legal process by which requesters may ask for government held information and receive it freely or at minimal cost.
- Pakistan's Freedom of Information Ordinance 2002 allows any citizen the right to request information regarding the workings, facts or data relating to the government.

Freedom of Information Legislation

- Freedom of Information Ordinance 2002
- Freedom of Information Rules 2004
- Balochistan Freedom of Information Act 2005
- Sindh Freedom of Information Act 2006
- Freedom of Information Bill 2008

Freedom of Information Legislation

- Fill a challan of Rs.50 and deposit in National or State Bank.
- Fill Annexure-1 of FOI Rules 2004.
- Attach a CNIC.
- Post or deliver to the concerned department.
- Information will be provided in 21 days.
- Appeals for delay or denial can be made to federal ombudsman.

Electronic Freedom of Information

- The provision that the government held information is published and provided in electronic form.
- United States Electronic Freedom of Information Act 1996.
- Electronic Freedom of Information Law 2005 in Hungary.

E-FOI Implementation

- Departmental Reading Rooms
- Publishing of Data on Departmental Websites
- Publishing Data in Digital Formats e.g. CDs and DVDs
- A Central National level Data Base

Status of IT in Pakistan

- An IT workforce of 133,000 with a growth rate of 20,000 a year.
- Nearly 10 million Internet users with 1900 cities/towns connected to internet.
- National Database and Registration Authority (NADRA).

DATA Mining

- Applying Computer Learning to automatically analyze and extract knowledge from data contained within a database.
- Detection of patterns pointing to corruption or fraudulent transaction.
- Detection of flaws in data.
- Interpolation of missing data.

DATA Mining : Examples

- AT&T uses data mining to detect fraudulent international calls.
- The Financial Crimes Enforcement Network AI system uses data mining to identify possible money laundering within large cash transaction.
- The Advanced Security for Personal Communication European group has employed data mining to detect fraud in mobile phone networks.

Conclusion

- I recognize Corruption as a major factor hampering the economic growth.
- I propose implementation of electronic freedom of information systems to act as a tool for improved accountability.
- I further propose to employ data mining techniques to enhance the detection of corruption cases using the electronic data.

REFERENCES

- National Anti Corruption Strategy (NACS) 2002.
- Worldwide Governance Indicators, Country Data Report for Pakistan , 1996-2008
- U4 Expert Answer, Overview of Corruption in Pakistan.
- National Accountability Bureau Annual Report 2007.
- "The Right to Know" by Naeem Sadiq September 2009.
- "DATA Mining: A Tutorial Based Primer", Richard J. Roger Michael W. Geatz.

REFERENCES

- www.info.worldbank.org
- www.doingbusiness.org
- www.pseb.org.pk
- www.wikipedia.org
- www.infotech.aicpa.org
- www.freedominfo.org
- www.libertysecurity.org
- www.u4.no
- www.transparency.org

Practicing ICTs in Private Sector

Khalid Latif

Practicing ICTs in Public Sector

Dr. Khalid Latif

School of Electrical Engineering and Computer Science,
National University of Sciences and Technology (NUST)

Background

- Corruption deteriorates the state of the affairs in socioeconomic development activities.
- Dimensions of Corruption
 - **Level:** Top, Middle, Bottom
 - **Execution:** Technical, Crude
 - **Sector:** Public, Private

Problem

- Ours is among the countries with the most perceived corruption according to Corruption Perception Survey (CPS) conducted by TI.
- Most corrupted sector of Pakistan is **public sector** followed by judiciary and then political parties.
- Gang of seven in the hall of shame:
 - Police, Taxation, Custom, Power, Health, Education, and Land Administration.

The Devil is in the Details

- Chains of petty corruption to
 - access public services; and
 - to bypass the law through the direct interaction of citizens (business entity) with the respective authorities

Solution

- Reduce direct contact between the business entity and public services/admin officers.
- Practicing ICT applications in public sector can reduce corruption by instating accountability in the processes and transparency in the interactions.
- Examples
 - ATM and E-Banking
 - E-Tag by NHA
 - EasyPaisha

What more we all need?

- EasyHealth (Streamlining healthcare processes)
- EasyPolice (Complaint registration in Police department)
- ...
- Result
 - Improved living standard by introducing transparency and automation in the routine life tasks.
 - Socioeconomic parameters will improve.
 - Local/foreign investors will indulge in more and more economic activities.

OUTCOME (TECHNICAL SESSION - 4)

Theme: Economy and S&T Issues

Subject Experts: 1. Dr. Tariq-ur-Rahman
2. Dr. Asad Ali Shah

Presentations by: 1. Mr. Wahid Bux Mangrio
2. Mr. Asad Raza
3. Ms. Samar Min Allah
4. Mr. Aamir Muhammad
5. Mr. Jawad Qarni
6. Mr. Syed Qudratullah
7. Mr. Kashif Munir
8. Mr. S.Safwan Khalid
9. Dr. Khalid Latif

Problems-identified in the Session	S&T-led solutions
R&D in science and technology is highly neglected in the country.	Good quality R&D labs should be established. Universities must enhance their academic capabilities, particularly in S&T. The government should establish high-tech parks and should also ear-mark adequate funds for R&D.
Industries are operating on low-grade technology. Private sector is not adequately contributing in R&D. The relationship among government, academia and industry needs to be strengthened.	There should be strong linkages between universities and industry to optimally utilize the S&T research output of the former in industrial production. Liaison, in this regard, should be established through effective technical means.
Gap between the social status of the rich and the poor is increasing due to highly disproportionate access to science and technology.	S&T should be mobilized in rural areas. Latest technology should be used to develop a comprehensive database of the poor populations, their demographics and locations.
Inaccessibility of technology to the rural and remote areas.	e-Learning programmes, such as those of Virtual University should be developed in order to facilitate remote, off-the-campus education. Cell phones can be effectively used for educating/ promoting different vocational trainings.
Insufficient healthcare facilities available for the masses which significantly restraining the economic productivity.	With the help of ICTs we can coordinate the various healthcare activities to ensure immediate availability of most appropriate healthcare for a particular emergency. With use of ICTs, medical transcriptions can be made available via internet for Pakistani citizens from across the globe.

Most of the industrial and agricultural work is still done manually.	Introduction of machines can refine the work and reduce the production-time. Locally manufactured machines should be extensively used, wherever possible.
The industry of dimension stones (granite and marble) is not properly developed.	Cracking-powder should be used to minimize waste from the extraction of square shaped blocks, which is in a high demand in the international market.
We are still using limited conventional sources of energy against rapidly growing demand.	Exploit and research on the use of other/renewable energy sources, such as solar energy, wind energy, bio-fuels, to meet energy needs. Private sector should be encouraged to invest, in this regard.
We have a high-level of imports and a low-level of exports.	We need to bridge this gap in order to maintain balance of payments by increasing applied R&D in indigenous industrial production using the latest S&T-knowledge.
Our agriculture is extremely backward. It uses the primitive techniques of production, low-quality seeds and traditional equipment.	Better agro-technology should be introduced through incentives by government. Organic food should be made to increase its share in total food-consumption.
Corruption has become a major retarding factor to Pakistan's economy.	ICTs should be extensively utilized for eradication of corruption in public- and private-sectors. Freedom of Information Act should be available to everyone electronically. The e-governance and e-management should be extensively used.
Globalization and excessive luxury-imports are significant economic problems for the country.	International competitiveness should be increased through assimilation and adaptation policies, for example in electronics, automobile industry and ICTs.
Low economic productivity is prevailing in the country's existing industries.	S&T should be extensively employed to increase economic productivity on the whole. Copper and gold reserves in Riko-dik area of Balochistan, and granite and marble deposits available in Pakistan, etc., to be exploited with geotechnical methods. Agricultural productivity to be boosted by genetic-engineering and biotechnology.

AGRICULTURE AND ENVIRONMENT**Subject Experts**

1. Dr. Qamar-uz-Zaman Chaudhry
Director General
Pakistan Meteorological
Department (PMD)
Islamabad.
2. Dr. M.E. Tusneem
Member (Food and Agriculture)
Planning Commission of Pakistan
Islamabad.

Presentations by:

1. Mr. M. Masood Azeem
Lecturer
Department of Development Economics
University of Agriculture
Faisalabad.
2. Ms. Shumaila Afzal
Student
Fatima Jinnah Women University (FJWU)
Rawalpindi.
3. Mr. Shabeh-ul-Hasson
Scientific Officer
Global Change Impact Studies
Centre (GCISC)
Islamabad.

Keynote Presentation

by

Dr. Qamar-uz-Zaman Chaudhry

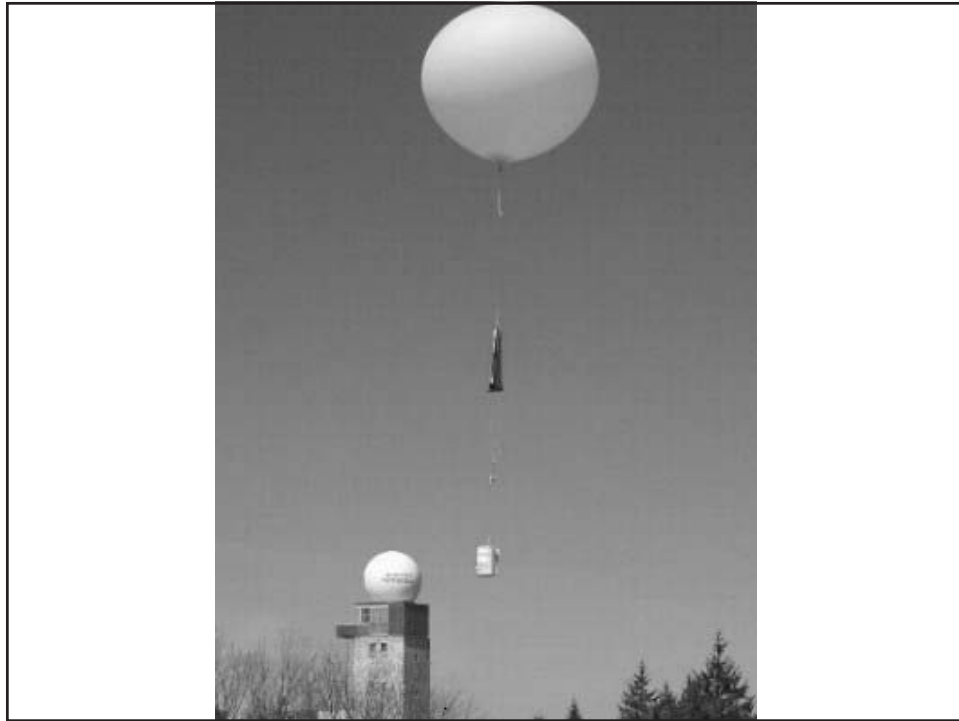
Director General, Pakistan Meteorological Department (PMD), Islamabad.

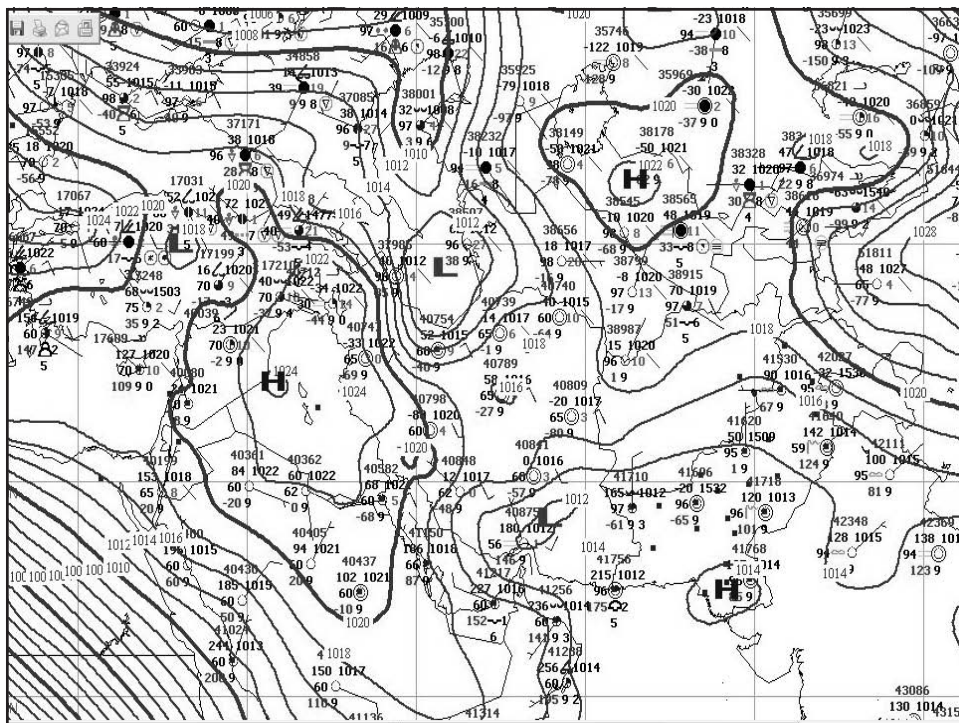


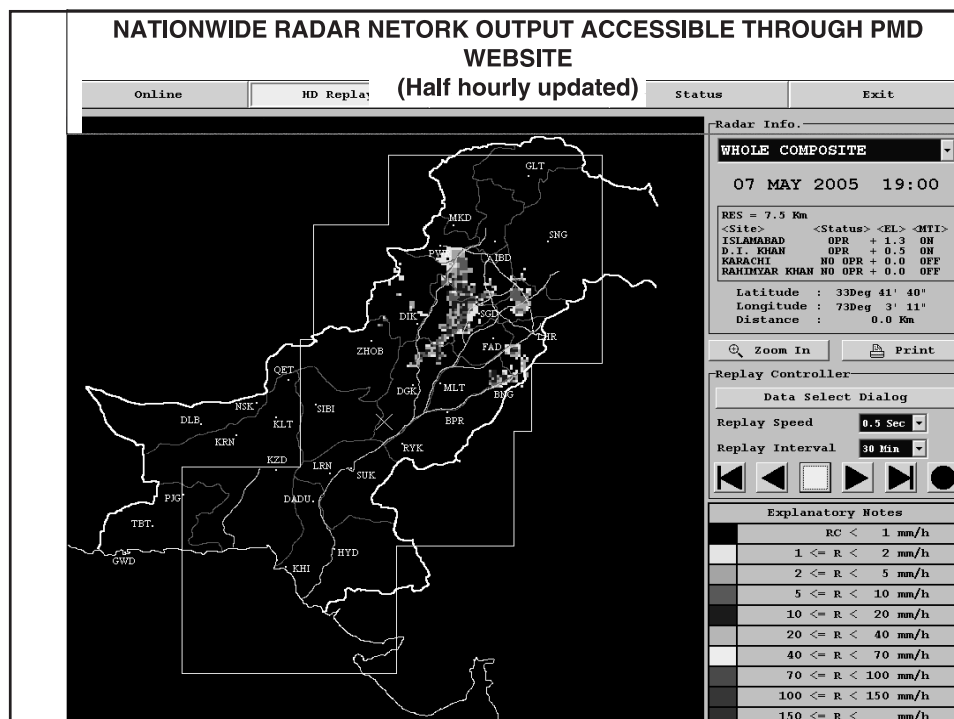
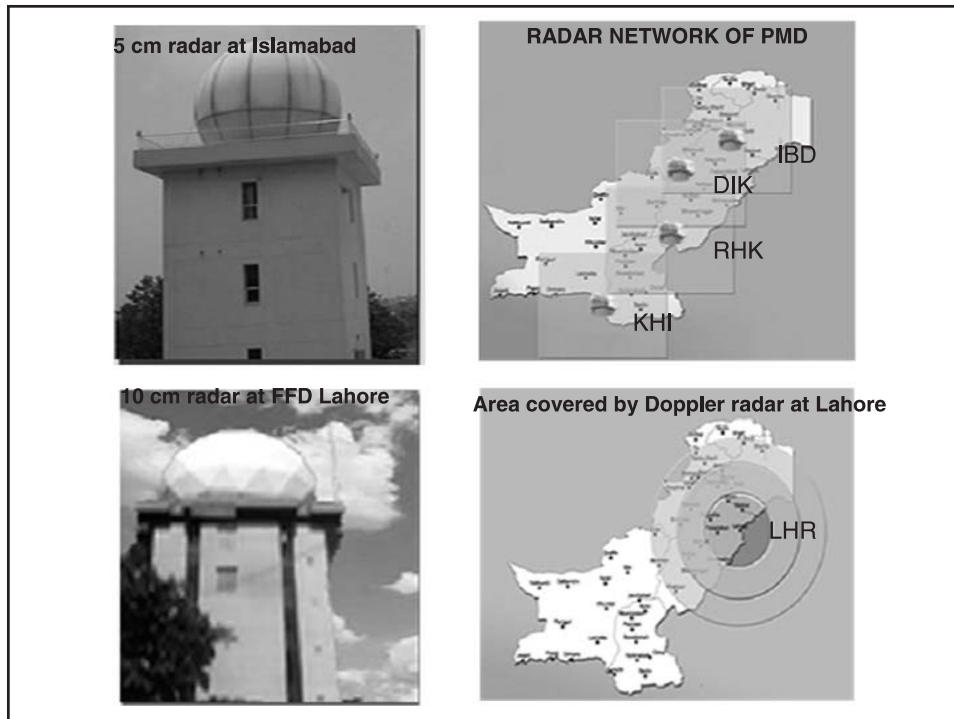
**Science & Technology for
Early Warning, Detection,
Prediction & Forecast**

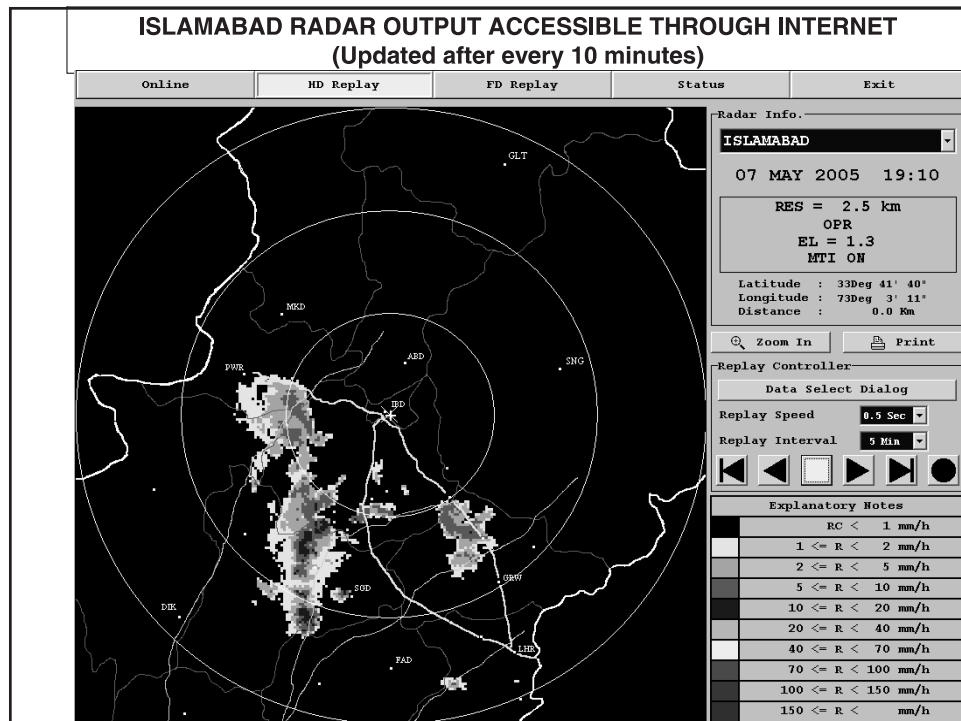
Dr. Qamar-uz-Zaman Chaudhry
Director General
Pakistan Meteorological Department
<http://www.pakmet.com.pk>

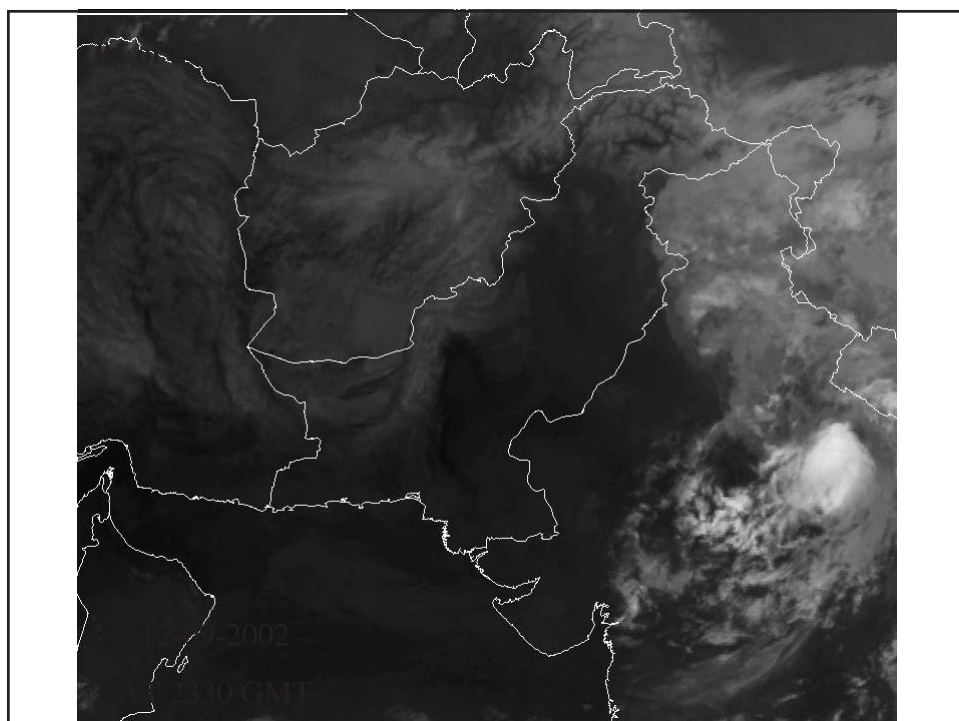
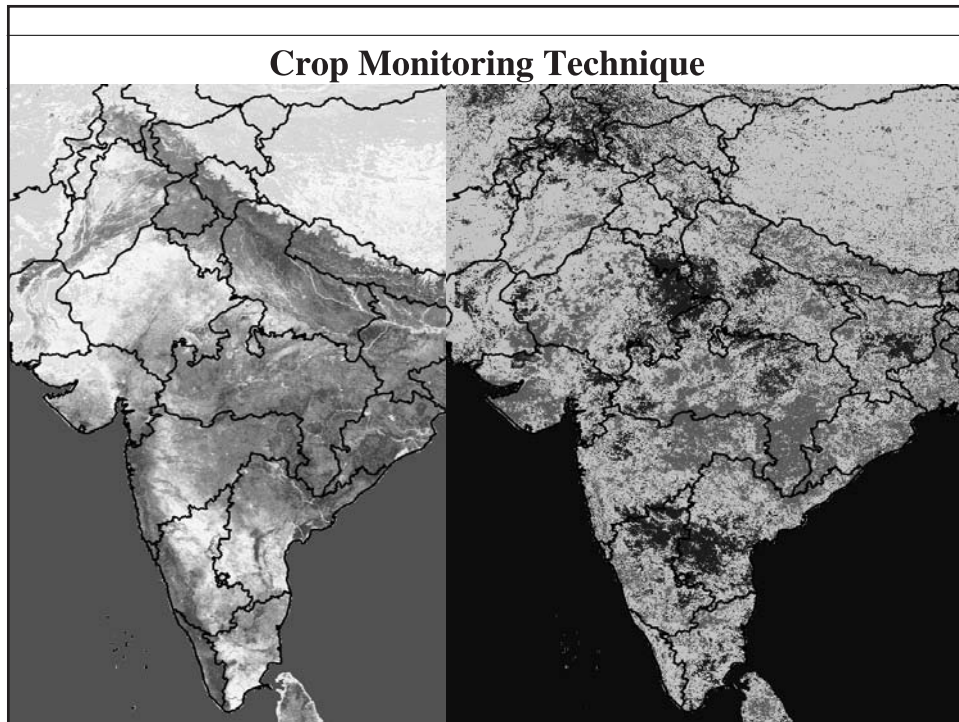


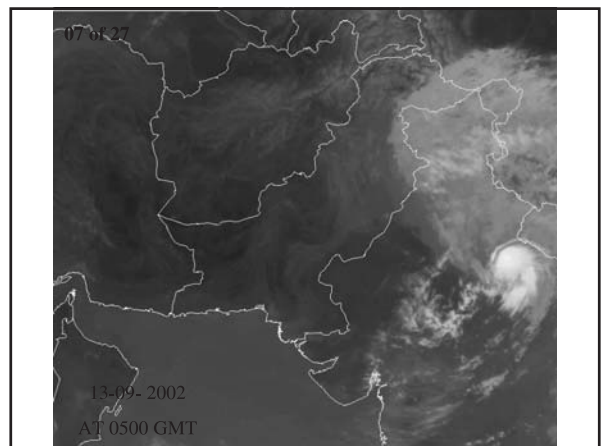
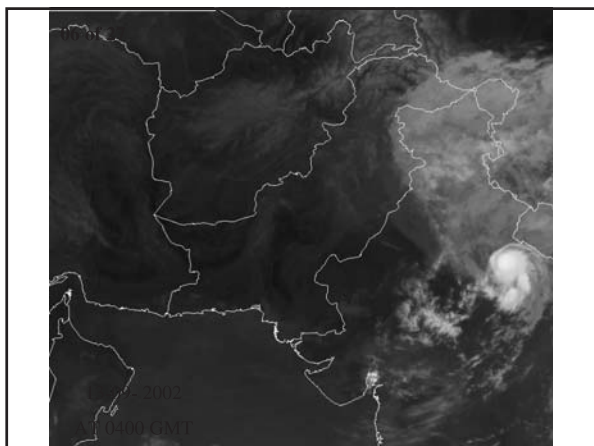
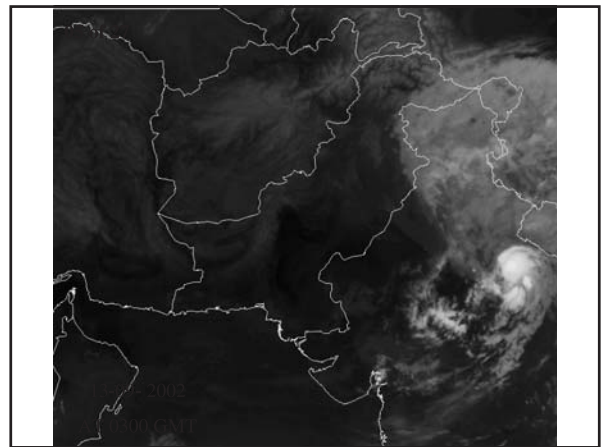
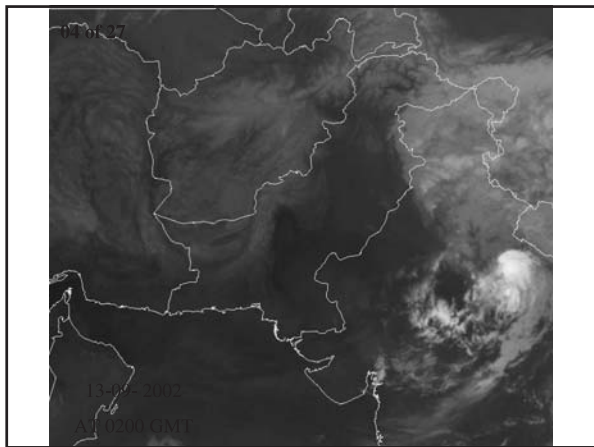
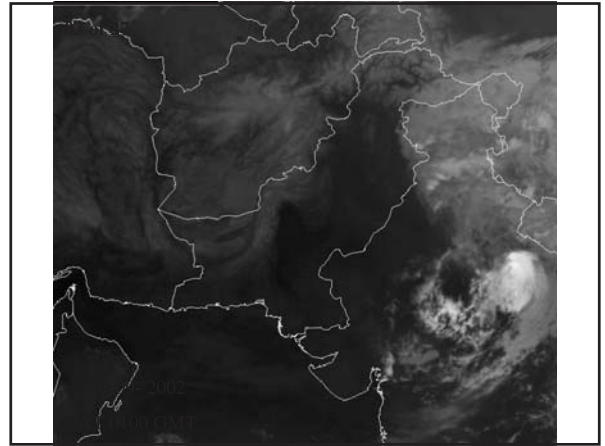
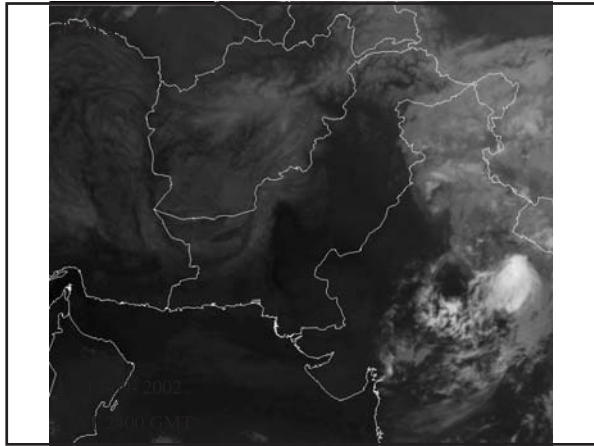


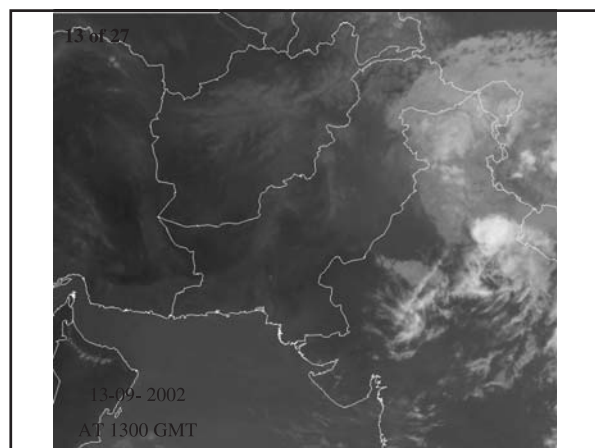
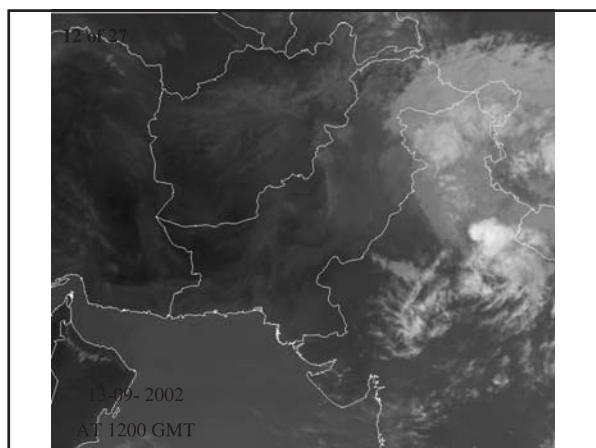
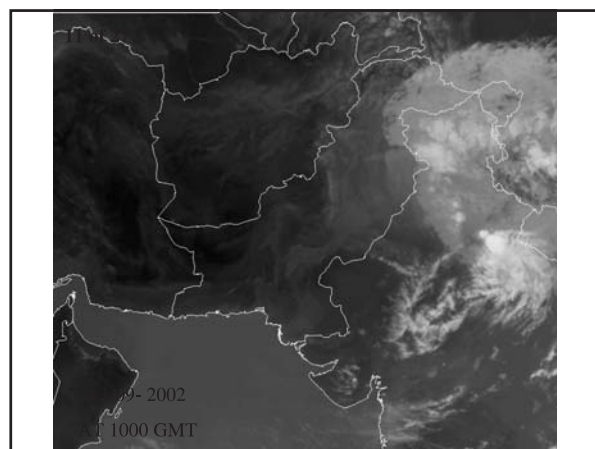
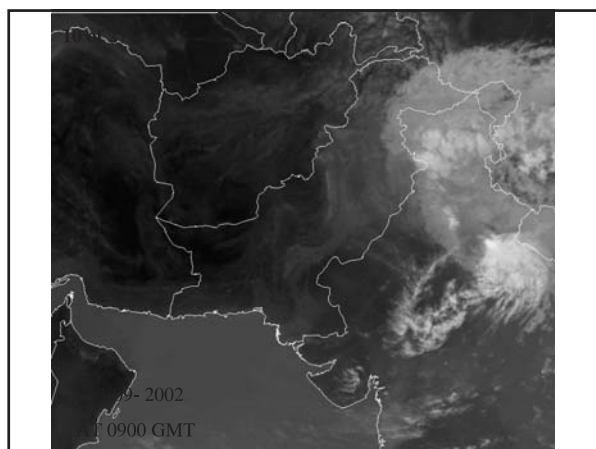
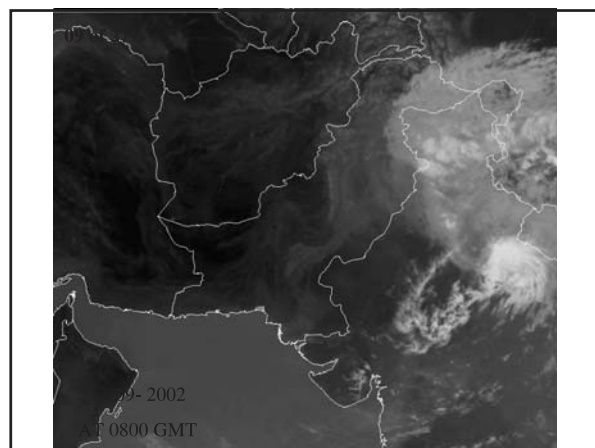
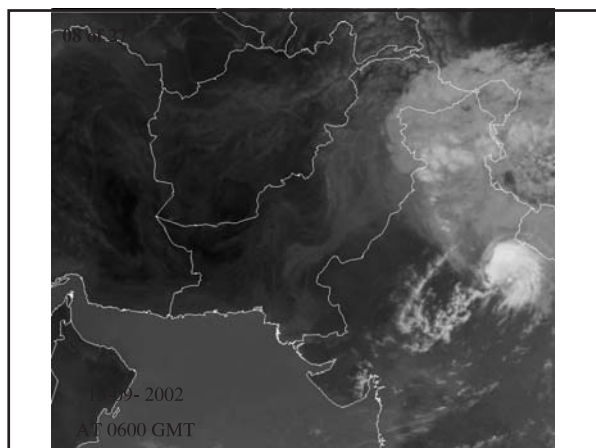


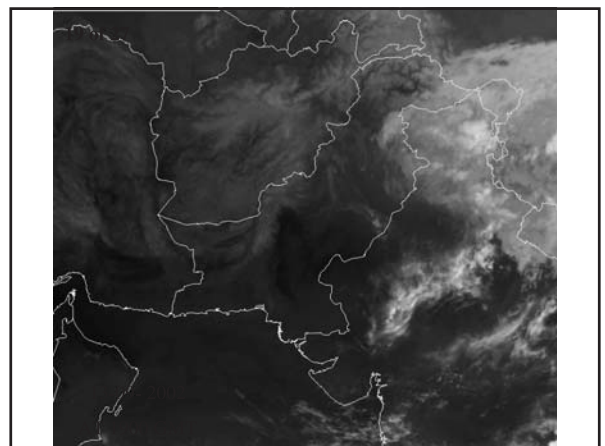
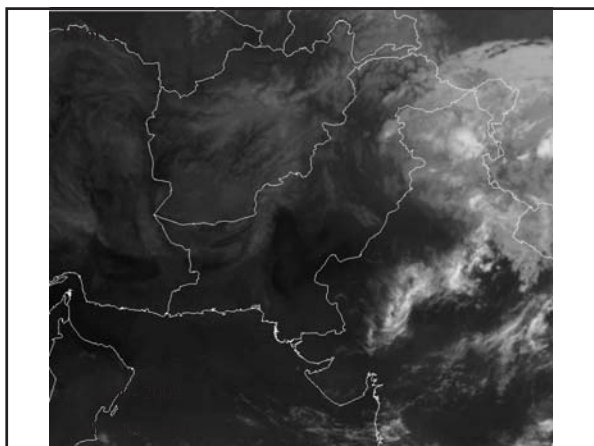
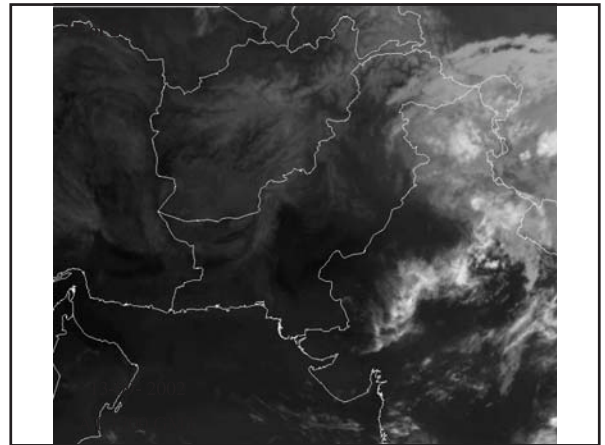
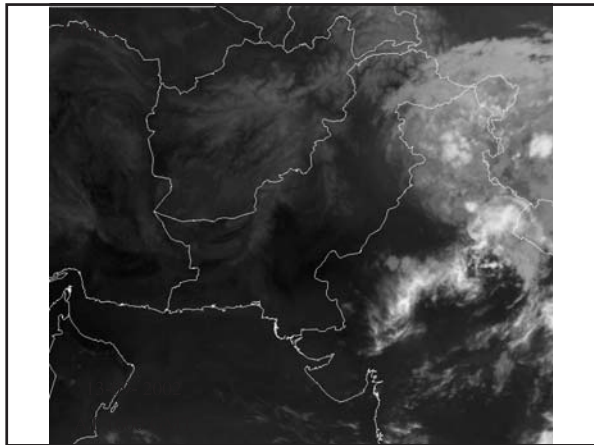
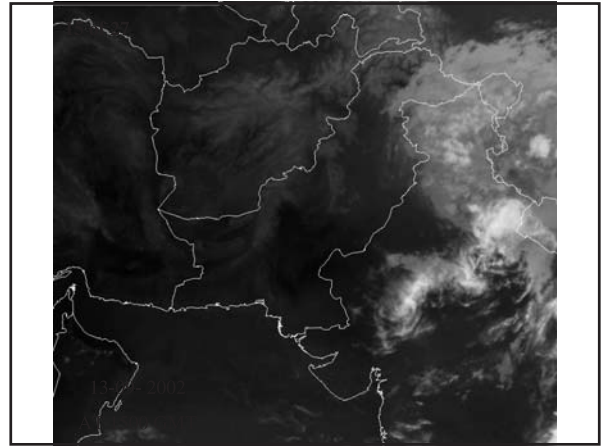
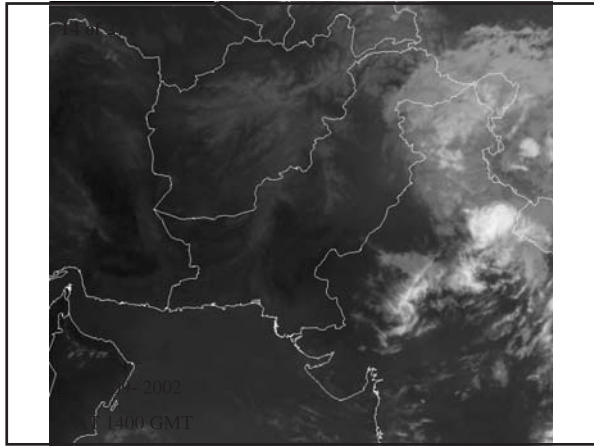


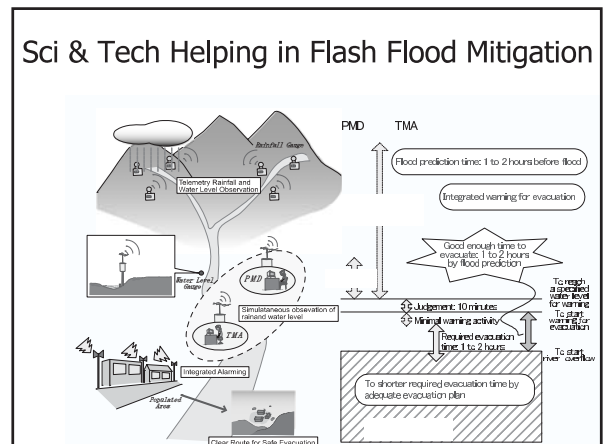
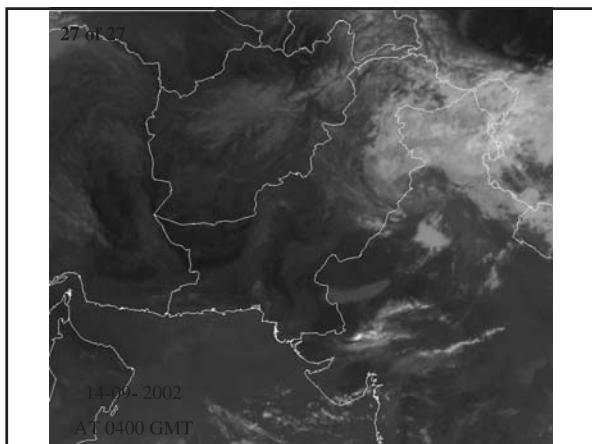
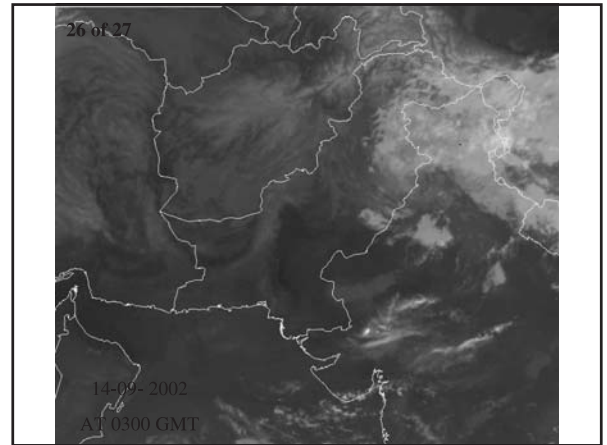
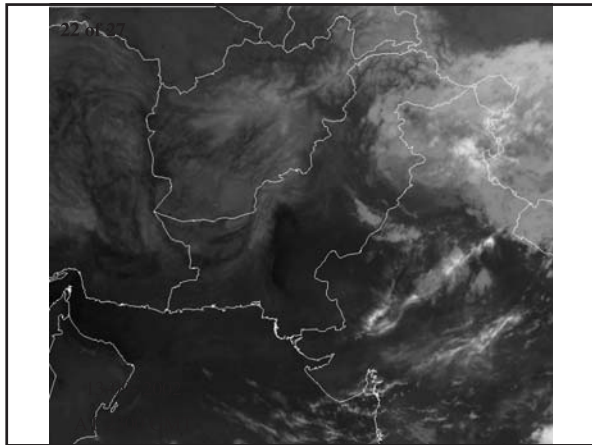
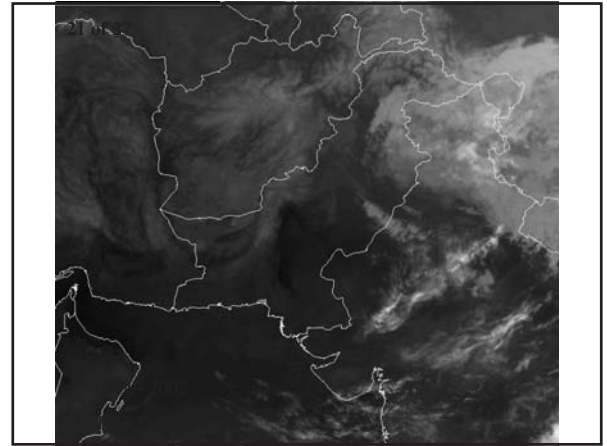
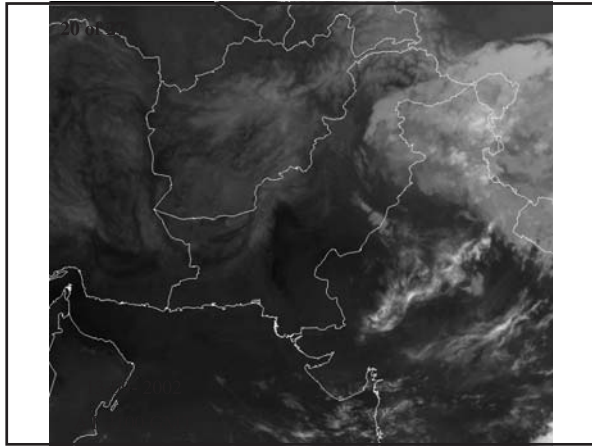












Lai Nullah Basin Area

2001 Flood

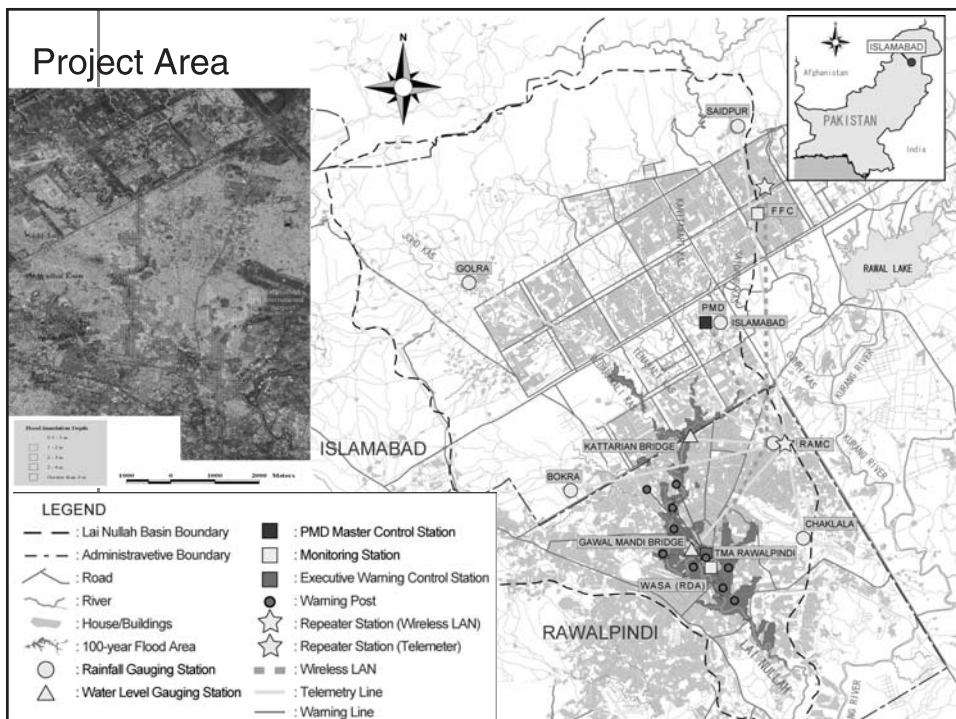


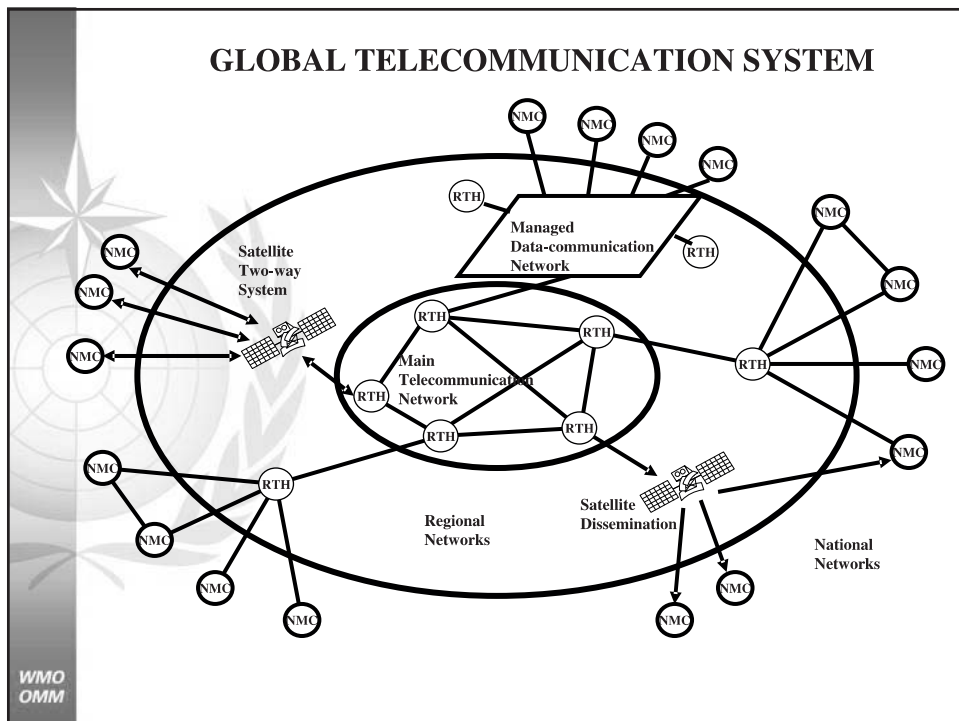
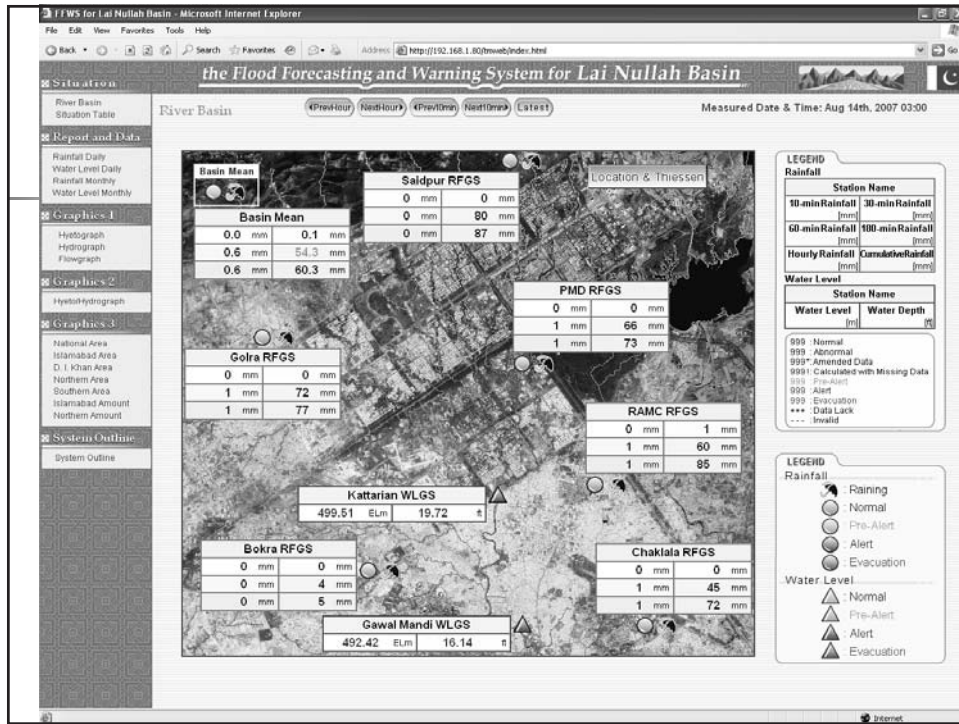
✓ The highest flash flood

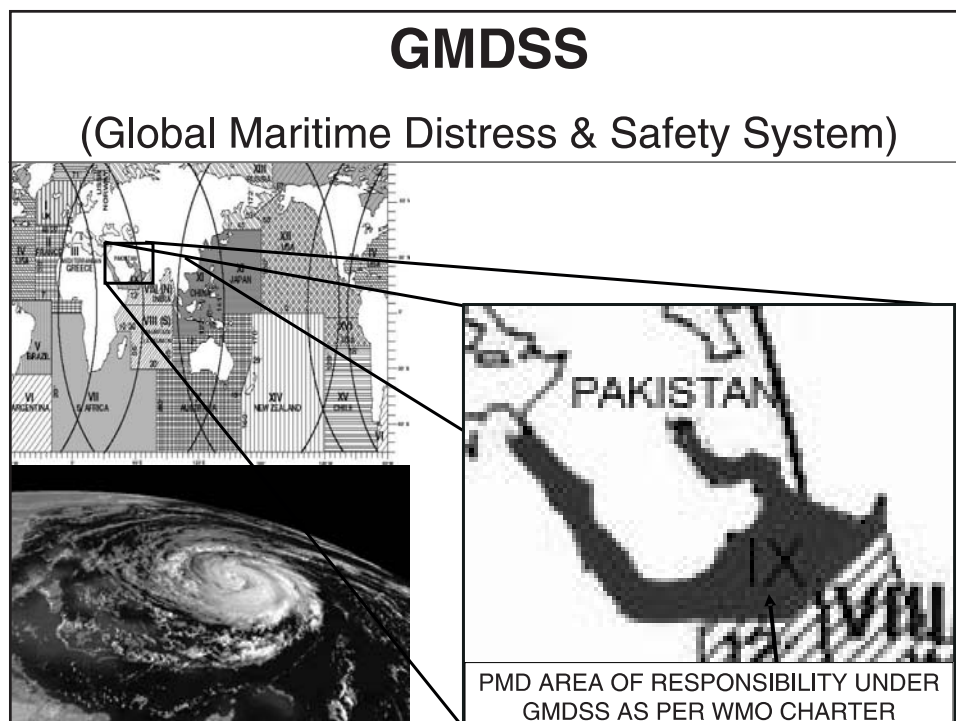
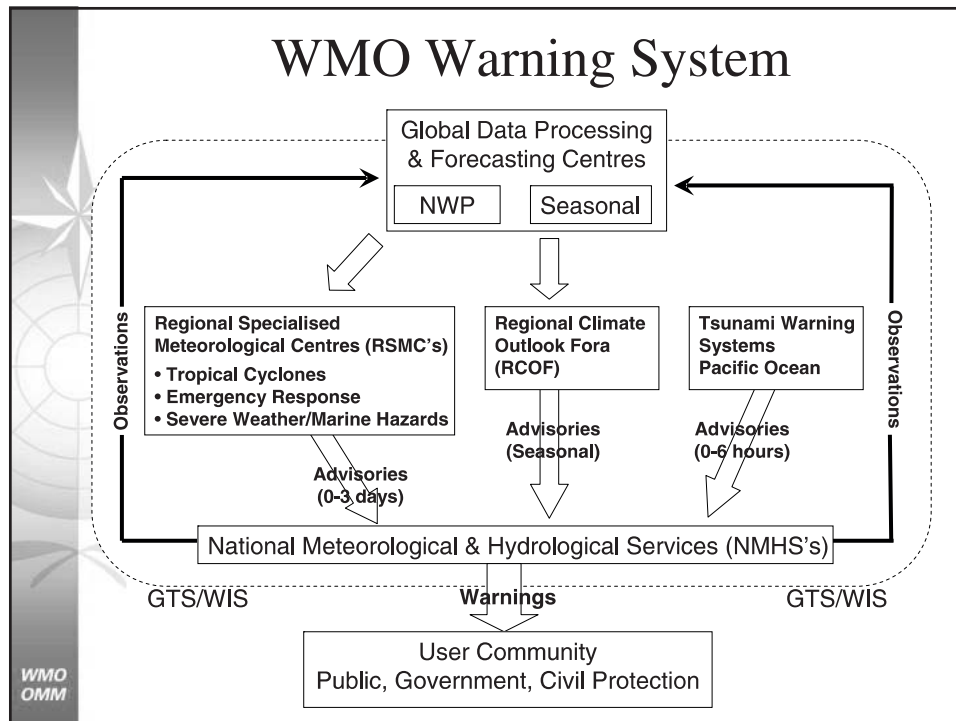
✓ Rainfall at Islamabad Station was recorded at 620mm in 10hrs from 6:00 to 16:00 (PST) on 23 July 2001.

Inundation depth was 4m or over
Inundation duration was 6hours or more

Project Area







Information disseminated regarding Cyclone 03B

First Bulletin

June 22, 2007 at 1300 PST

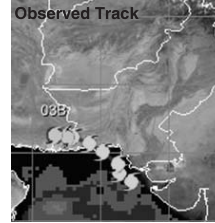
Sindh:

A strong Monsoon weather system (deep depression) over India is likely to approach Sindh coast in next 36-48 hours. Widespread, heavy to very heavy rainfall is likely in Sindh especially in Southern Sindh and coastal areas including Karachi. Sea conditions will be extremely rough along Sindh coast. Fishermen are advised to stop fishing activities from 24th afternoon till 27th afternoon. Irrigation authorities may reduce the canal discharges.

Balochistan:

Later the Monsoon weather system is expected to move towards Balochistan coast. It may produce heavy to very heavy rainfall in Balochistan especially in coastal areas including Gawadar, Jiwani, Pasni, Ormara, Lasbella etc. Hilly areas especially in Southern Balochistan may experience flash floods. Due to very rough sea conditions, fishermen are advised not to venture into the Sea from 25-28 June, 2007.

Special Bulletins were regularly issued on subsequent development and movement of the tropical cyclone until its dissipation on June 26, 2007.



Tracking info for Tropical Cyclone 03B

Time Lat/ Lon Wind(mph) Storm type

06 GMT 06/25/07	22.9N 67.3E	40	Tropical Storm
12 GMT 06/25/07	23.5N 66.4E	40	Tropical Storm
18 GMT 06/25/07	24.2N 66.3E	50	Tropical Storm
00 GMT 06/26/07	25.1N 65.2E	60	Tropical Storm
06 GMT 06/26/07	25.7N 64.2E	50	Tropical Storm
12 GMT 06/26/07	26.2N 63.0E	45	Tropical Storm
18 GMT 06/26/07	26.2N 62.6E	35	Tropical Depression

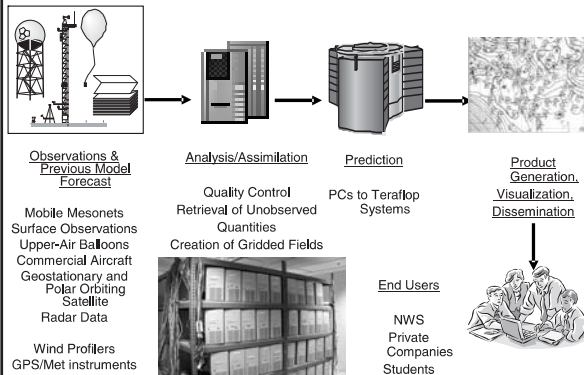
First Track Forecast By PMD



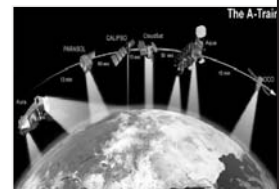
Modified Track Forecast By PMD



Numerical Weather Prediction: Key Steps



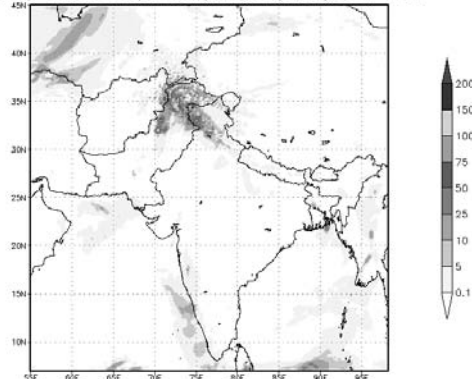
Exploit new and high-powered computers



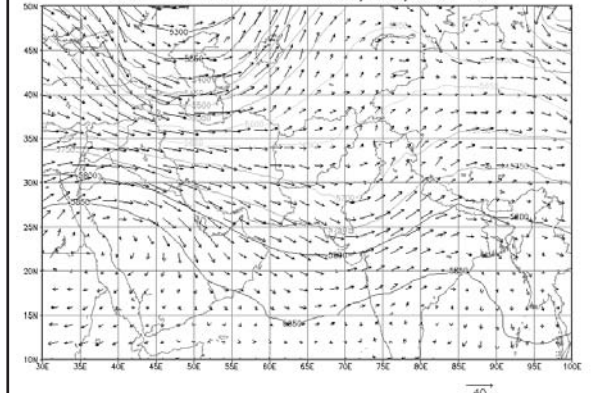
• Exploit 3 improvements:

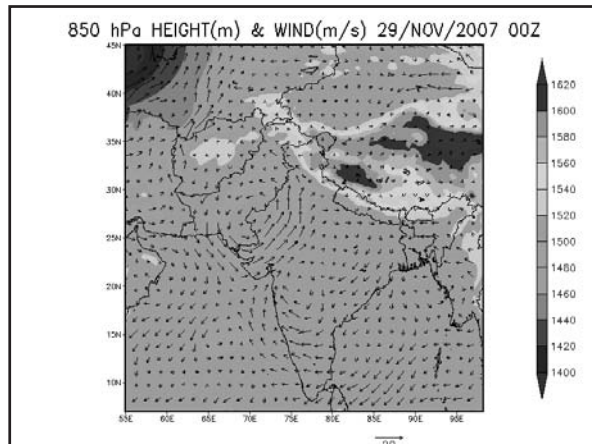
- EOS-era of satellite obs
- GOOS real progress
- Cloud-resolving models

Daily Total Precipitation(mm) 30/NOV/2007 00Z



500 HPa HEIGHT & WIND 29/NOV/2007 12Z





Integrated Data Viewer

- Unidata's newest scientific analysis and visualization tool
- Provides 2, 3 and 4-D displays of geoscientific data
- Stand-alone or networked application, providing client-server data access via multiple protocols
- Java-based tools: Runs on Windows, Macs and Unix machines

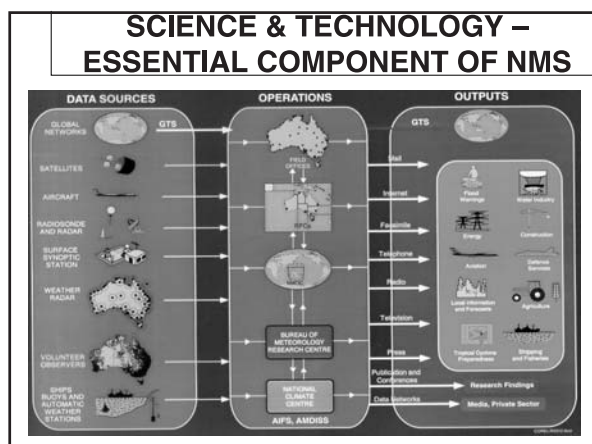
Remote Visualization of Local NWP Output

Developed for real-time WRF predictions from University of Illinois.

Courtesy: Brian Jewett

Technology for Real-Time Communication

- VPN (VIRTUAL PRIVATE NETWORK) LINKS.
- HIGH SPEED LINKS.
- SMS THROUGH MOBILE SERVICE.
- EMAIL SERVICES.
- DIALUP CONNECTIVITY FOR DATA RETRIEVAL AND SUBMISSION
- VSAT LINKS AT COASTAL/DESERT AND MOUNTAIN AREAS.
- SATELLITE BASED DIGITAL DATA BROADCAST AND ITS RECEPTION.
- INTERACTIVE VOICE RESPONSE SYSTEM (IVRS) – A PUBLIC WEATHER SERVICE.
- DATA RECEPTION THROUGH WEB INGEST



Keynote Presentation

by

Dr. M.E. Tusneem

Member (Food and Agriculture), Planning Commission of Pakistan, Islamabad.

M.E.Tusneem

Member Food & Agriculture
Planning Commission of Pakistan

Agriculture Sector

Goal:
Broad based and sustainable economic growth, food security and poverty reduction

Objectives:
To make agriculture more:
Productive
Profitable
Competitive &
Sustainable

Agriculture Sector in the National Economy

• GDP	21%
• Employment	43%
• Industrial production	50%
• Export earning	> 60%
• Livelihood	66% of population

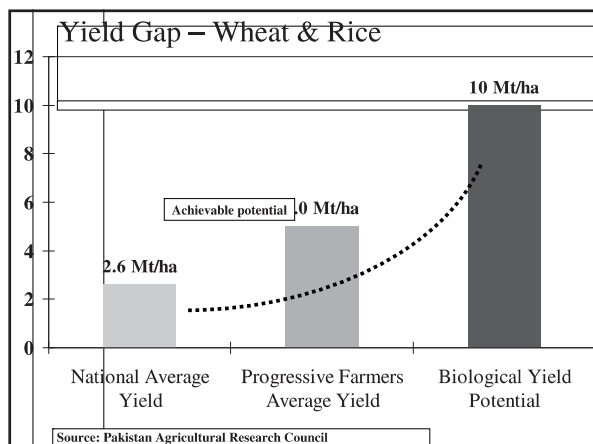
Source: Economic Survey of Pakistan 2006-07

Agriculture Sector Growth Trends (1960 – 2007)

Year	Mean Average Growth (%)
1961-70	4.97
1971-80	2.37
1981-90	4.07
1991-00	4.15
2000-07	2.50

Mean Growth Rate for Last 47 Years = 3.7 %

Source: Economic Survey (s) of Pakistan



Agriculture Sector Targets 2015

- **Maintain an Annual Growth at: 4–5 %**
 - **Crops** **4%**
 - Cotton **20.7 m bales** (5.3%)
 - Wheat **30 m tons** (3.5%)
 - Rice **7.5 m tons** (3.4%)
 - **Horticulture** **8%**
 - **Livestock** **6.5%**
 - Milk 8%
 - Meat 5%
 - **Fisheries** **4.8%**

Challenges

- Food Security and Rural Poverty
- Sector Policies, Institutions and Governance
- Product and Factor Markets
- Competitiveness / Globalization
- Climate Change & Water Resources
- Natural Resources Management
- Research & Innovations

Opportunities

- Productivity Enhancement by Narrowing Yield Gap, Especially of Small Farmers
- Diversification into High Value Agriculture (e.g. Livestock, Horticulture)/Contract Farming
- Value Addition and Market Connectivity
- Green to Gene Revolution
- Resource Conservation Technologies (RCTs)
- Improved Water Use Efficiency
- Public Private Partnership/Joint Ventures
- Market Infrastructure Development

Strategic Intervention

- Strengthening of Sector Policies & Institutions with Focus on Small Farmers and Improved Sector Governance
- Ensuring Fair Price to Farmers
- Social Safety Nets for Poor & Vulnerable Groups
- Development of Land and Agriculture Markets
- Promotion of Resource Conservation Technologies
- Improved Market Information and Infrastructure
- Enhancing Smallholders' Access to Rural Financial Services

Special Initiatives

- **National Conference on Agriculture**
- Benazir Tractor Scheme
- Benazir Credit Card for Small Farmers
- Substitution of 20% Wheat with Other Cereals
- Improved Coverage Under High Quality Seed
- Contract/Corporate Farming
- Oilseed/IPulses Maximization Programme
- Increasing Water use Efficiency
- Biotechnology
- Enhancing Livestock Productivity
- Human Resource Development in Agriculture
- Dissemination of Agriculture Related Information/Technology
- Range Management

Rural Poverty Alleviation through Skill Development

M. Masood Azeem



Rural Poverty Alleviation through Skill Development

Muhammad Masood Azeem

Structure of presentation

- Introduction
- Trends of Poverty
- Rural Poverty
- Sectoral Share of Agriculture
- Agriculture growth and Poverty
- Govt. Expenditure on Agriculture
- Conclusion

Introduction

- What is poverty?
- Economic Manifestation
 - The failure to attain some minimum level of income or consumption
- Non-Economic Manifestation
 - The conditions that restricts equal and unhindered participation in the economic, social and political life of the community

Trends in poverty

Proportion of Poor Head Count (%)

Years	Total
1963-64	40.24
1966-67	44.50
1969-70	46.53
1979	30.68
1984-85	24.47
1987-88	17.32
1990-91	22.11
1992-93	22.40
1996-97	31.00
1998-99	32.60
2000-01	34.5
2004-05	23.9
2005-06	22.3

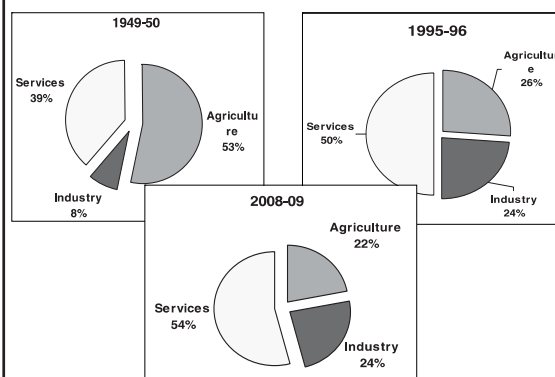
Incidence of Poverty (%)

Years	Rural	Urban
1975	49.8	19.0
1980	36.2	11.8
1985	15.2	7.4
1990	19.0	4.8
1995	23.1	2.6
2001	34.80	25.90
2005	39.3	22.7
2006	28.1	14.9

Why Poverty High in Rural Areas?

Main Source of Livelihood?

Structural Changes in the Economy



Trends in Agricultural Growth rates (%)

Years	GDP	Agriculture
1950s	3.1	1.6
1960s	6.8	5.1
1970s	4.8	2.4
1980s	6.5	5.2
1990s	4.6	4.4
1999-2003	3.6	0.4
2003-2009	5.8	4.28

Trends in Growth, Poverty and Income Distribution

Decade	Growth	Poverty	Income Distribution
1950s	Stagnated	Persisted	Unknown
1960s	Rapid Increase	Increased	Improved
1970s	Slow, Stagnated	Declined	Worsened
1980s	Rapid Increase	Declined	Rapid deterioration, followed by Rapid improvement
1990s	Substantial Decline	Increased Considerably	Worsened

Govt Expenditures on Agriculture

Share of Agriculture and Water in Total PSDP/ADP

Years	% Share		
	Agri.	Water	Agri. + Water
1980-81	12.78	6.18	18.96
1981-82	12.69	10.40	23.09
1982-83	11.69	12.99	24.68
1989-90	5.22	9.43	14.65
1994-95	1.30	9.18	10.48
1999-00	0.36	7.65	8.01
2000-01	0.55	7.71	8.26
2004-05	0.35	10.60	10.95
2007-08	0.30	12.22	12.52

Central Government expenditure heads-to GDP ratios

Years	Defence	Debt Servicing	General Admin	Social, economic, & Community services	Subsidies & others	Total expenditure
1949-50	3.2	0.2	0.8	0.2	0.1	4.4
1954-55	3.0	0.4	1.3	0.4	0.3	5.4
1959-60	3.3	0.7	1.2	0.5	0.1	5.8
1964-65	2.7	0.9	1.1	0.4	0.1	5.2
1969-70	3.8	1.3	1.0	0.5	0.1	6.6
1974-75	6.7	2.2	1.8	0.5	0.7	11.8
1979-80	6.0	5.0	1.2	0.5	1.3	14.0
1984-85	7.5	6.0	1.0	0.6	2.4	17.5
1989-90	7.7	8.9	0.9	0.7	1.9	20.0
1994-95	6.0	8.3	0.9	0.9	1.5	17.7

Percentage Distribution of Various Expenditure Heads in Total Expenditure

Years	Defense	Debt – services	General Admin	Social, economic, & community Services	Subsidies & others	Total Expenditure
1949-50	73.1	3.6	17.2	4.2	1.9	100
1954-55	55.5	8.2	24.5	6.8	5.0	100
1959-60	57.0	11.3	20.1	9.3	2.3	100
1964-65	52.6	18.0	20.9	7.0	1.5	100
1969-70	58.1	19.6	14.4	7.0	0.9	100
1974-75	56.5	18.4	15.3	3.9	5.9	100
1979-80	42.9	35.5	8.3	3.8	9.5	100
1984-85	42.8	34.4	5.5	3.4	13.9	100
1989-90	38.6	44.6	4.3	3.4	9.2	100
1994-95	34.2	46.9	5.2	5.1	8.7	100

Nature of the Problem & workable Solution

- Population of the country attached to Agriculture (67%)
- Income generating opportunities
- Skill Development and Value Addition
- Competitiveness under globalization
- Focus of the world (country experiences like China, India, Nepal, Africa around us)
- Inadequate formal & informal skill Dev in Pakistan

Vocational And Tech. training Inst. in Pakistan

Province	Type of institute	No. of Centers	Capacity
TEVTA Punjab	Technical & Vocational	402	83,000
Punjab Training Council	Vocational	60	15,000
DMT Sindh	Vocational	33	3,740
TE & VT NWFP	Technical & Vocational	35	3,300
DMT Balochistan	Vocational	12	1,730
Skill Development	-	Contractual Basis	25,000
Federal	Ministry of Labour	2	1,500
Federal	Ministry of Education	2	1,400
Private Sector and Apprentice			70,000
Total		546	204,670

Skill Development Institute at UAF

Objectives

- To organize & deliver the skills and entrepreneurial training to the rural masses
- Offer research-based information in support of identifying solutions to community problems
- Provide training for selected and appointed officials and community leaders to foster decision making
- Motivate the faculty and staff to build collaborative partnerships and to envision community and rural development alternatives in key areas.

Possible Skills for Rural Masses

- Tunnel Farming
- Food Processing
- Calf Fattening
- Poultry and milk production
- Fisheries
- Land Preparation
- Entrepreneurship
- Marketing
- SME,s etc.

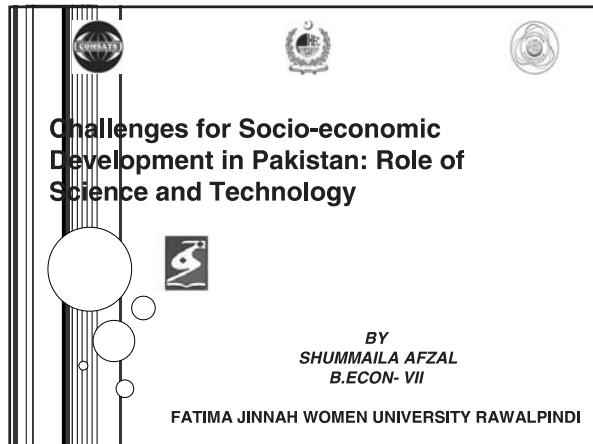
Focus of Institute

- Research (Problem Oriented)
 - Planning
 - Monitoring
 - Evaluation
- Training and Development
- Collaboration

THANK YOU

Socio-economic Challenges of Pakistan and Role of Science and Technology

Shumaila Afzal



STRUCTURE OF PRESENTATION

- My Understanding of S&T
- Socio-Economic Challenges and Economy
- Role of Science and Technology
- Suggestions

MY UNDERSTANDING OF S&T

- Evolution.
- Homo sapience → homo sapience
sapience → human beings.
- Understanding the natural world (science)
developing the ability to manipulate it
(technology).
- The modern era of science and technology.

SOCIO ECONOMIC CHALLENGES AND ECONOMY

- Agricultural growth rate (FY 2007-08) 1.1%.
- 69.5% of the labor force belongs to the rural areas out of which 43.6% is employed in the agricultural sector.
- Total unemployed 2.69 million (out of which 1.7 million belong to the rural area).

SOCIO ECONOMIC CHALLENGES AND ECONOMY

- Food inflation (July-April 2008-09) 26.6% & non food inflation during the same period stood at 17.8%.
- Poverty head count 33.8% in 2007-08 and 36.1% in 2008-09.
- Education expenditures 2.47% of GDP (FY 2007-08)

SOCIO ECONOMIC CHALLENGES AND ECONOMY

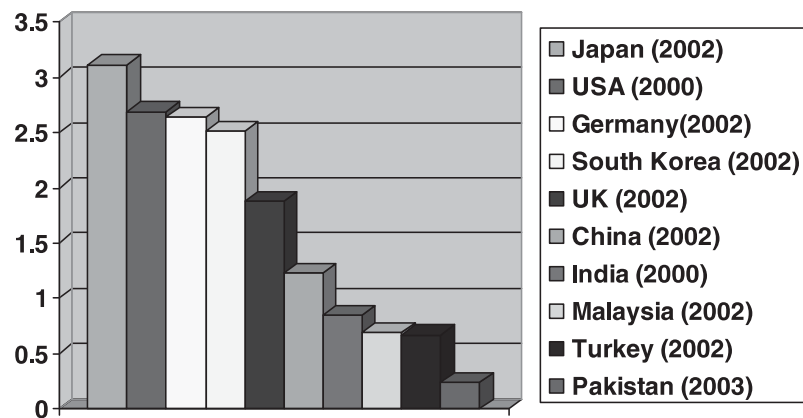
- 0.5% of GDP in health for the (FY 2007-08).

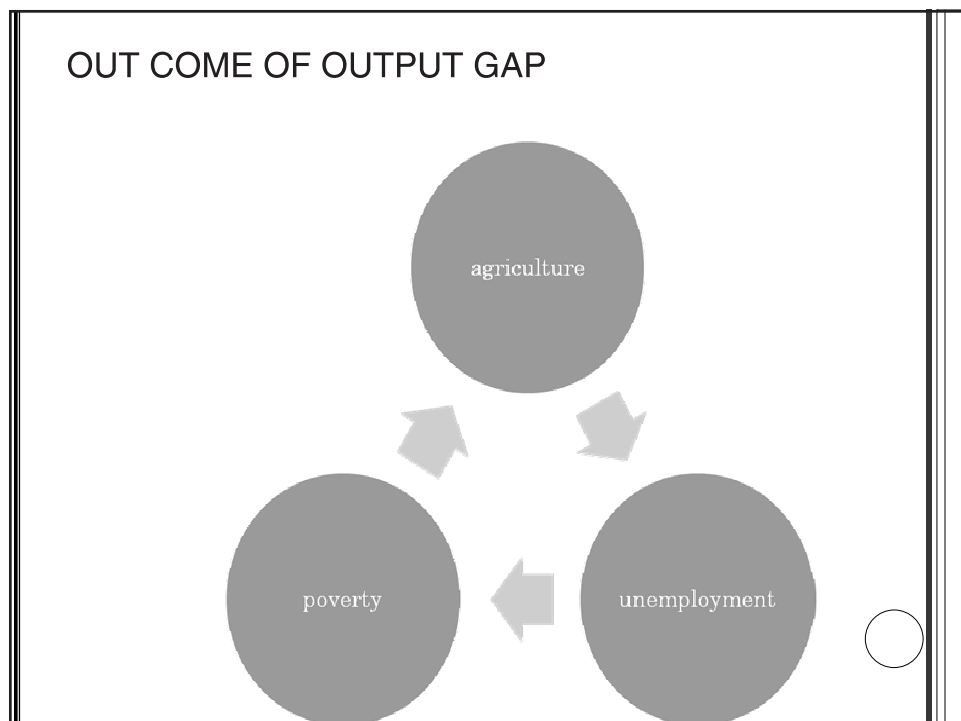
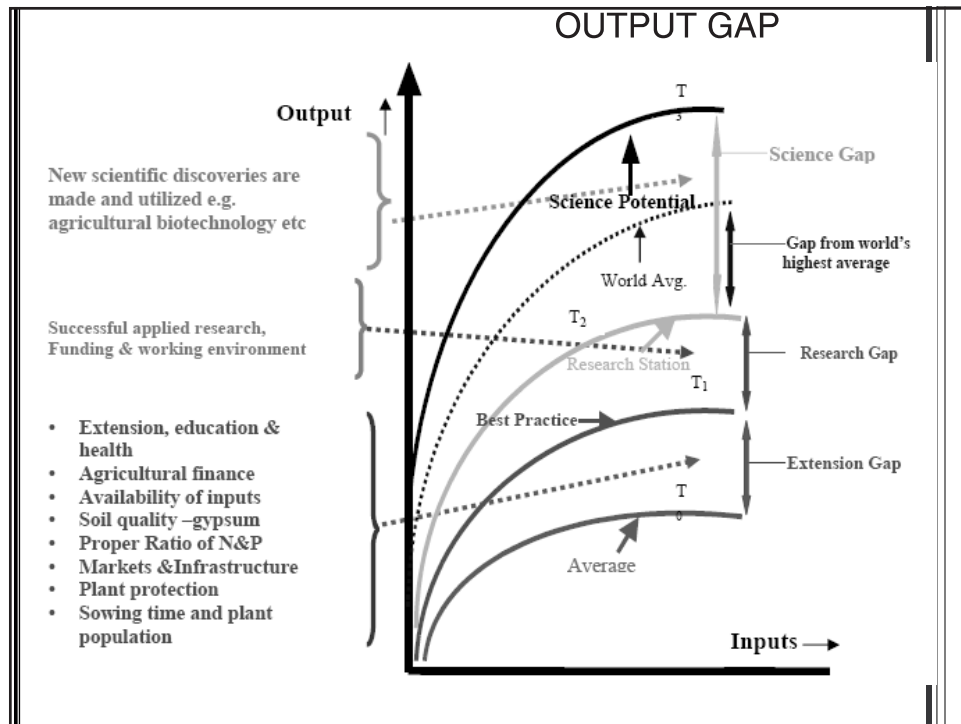
Note: Policy Regime for S&T in Pakistan started in 1984

REASONS OF SOCIO ECONOMIC ISSUES

- Little budgetary allocations for social sector.
- Lack of attention by the government.
 - Accountability.
- Less R&D expenditures.
- Agriculture still a subsistence sector.

R&D EXPENDITURES: A COMPARISON





SUGGESTIONS

- o Creation of Scientific and technical manpower.
- o Talent Pool Scheme.
- o Efficient utilization of available resources.
- o Rural Training.
- o Women in S&T(because they are 50% Of population)



SUGGESTIONS

- o Backward engineering.
- o A proper carrier structure should be provided for S & T personnel.
- o Conducive environment for creative work.
- o S&T documentary films and S& T fairs.
- o Should be arranged at national, regional and district levels.



SUGGESTIONS

- o In bilateral and multilateral research projects and through cooperation with **Science Foundation** and R&D organization of friendly nations.
- o Accountability.

REFERENCES

- o Iqbal,M and Ahmad ,M. (2003),science and technology based agriculture vision of Pakistan and prospects of growth, pg. 4
- o Economic Survey of Pakistan 2008-09, **Agriculture**, chapter 2, table 2.1, 2.3, pp. 17, 18.
- o Economic Survey of Pakistan 2008-09, **Education**, Chapter # 10, pp. 157.
- o Economic Survey of Pakistan 2006-07, **Environment**, Chapter # 16, pp. 247.
- o Economic Survey of Pakistan 2008-09, **Health**, Chapter 11 table 11.2, pp. 171.

REFERENCES

- o Economic Survey of Pakistan 2008-09, **Population**, Chapter # 12, , pp. 177.
- o Economic Survey of Pakistan 2008-09, **Poverty**, chapter # 13, pp. 195,197.
- o Poverty Reduction Strategy Paper-II (final draft), **Increasing Productivity and Value Addition in Agriculture**, chapter 6, pillar-III, pp. 80.
- o Poverty Reduction Strategy Paper-II (final draft), **Poverty Diagnostics**, chapter 3, table 3.2, pp. 43.
- o **Science and Technology Indicators of Pakistan (2005)**, Pakistan Council of Science and Technology, Islamabad.

REFERENCES

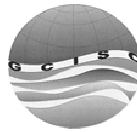
- o Poverty Reduction Strategy Paper-II (final draft), **Poverty Diagnostics**, chapter 3, table 3.2, pp. 43.
- o **Science and Technology Indicators of Pakistan (2005)**, Pakistan Council of Science and Technology, Islamabad.

Thank You

Climate Change: Challenge for Fresh Water Resources in Pakistan

Shabeh-ul-Hason

Climate Change Challenge for Fresh Water Resources of Pakistan



Shabeh ul Hasson
Global Change Impact Studies Center, Islamabad

COMSATS-COMSTECH National Meeting
Challenges for Socio-economic Development in Pakistan
Role of Science and Technology
26 – 28 October 2009

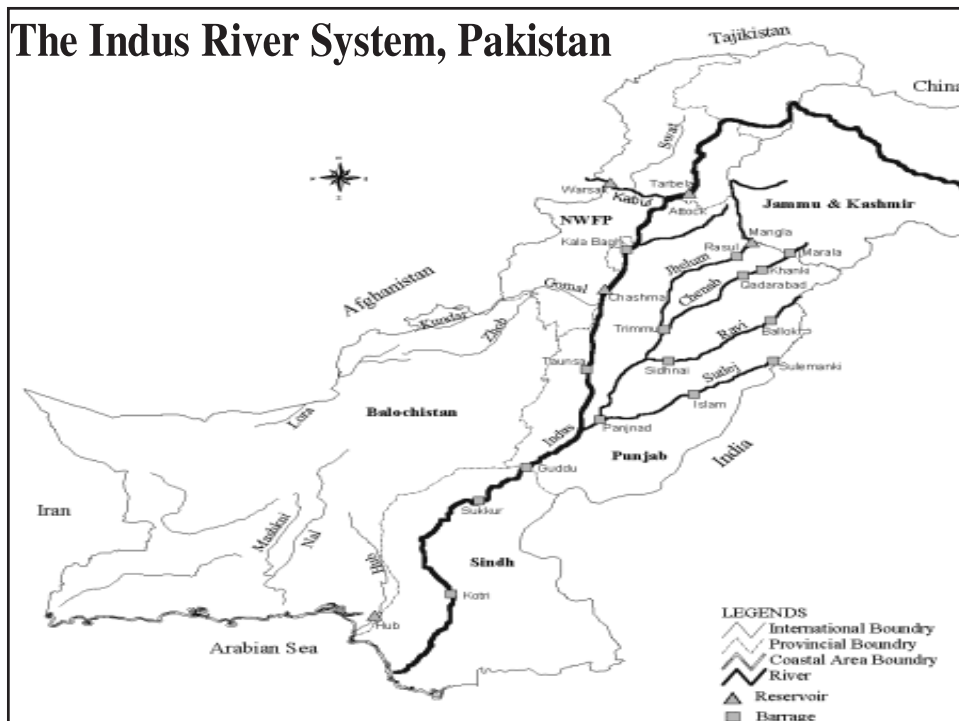
1

Outline

- **Freshwater Resources of Pakistan**
- **Past & Projected Climate Change**
- **Implications for Pakistan's Water Resources**
- **Addressing the Challenge: Role of S & T**
- **Way Forward**

2

The Indus River System, Pakistan



Some Characteristic of Pakistan's Water Resources

- Water Availability Per Capita (m³)

Year	1951	2003	2007	2020 (projected)
Availability	5650	1200	1100	855

- IRS Inflows (1976-77 to 2002-03)

	Annual	In Kharif (Apr-Sep)	In Rabi (Oct-Mar)
Average (76-77 to 2002-03)	141 MAF	82%	18%
Max (in 1991-92)	172 MAF		
Min (in 2001-02)	97 MAF		

Source of data: WAPDA

4

- **Reservoir Capacity (Mangla + Chashma + Tarbela)**
- **Original : 18.4 MAF** ($\approx 13\%$ of Average Annual Flows)
- **Year 2001 : 14.1 MAF** ($\approx 10\%$ of Average Annual Flows)
- **Projected 2010: 12.4 MAF** ($\approx 9\%$ of Average Annual Flows)

- **Downstream Kotri Annual Discharges (1976-77 to 2002-03)**
- **Average: 35 MAF**
- **Maximum (in 1994) 92 MAF**
- **Minimum (in 2000) 0.7 MAF**

Distribution of Water in Main Rivers of Pakistan

	% of IRS Inflows	% Seasonal Distribution		Dominant Source in Summer	Dominant Source in Winter
		Summer (AMJJAS)	Winter (ONDJFM)		
Indus	44	86	14	Snow/Glacial melt	Winter Rainfall + Baseflow
Chenab	19	83	17	Snow/Glacial melt + Monsoon	Winter Rainfall + Baseflow
Jhelum	16	78	22	Mainly Snow melt + Monsoon	Winter Rainfall + Baseflow
Kabul	16	82	18	Snow/Glacial melt	Winter Rainfall + Baseflow
Others	5				

* Based on 1961-2001 Data

6

Past & Projected Climate Change

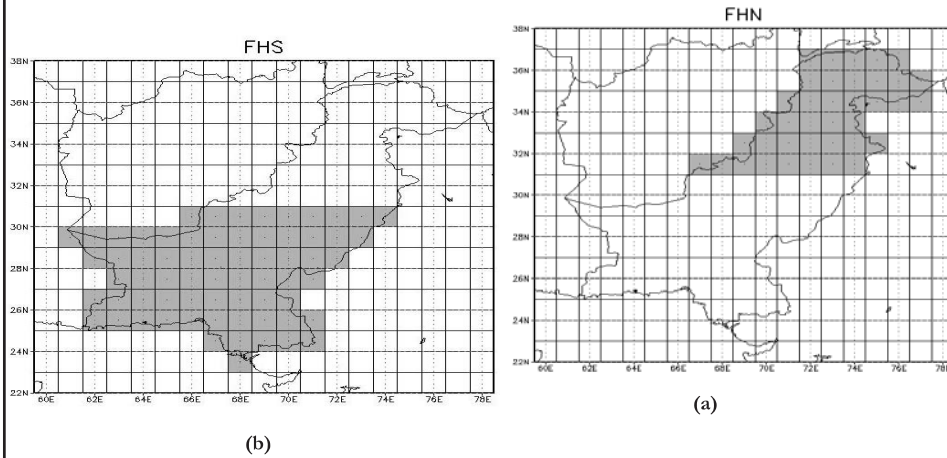
7

Global Climate **Change** (IPCC AR4 Findings)

- **Average global temperature increased during the last century by 0.6 °C mainly due to increase in GHG levels; the updated 100 year (1906-2005) increase is 0.74 °C;**
- **Globally 11 of the last 12 years were the warmest during the last 150 years with 1998 being the warmest in the previous century and 2005 in the current century. (The order is: 2005, 1998, 2002, 2003, 2006, 2004, 2001, 1997, 1995, 2000, 1999)**
- **Future change in global average temperature is expected in the range 1.8 °C – 4.0 °C over the 21st Century;**
- **This will be accompanied by much increased impacts on global precipitation, extreme events, melting of glaciers, sea level rise etc.**

8

Northern and Southern Parts of Pakistan

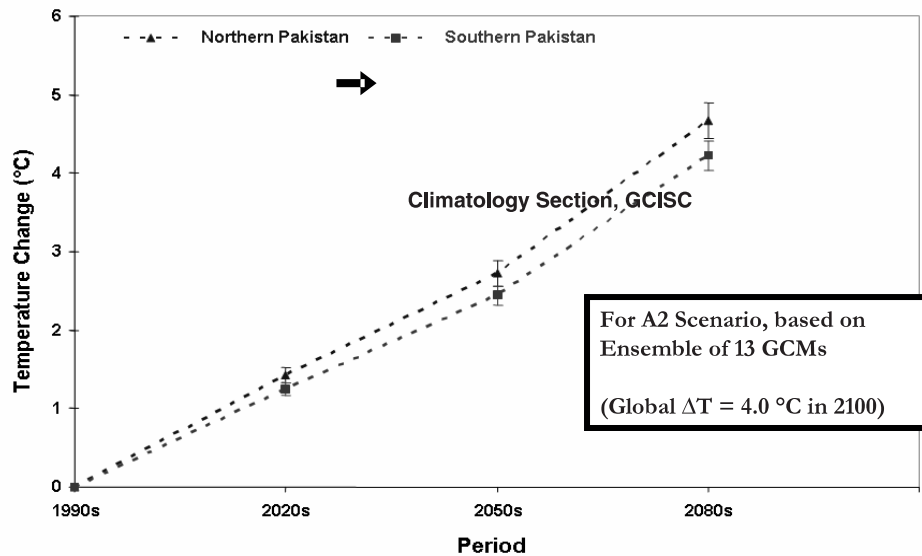


Grids covering geographical areas of:
a) Northern, and b) Southern parts of Pakistan

Climatology Section, GCISC

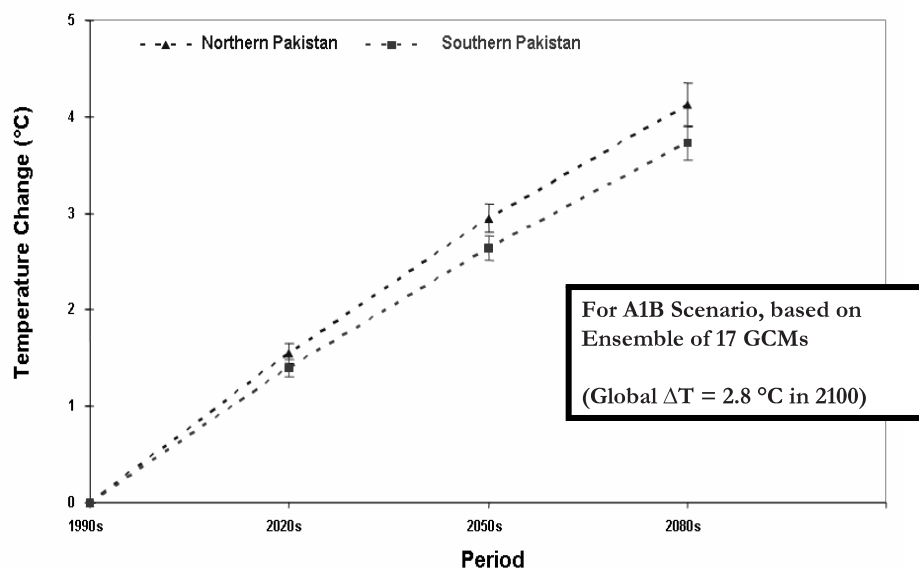
9

Projected Changes in Average Temperature of Northern and Southern Pakistan



10

Projected Changes in Average Temperature of Northern and Southern Pakistan



Projected Temperature Changes in 2080s, ΔT (°C) by GCM Ensemble for A2 Scenario

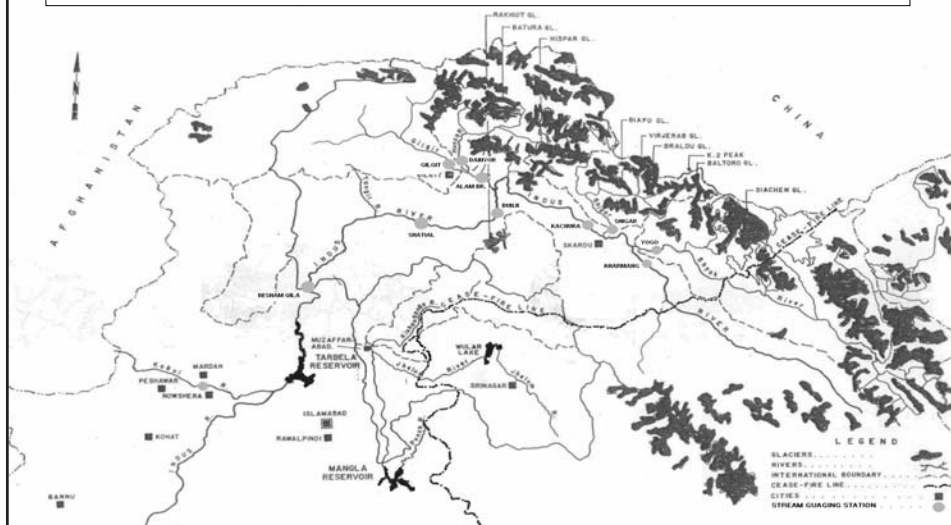
	Pakistan	Northern Pakistan	Southern Pakistan
Annual	4.38 ± 0.44	4.67 ± 0.23	4.22 ± 0.18
Summer	4.13 ± 0.26	4.56 ± 0.28	3.90 ± 0.26
Winter	4.47 ± 0.20	4.72 ± 0.24	4.33 ± 0.18

- The rate of increase in Pakistan is higher than the rate of increase observed globally
- Temperature increases in both summer and winter are higher in Northern Pakistan than in Southern Pakistan
- Temperature increases in Northern and Southern Pakistan are higher in winter than in summer

Implications for Pakistan's Water Resources

13

Glaciers and Drainage in Northern Pakistan



Total Glaciers: 5,218 Covered Area: 15,040 Sq. km. Total ice reserves: 2,738.5 km³

Shyok, Shigar and Hunza are major tributaries of Indus River and contain 83% of total ice reserves of Pakistan (Roohi et. al. 2005)

Glaciers World Wide and in Himalayas

- **WGMS:** Measurements taken over the last century clearly reveal a general shrinkage of mountain glaciers on a global scale
- **ICSI (1999):**
Glaciers in Himalayas are receding faster than in any other part of the world and, if the present rate continue, the likelihood of them disappearing by the year 2035 is very high

A conclusion reached by the 1999 report of the Working Group of Himalayan Glaciology (WGHG) of the International Commission for Snow and Ice (ICSI).
- **Hewitt (2005):**
Widespread evidence of glacier expansion in the late 1990s in the Central Karakoram, in contrast to a worldwide decline of mountain glaciers

15

Projected Implications on Indus River Flows due to Melting of HKH Glaciers

(Reported by Some Recent Studies)

- **IPCC AR4 (2007)**
Glacier melt in the Himalayas is projected to increase flooding within next two to three decades. This will be followed by decreased river flows as the glaciers recede.
- **World Bank (2006)**
Western Himalayan glaciers will retreat for the next 50 years causing increase of Indus River flows. then the glacier reservoirs will be empty, resulting in decrease of flows by up to 30% to 40% over the subsequent fifty years.

16

Major Climate Change related Concerns for Water Resources of Pakistan

➤ Melting of HKH glaciers and its Implications for:

- Average Annual River Flows
- Pattern of Seasonal Flows
- Inter Annual Variability of Flows
- Increase in Frequency and Intensity of
Extreme Precipitation Events and its
Implication for Floods and Droughts
- Sea-level Rise and its Implications

Addressing the Challenge: Role of S & T

Role of Science & Technology

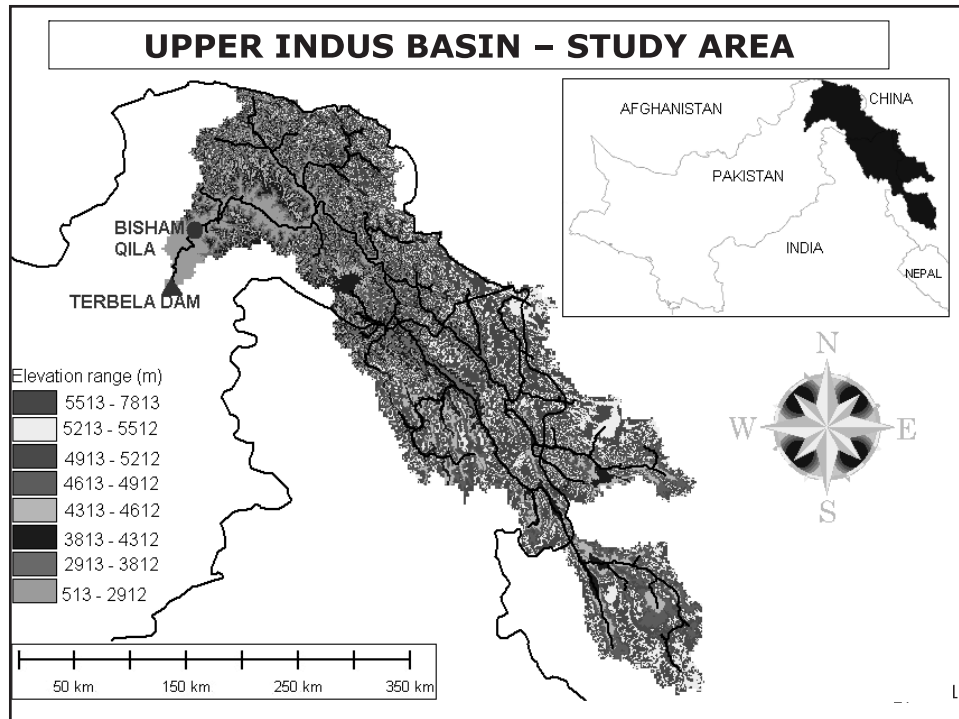
- **Use of advanced RS/GIS Techniques for:**
 - Regular Monitoring of HKH glaciers
 - Monitoring of Glacial Lakes
 - Land Cover and Land Use Changes etc
- **Application of Climate Models GCMs/RCMs for:**
 - Simulating Past Climate
 - Projection of future climates under IPCC SRES Scenarios
 - Seasonal Weather Forecast
- **Application of suitable hydrological models for:**
 - Simulation of the River Flows
 - Coupling with climate models to assess future water availability

19

Way Forward

- **Capacity building in more advanced Remote Sensing & GIS Techniques**
- **Validation of most appropriate RCM to assess future climates over Upper Indus Basin to reduce uncertainties in climate variables**
- **To build capacity to modify existing hydrological models to make them suitable for Upper Indus Basin environment**

20



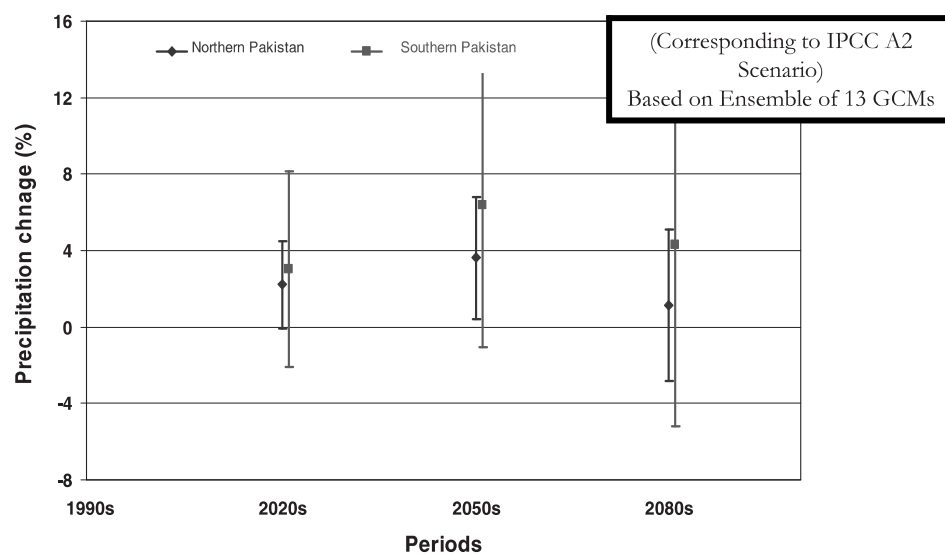
Methodology & Outcome

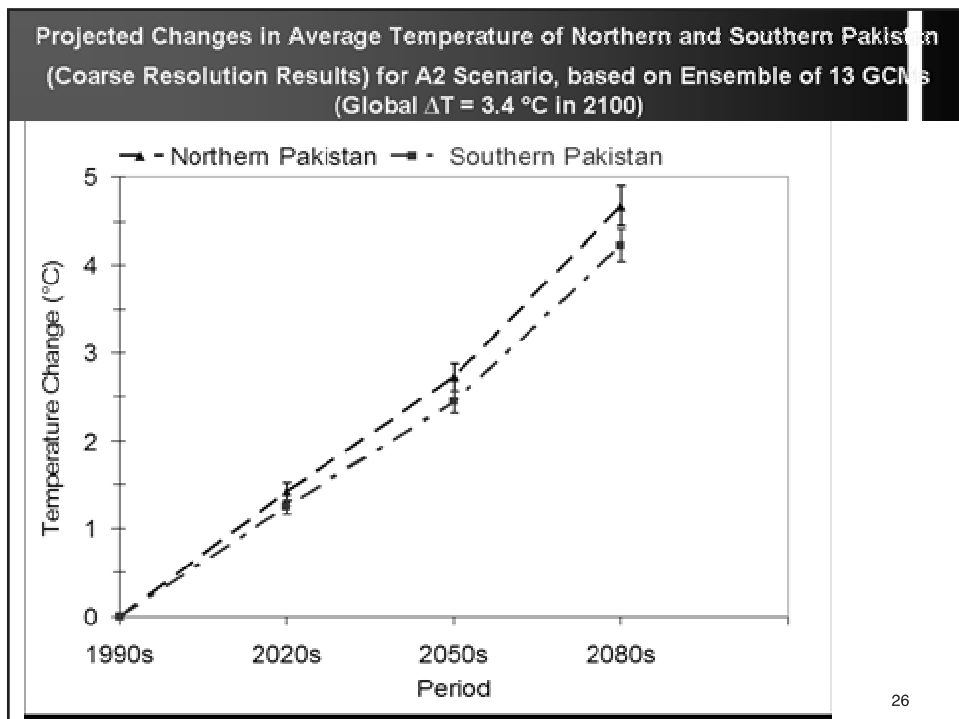
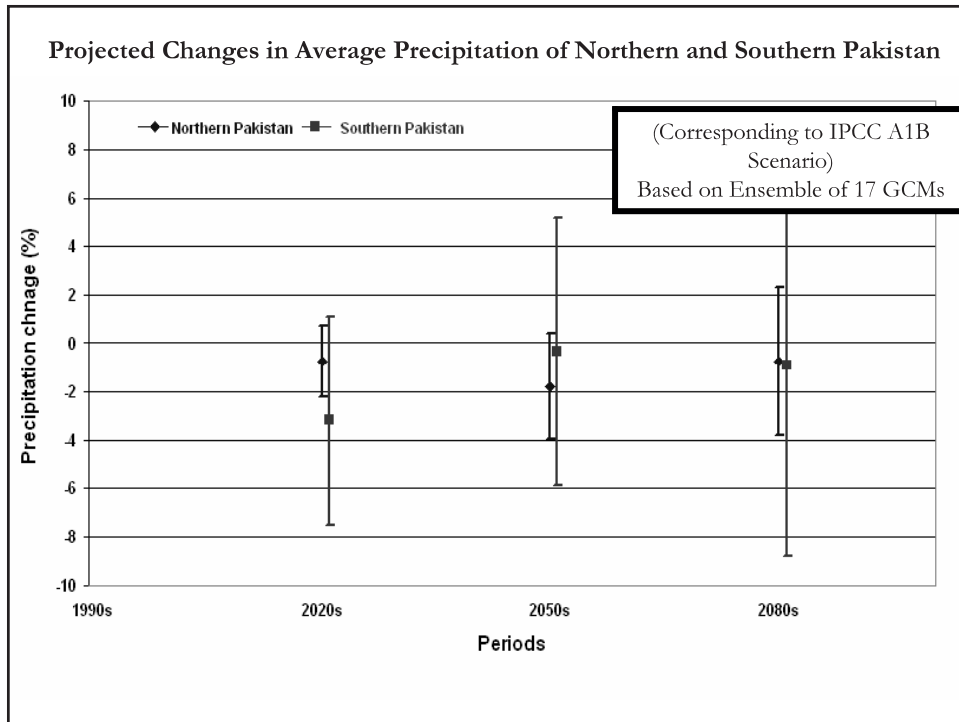
- **Future Climate Variables** will be obtained from **Regional Climate Models PRECIS** developed by the **Hadley Centre for Climate Prediction, UK** for **IPCC SRES A2 Scenario**
- **UBC Watershed Model** developed by **University of British Columbia** will be **calibrated/validated** for **simulating Indus River Flows**
- **Physio-geographical characteristics of UIB** required for **UBC** will be extracted from the **Satellite imagery/Global Datasets**

Methodology & Outcome

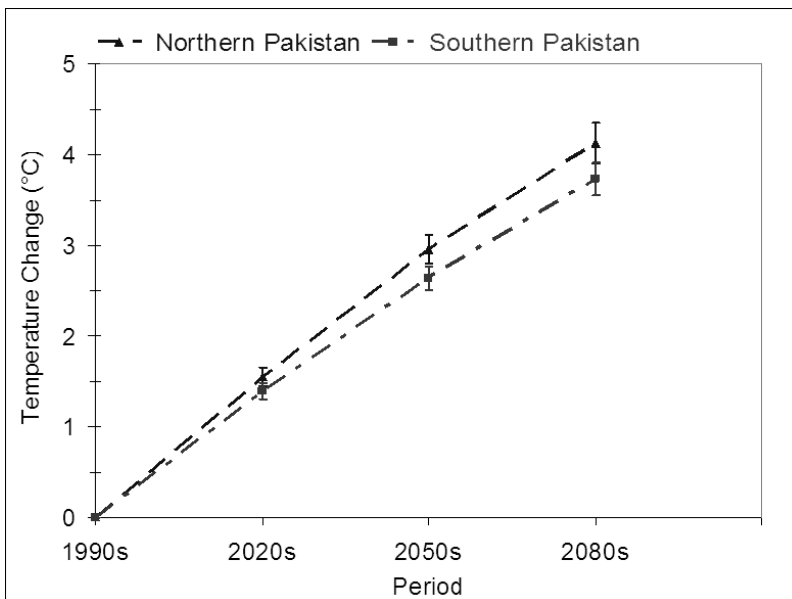
- **Offline Coupling of UBC with PRECIS model for generation of future water availability scenarios**
- **Variations in the projected runoff regimes and frequency and intensity of extreme hydrological events will be assessed**
- **Put forward some recommendations to address adverse projected impacts/implications and to develop appropriate adaptation strategy**

Projected Changes in Average Precipitation of Northern and Southern Pakistan



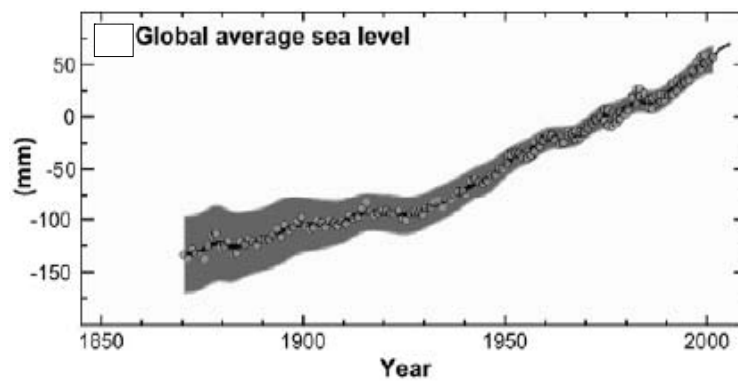


**Projected Changes in Average Temperature of Northern and Southern Pakistan
(Coarse Resolution Results) for A1B Scenario, based on Ensemble of 17 GCMs
(Global $\Delta T = 2.8^\circ\text{C}$ in 2100)**



27

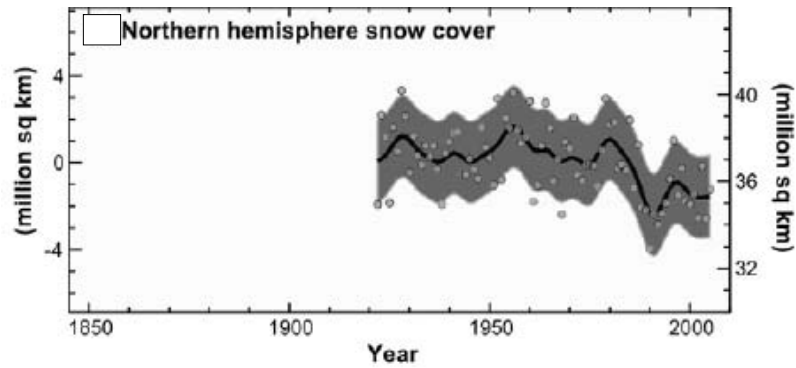
Trends of Sea Level Rise and Snow Cover Reduction



17 cm rise over 20th Century
(28 – 42 cm rise Projected for 21st Century)

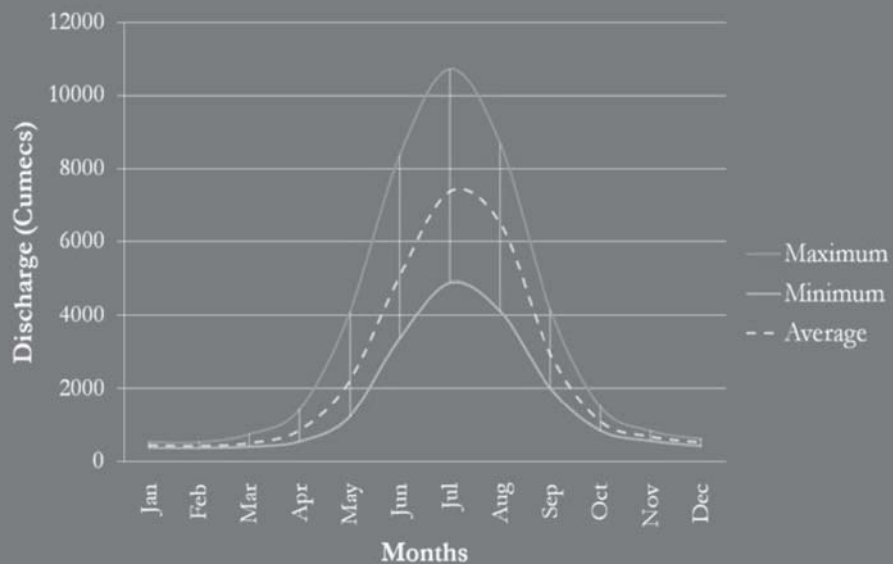
According to the National Institute of Oceanography (NIO), the sea level along the coast of Pakistan has been rising approximately at 1.2 mm per year and is in agreement with the average global rise of 1.5 mm per year since 1960.

Trends of Sea Level Rise and Snow Cover Reduction



10% reduction
since 1978

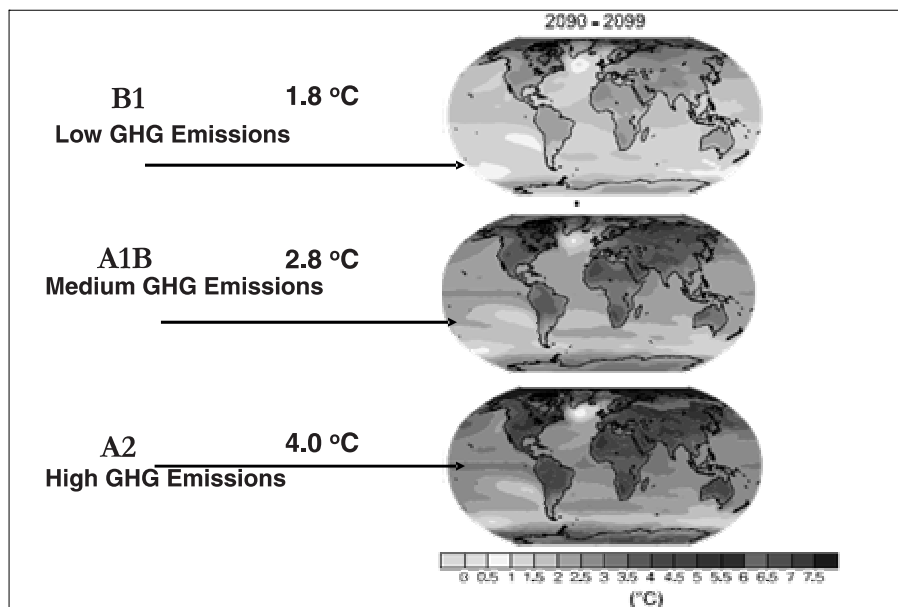
Maximum, Mean and Minimum Monthly Discharges for Indus @ Besham Qila (1969-2006)

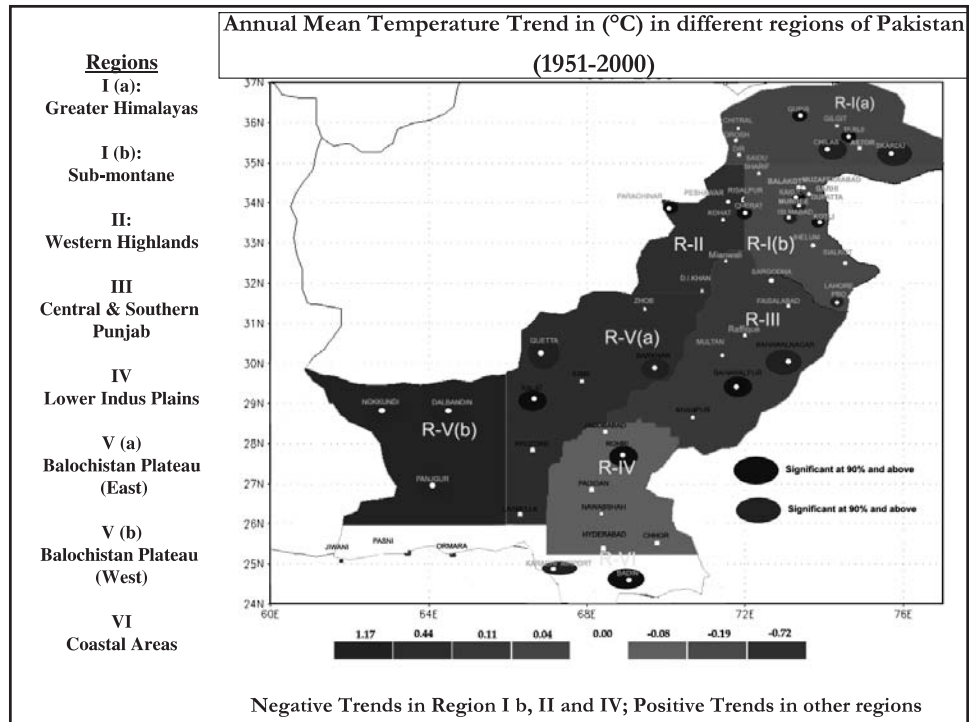


Sea Level Rise in the Past

- Global sea level rise rose at a rate of 1.8 mm/y over 1961-2000 and an average rate of 3.1 mm/y from 1993-2003
- Thermal expansions of the oceans, since 1993, has contributed about 57% to the sea level rise
- Observed decreases in the snow-ice extent contributing to sea level rise are consistent with the global warming
- Mountain glaciers and snow covers on the average have declined in both the hemispheres

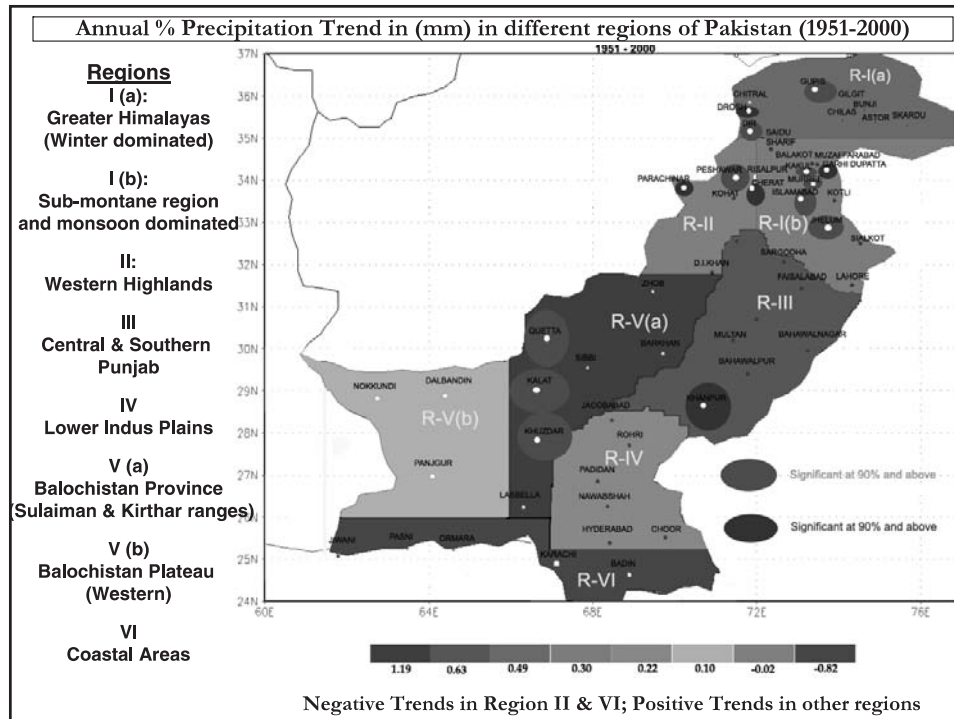
AR4 Projections of Global Mean Surface Temperature





Mean Temperature Trends in different regions on annual and seasonal basis (1951-2000)					
Regions/Seasons	Annual	Monsoon (Jun-Sep)	Winter (Dec-Mar)	Apr-May	Oct-Nov
I (a): Greater Himalayas	0.04	-0.80	0.32	1.09	-0.06
I (b): Sub-montane / monsoon dominated	-0.19	-0.57	0.00	0.13	0.12
II: Western Highlands	-0.72	-1.48	-0.65	0.17	-0.47
III: Central & Southern Punjab	0.11	-0.25	0.03	0.83	0.31
IV: Lower Indus Plains	-0.08	-0.55	-0.07	0.35	0.15
V (a) : Balochistan Province (Sulaiman & Kirthar Ranges)	0.11	0.46	0.63	0.79	0.50
V (b): Balochistan Plateau	1.17	1.3	0.43	2.17	1.80
VI: Coastal Areas	0.00	-0.18	0.05	0.03	0.30

Weighted change for the whole of Pakistan (1901-2000) = 0.6 °C
Country Average Temperature (1901-2000) = 20.1 °C
Temperature during 1998 = 20.7 °C



Percentage Precipitation Changes (on yearly basis) (1951-2000)

Regions/Seasons	Annual	Monsoon (Jun-Sep)	Winter (Dec-Mar)
I (a): Greater Himalayas	0.49	1.73	-0.04
I (b): Sub-montane	0.3	0.38	0.53
II: Western Highlands	-0.02	0.22	0.00
III: Central & Southern Punjab	0.63	0.57	0.99
IV: Lower Indus Plains	0.22	0.45	-0.27
V (a): Balochistan Plateau (East)	1.19	1.16	1.14
V (b): Balochistan Plateau (west)	0.1	-0.2	-0.4
VI: Coastal Areas	-0.82	-1.34	0.00

Major CC-related Concerns of Pakistan (Contd.)

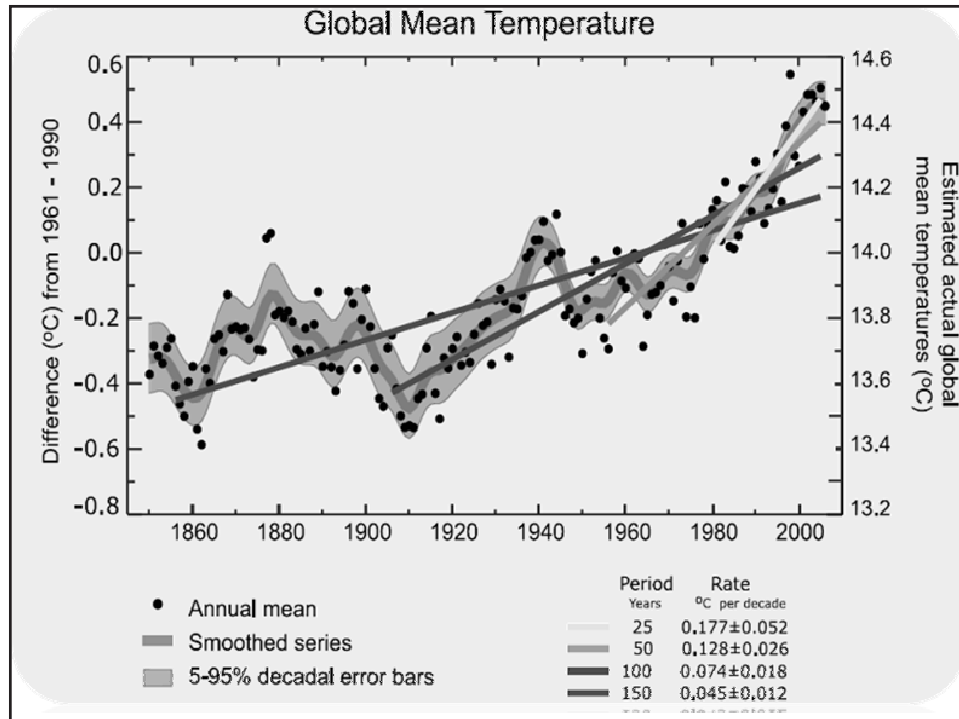
- Higher incidence of Malaria and other vector-borne, water-borne and heat-related diseases due to warmer and wetter conditions
- Risk to fragile ecology of Mountain and Highland systems due to synergetic effects of Climate Change
- Increased threat to biodiversity, which is already at risk due to land-use/cover change and population pressure

Vulnerability of Pakistan

Pakistan, like most other Developing Countries, is very vulnerable to Climate Change, because

- A large part of its economy is based on agriculture, which is climate sensitive;
- It has low technological and scientific base and has limited access to knowledge;
- It has low capacity to adapt to changes resulting from Climate Change;
- It lacks financial and institutional capacity.

060212/0034



Climate Change Trends over Pakistan

- The slope of the mean annual temperature over Pakistan during the 48-year period 1960-2007 was found as:

1901-2000	0.06 °C per decade
1960-2007	0.24 °C per decade

- The rate of increase is higher than the rate of increase observed globally

OUTCOME (TECHNICAL SESSION - 5)

Theme: Agriculture and Environment

Subject Experts: 1. Dr. Qamar uz Zaman Chaudhary
2. Dr. M.E.Tusneem

Presentations by: 1. Mr. Masood Azeem
2. Ms. Shumaila Afzal
3. Mr. Shabeh-ul-Hassan

Problems-Identified in the Session	S&T-led solutions
Depletion of water-resources, water wastage in agriculture sector, low agri-yield, and high food-costs.	Efficient water-management for better crops and hence comparatively lower food-costs, the following may be given considerations: • Using dual/parallel water-supplies (one for pure fresh water and one for recycled used water); • Developing an attitude for energy-conservation; • Creating awareness about water-usage at domestic level, e.g., media campaigns; • Usage of digital sensors to detect leaks and spillage in domestic water tanks; • Using better irrigation methods, e.g., drip-irrigation and participatory-irrigation; • Use of ICTs for agri-market; • Conducting scientific study and maintaining records of Pakistan's glaciers.
High poverty-rate in agricultural communities in rural areas, lack of agro-related skills and inadequate agro-industry.	Science and technology-based, country-specific agricultural education with high incentives, i.e., scholarships for poor students, should be planned. Skill-development institutes should be established in some selected universities of Pakistan.
Water reservoirs and dams are not sufficient. Water capacity gradually decreasing due to silt deposition.	There is a need to: • Revisit policies and build more dams; • Leave those issues which have been politicized like Kalabagh and move on; • Develop accurate feasibilities for new dams using authentic scientific data; • Maintaining of existing resources to increase water capacity;

	• Employ advance remote sensing/GIS techniques; • Use of application of suitable hydrological and climate models, such as GCM/RCM.
Environmental degradation occurring at an alarming rate.	There is a need to: • Identify plants and trees that will integrate with environment protection initiatives and improve technical education for environment. • Avoid planting such flora that requires a lot of water for its growth and may damage the water table of the area. Technical surveys are needed in this regard. • Keep a check on industrial waste and carbon emissions with mitigation techniques. • Generation of environment assessment-reports by pertinent agencies, such as the Pakistan Environment Protection Agency (Pak-EPA). • Resolve issues of deforestation and focus on reforestation.
Increasing global environmental factors, such as: • Noise pollution; • Green imprints; • Carbon & methane emissions; • Temperature increase	• The negative impact can be reduced but not completely mitigated. • Awareness campaigns, focusing on individuals' role, should be made.

ENERGY

Subject Experts

1. Mr. Ashfaq Mahmood
Visiting Faculty Member
COMSATS Institute of Information
Technology (CIIT)
Islamabad.
2. Dr. Shaukat Hameed Khan
Former Member on Science and
Technology
Planning Commission of Pakistan
Islamabad.

Presentations by:

1. Mr. Ali Bahadur
Research Associate
School of Chemical and Materials
Engineering (SCME)
NUST
Islamabad.
2. Ms. Faroha Liaqat
Ph.D Student
Department of Chemistry
Quaid-e-Azam University
Islamabad.
3. Ms. Shaima Akhlaq
Student
Forman Christian College University
Lahore.
4. Mr. Kaleem Anwar Mir
Scientific officer
Global Change Impact Studies
Centre (GCISC)
Islamabad.

KEYNOTE ADDRESS

by

Ashfaq Mahmood

Visiting Faculty Member

COMSATS Institute of Information Technology (CIIT), Islamabad.

I congratulate COMSATS and COMSTECH on successful organization of this important conference. I am particularly delighted to be in the company of our young generation. The papers that they presented in this session are of very high quality, portray the effort of the scholars conducting research in energy sector issues and solutions, and their initiative to discover new horizons to address our energy problems.

As you all know Pakistan is facing the worst energy crisis. Continuous power-load shedding in the country, looming gas shortages in winter, unaffordable prices and sky rocketing circular debt amongst energy entities has raised many questions as to what has gone wrong. The fact of the matter is that if one reviews our plans since the 5th five-year plan, one notices that sound principles of energy planning, such as harnessing hydro-power, energy conservation, increased exploration and development of oil, gas and coal have been enunciated. The real problem is that, of late, our energy planning has not been consistent with the macroeconomic framework of the country. Plans tend to be wish-list having no cognizance of the limitation of the economy to service required foreign-exchange, size of the investment that the economy can absorb, resultant prices and inflation, etc. The other important factor is the failures in implementation of policies and projects due to lack of consensus or limitations of the implementation agencies. Projects like Kalabagh dam are typical examples. Whereas, the government is aware of the high prices of electricity and yet it is unable to harness cheaper electricity due to lack of consensus. Similar is the case for Thar coal project where the world's largest coal resources are lying dormant for years. The third important factor is the lack of attention to development of human resources in the field of research, implementation and management of energy projects. I am, however, very impressed by the quality of the papers which our young researchers have presented today. They have rightly chosen the topic of developing renewable energy, biofuels, and improving efficiency. Let me also share with you some other topics on which further research and development may be useful. These are development of saline agriculture for biofuel crops; solarization of schools to harness solar energy without requiring batteries; coal gasification; power generation based on dung collected from cattle colonies; and development of smart grids to improve energy-management and reduce losses in the distribution systems. Technology for power-generation based on bagasse from sugar mills is another area to explore.

I am sure that our younger generation has the potential and spark to rise to the challenges of the future and explore new avenues to meet these challenges.

Thank You.

KEYNOTE ADDRESS (SUMMARY)

by

Dr. Shaukat Hameed Khan

Former Member on S&T

Planning Commission of Pakistan, Islamabad.

Dr. Shaukat Hameed Khan presented an overall scenario of the world's energy status, including energy sources, present and future energy demands, availability of fuel and the projections on short-term and long term basis. He also discussed the present and future energy scenario of Pakistan, especially the energy-security situation envisaged in the country. He pointed out problems faced by Pakistan in energy-sector due to various technical and non-technical reasons. Faulty management of resources and generating facilities are major factors which need priority attention of the concerned authorities. Determination of appropriate energy-mix for Pakistan, for its future needs, is of fundamental importance. Assured sources like hydel should be given priority. Nuclear energy can also prove to be of great promise. Renewable energies have limited prospects. Fossil-fuels will remain important for Pakistan for quite some time in the future. Major emphasis should be placed on enhancing electric power generation and distribution by investing in fossil-fuel exploration like Thar coal fields and employing remedial measures to reduce line losses, theft and other management malpractices. Implementation of adaptive and mitigative policies and strategies to come out of the current energy crises in Pakistan is absolutely necessary.

Biodiesel Concept and Prospect in Pakistan

Ali Bahadur



Biodiesel Concept And Prospect in Pakistan

Ali Bahadur
School of Chemical And Materials Engineering
National University of Sciences and Technology
H-12 Campus, Islamabad, Pakistan



Overview of Energy Situation

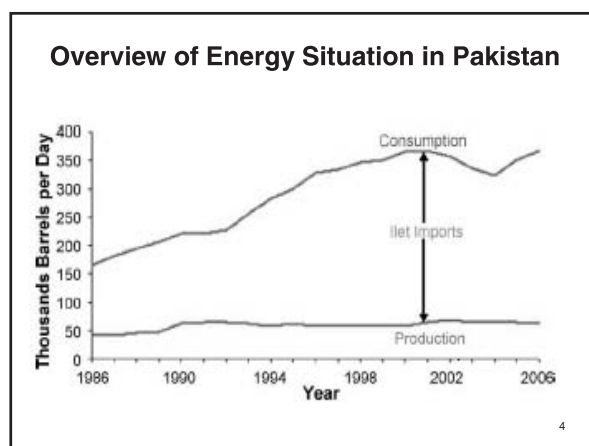
- In fiscal year 2005/2006, Pakistan imported 8.6 million tons of crude oil and Pakistan state bank paid \$6.7 billion for oil imports during 2005/2006
- It is highly expected that the energy (power and transportation) demand will increase by 53% by 2030
- Pakistan will require approximately 50% more energy for power and transportation sector .
- International Energy Outlook 2008 predicted that world petroleum demand will increase from the current 94.40 million barrels per day (bbl/d) to 130.16 million barrels per day by 2030.
- Proved oil reserves are depleting in 6 of the 11 members of the Organization of Petroleum Exporting Countries (OPEC); this may increase the cost of crude oil exorbitantly .



Overview of Energy Situation in Pakistan

Pakistan energy supply mix, 2005-2006

Energy source	Production (million tons)	Percentage
Oil	16.44	28.4
Natural gas	29.18	50.4
Coal	4.05	7.0
LPG	0.23	0.4
Nuclear	0.57	1.0
Hydroelectricity	7.35	12.7





Energy source for auto ignition engines (transport sector)

- Main consumer of crude oil is combustion engines.
- Transport industry (buses, cars, etc.) can only accept petroleum fuel oil for its energy generation.
- Price of crude oils is increasing with passing time due to the increase in demand and decrease in supply.
- According to researchers high prices of crude oil will be observed after 2050.
- Renewable energy sources such as ethanol and methyl ester (biodiesel) are only reciprocal to present engine technology for smooth running of vehicle.
- Transport sector was the main user of crude oil followed by power sector as described.



Energy source for auto ignition engines (transport sector)

Petroleum products consumption by sector, 2006-2007

Consumption sector	Consumed energy (million tons)	Percentage
Transport	7.98	47.4
Power	6.74	40.0
Industry	1.60	9.5
Domestic	0.10	0.6
Government	0.32	1.9
Agriculture	0.10	0.6



An Illumination



An Illumination happened to us that the nature has got the two predominant qualities. One is "continuous movement between the polar opposites" and another is 'Balancing Things."

These Qualities has got a subtle connection with the biodiesel. Likewise biodiesel plants are evolving immensely in this century just to balance the depletion of the fossil fuel.

We can see the Polar opposites in this case. Now we are having fuel under the earth soon we may obtain it above the earth through Biodiesel Plants.

Another ecological point of view has to be considered here that the scientists have put their opinions on the latest Earth Quake , must have happened because of continuous digging into earth for fossil fuel.

7



Considering the Global energy Scenario, climate changes and national Energy requirement

Energy from crops is not only financially viable, but strategically and environmentally important

8

Biodiesel



- Biodiesel is a renewable, environment friendly substitute for petro-diesel.
- It is produced from edible, non-edible oils and animal fats.
- Normally Biodiesel blends can be used in diesel engines without any alteration.
- Technical Definition for Biodiesel and Biodiesel Blend:
- Biodiesel is a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animals fats, and meeting the requirements of standard specifications.

9

STRATEGIC OBJECTIVES



Effective use of agricultural sciences, manufacturing technology, domestically produced feedstock and rural human resources for economical production of biodegradable, cleaner burning BioDiesel to substitute for petroleum based Diesel Oil

Utilization of sub-standard waste lands, un-utilized Public lands and rural human resources to develop plantations and Process Centers in various regions of Pakistan to produce oil rich seeds and BioDiesel.

Significantly reduce Nation's dependency on imported petroleum, reduce trade deficit, promote rural economic growth, national prosperity and improve breathing air quality

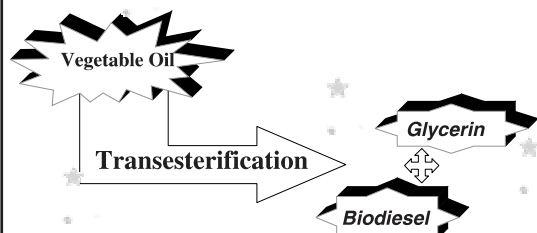
10



Production Technology for Biodiesel



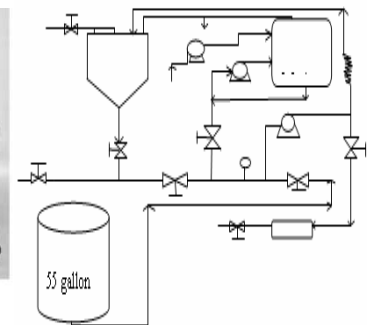
Transesterification was eventually successful in bringing about the viscosity close to petro-diesel.



11



40 Gallon Batch Biodiesel Kit





Benefits of Biodiesel



Environmental

- » **Approx. 80% less carbon dioxide emissions**
- » **Almost 100% less sulphur dioxide**
- » **Over 90% reduction in total unburned hydrocarbons**
- » **Approx. 75-90% reduction in aromatic hydrocarbons**
- » **Significant reduction in particulates & carbon monoxide**

Mechanical

- » **Provides superior lubricating properties.**
- » **High detergent properties keep fuel lines, injectors, and combustion chambers clean.**

13

VEGETABLE OIL	BIODIESEL	DIESEL FUEL
Triglyceride of fatty acid (Molecular Wt 700-1000)	Alkyl esters of Fatty acid Molecular Wt~260 to 300	Saturated Hydrocarbon (C ₁₂ -C ₁₄) Molecular Wt~200
10% less heating value than diesel because it contains Oxygen	10-12 % less heating value than diesel	Major hydrogen and carbon (SO _x , NO _x , PAH)
Kinematic viscosity is higher (35-45 cSt at 40°C)	Kinematic viscosity is in same range of that of diesel	Kinematic viscosity is lower (3.8 -5 cSt at 40°C)
Less volatility	Less volatile than diesel	High volatility

Let us Sow the Fuel Seed

Pongamia Pinata, Jatropha Curcas L., Karanja, Pinata millatia, Algae

- Jatropha is a hardy, wild oilseed perennial plant
- Conditions for the cultivation of this plant are favorable in Pakistan
- Oil content ranges from 30 to 35%; Plant life is 40-50 years approx.
- Does not require special expertise for plantation / farming
- Grows on good as well as degraded soil (marginal land) & require less water
- Requires minimum transesterification cost due to its low viscosity, It also blends well with petro-diesel



15



A Vision On a Fuel Crop Jatropha Curcas



- As Ornamental Plant
- As a Fence
- As a potential oil crop
- As a raw material for Industrial use
- Potential as medicinal Plant
- As raw material for Dye
- For Enrichment of Soil
- As non conventional Energy Crop
- As Profitable agro Forestry Crop

16



Land availability in Pakistan



- Pakistan has abundant of waste land available
- Total Geographical area 80 million ha
- Cultivated area 22 million ha
- Irrigated area 16 million ha
- Dependent upon rains 7 million ha
- Forest area 4 million ha
- Range Land 52 million ha
- It is estimated that 62% of geographical area of Sind is Arid, comprising Thar, Nara and Kohistan, moreover a large area under coastal belt and Katcha area is also available.

17



ECC's Decision of 15th Feb, 2008:

5% biodiesel blending with petro-diesel by 2015

10% biodiesel blending with petro-diesel by 2025

18

Strategy for the production of Biodiesel in Pakistan



- Ministry of Water & Power in coordination with AEDB shall be the apex coordinating and facilitating body for the National Bio-Diesel Programme.
- Gradual introduction of biodiesel fuel blends with petroleum diesel so as to achieve a minimum share of 5% by volume of the total diesel consumption in the country by 2015 and 10% by 2025.
- Oil Marketing Companies (OMCs) to purchase Bio-Diesel (B-100) from biodiesel manufacturers; and sell this Bio-Diesel blended with Petroleum Diesel (starting with B-5) at their points of sale.
- Ministry of Petroleum & Natural Resources shall come up with the fuel quality standards for B-100 and blends up to B-20.
- OGRA shall regulate the pricing mechanism of various blends of Bio-Diesel (B-5, B-10), etc.) and ensure its cost-competitiveness with petroleum diesel.
- All imported plant, machinery, equipment and selective raw material, e.g. Jatropha, for use in the production of Bio-Diesel shall be exempted from customs duty, income tax and sales tax.

19

Diesel & Furnace Oil Consumption in Pakistan



Pakistan consumes around 8 million tons of diesel & 7.2 million tons of furnace oil per year

Around 9 million tons of diesel & furnace oil is imported out of which PSO alone imports 3.4 million tons of diesel & 4 million tons of furnace oil.

If 10 % of the total diesel & furnace oil consumed by Pakistan (i.e. 0.80 million tons of diesel & 0.72 million tons of furnace oil) is switched to blended fuel the country's import bill can decline by ~ US \$ 1.00 Billion

20



NUST's Directions



NUST's Focus is on:

- Non-edible plant seeds as feed stock
- Avoidance of competition with Food Crops
- Utilization of country's ample Marginal /Barren land
- Conserving agricultural Water Resources.
- Produce biodiesel at minimum possible cost
- Creation of employment opportunities

21



Jatropha Model Farm



22



23



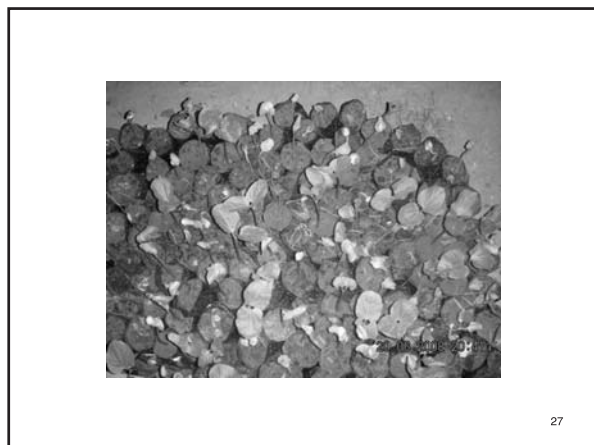
24



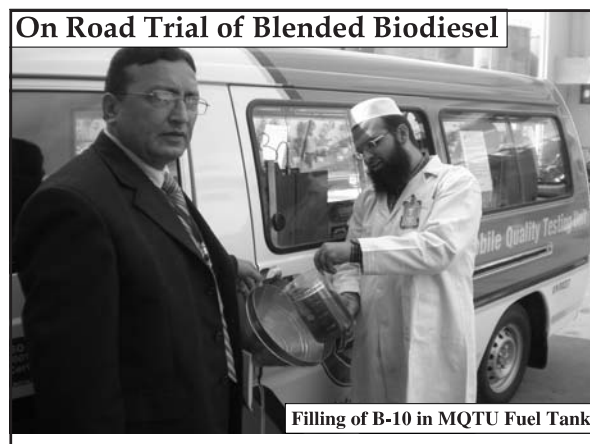
25



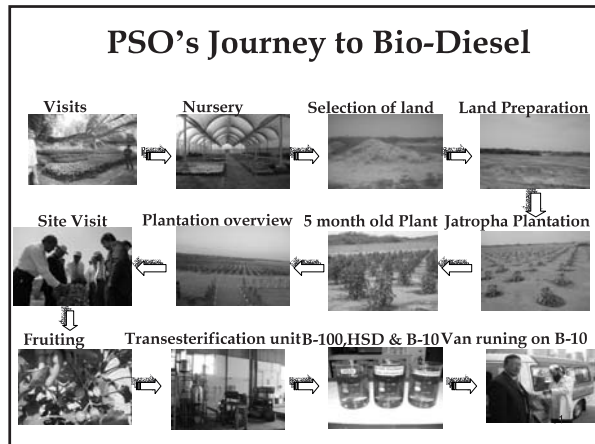
26



27



On Road Trial of Blended Biodiesel





NUST
Defining Futures

"The earth was not given to us by our parents, it was loaned to us by our children."

Kenyan Proverb

WE NEED TO ACT, NOW

THANKS

32

Energy Crises - The way out

Faroha Liaqat

Challenges for Socio-economic Development in Pakistan: Role of Science and Technology

Energy Crisis- The way out

Presented by

Faroha Liaqat

Technology and Socio-economic Development

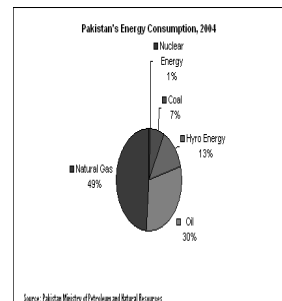
- Innovative technologies may contribute to development.
- Target-oriented research, specific to each country, pave the way for economic development.
- Economic progress brings social stability.

Energy - Pakistan's growing crisis

- Energy is the lifeline of a nation.
- On the social aspect, energy consumption per capita is a key indicator of the quality of life of the citizens and community.
- Electric power shortages of about 3,500 MW.
- Considering the load of the industry of about 1,500 - 2,000 MW, shutdown now, actual shortfall is in the 5,000 MW range.

Energy supply and demand situation in Pakistan

- Pakistan had 28.8 million barrels of proven conventional oil reserves (OGJ, 2005).
- Currently production around 64,000 bbl/d
- Consumption: 351.4 thousand bbl/d.
- Natural gas supplies 49 percent of Pakistan's energy needs.



Reasons behind Pakistan's energy crisis

- No real solutions to meet the energy requirements. Only empty rhetoric.
- Fiscal constraints.
- Lack of vision and robust planning.
- Heavy reliance on fossil fuels for power generation.
- Low focus on alternative energy sources.
- Minimal research in exploring alternatives to conventional energy sources.

How technology can help us in overcoming the power crisis in Pakistan?

Pakistan currently produces only 18.3 percent of the oil it consumes, fostering a dependency on expensive, imported oil.

40% of the Pakistani households that have yet to receive electricity, and only 18% of the households that have access to pipeline gas.

Pakistan relies heavily on fossil fuels, which leads to:

- Increased carbon emissions.
- Dependency on oil-rich powers.
- Environmentally disastrous.

Alternative Energy Sources

- Scientific research on alternative energy sources and related technology can help power-hungry Pakistan.
- Environment-friendly alternative energy resources could add billions of dollars to the economy in the form of carbon credit.

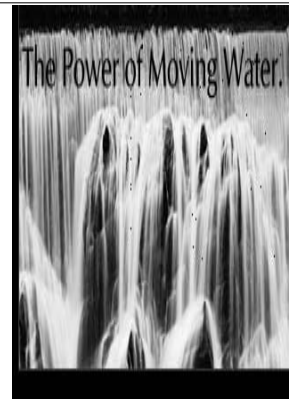
Wind Energy

- Pakistan has a breezy and long coastline.
- Potential to produce over 50,000 MW of electricity from wind.
- Current generation is 100 megawatts.
- India and China top 10 producers of wind energy



Water Power

- Water wheels used for grinding grain date back 3,000 years.
- Energy of falling water is used mainly to drive electrical generators at hydroelectric dams.
- Pakistan's current installed capacity is around 19,845 M; around 20% is hydroelectric.
- Community Based Micro hydel projects, eg like those in Northern Areas of Pakistan, with Aga Khan Foundation.



- Periodic droughts affect the availability of hydropower.
- Transmission losses are about 30 percent, due to poor quality infrastructure.

Coal Power

- Pakistan is currently world's seventh largest coal-producing country, with coal reserves of more than 185 billion tons (second in the world after U.S.A.).
- Sufficient to fuel the proposed 405 MW power plant.
- Investment of \$600 million for setting up an integrated coal mining-cum-power project in Sindh.
- Problem is : The world is thinking of limiting coal power plants and we are thinking of starting one?

Solar Power

- Only 500 solar homes projects in Pakistan, under the World Bank project.
- Import of solar power geysers in China, for solar water heating.
- The energy of less than one hour of sunlight is equal to the total yearly human energy consumption



Photovoltaic/ Solar cells

- Solar cells convert available light into electricity.
- Modern solar cells are based on semiconductor physics - they are basically just P-N junction photodiodes with a very large light-sensitive area.
- Silicon solar cells- High efficiency but the problem is

Very expensive

Can laptops run on spinach?



OR

Hibiscus Tea?

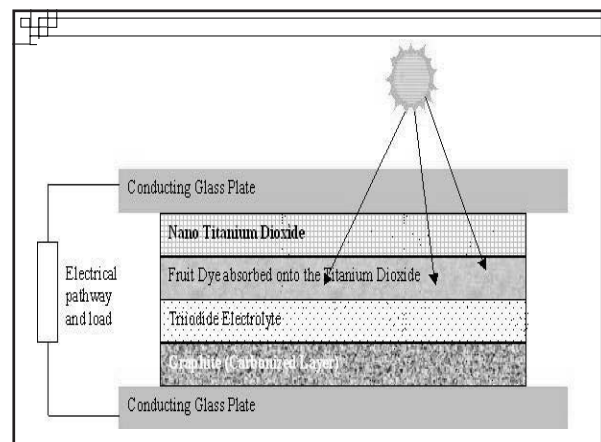
The answer is.....

They can!



Dye sensitized solar cells (DSSC)

- Solar cells that rely on cheap Titanium Dioxide, instead of Silicon.
- Dyes are used as light sensitizers, where electrons in the dye molecules are excited by solar radiation and jump into the Titania layer.
- A liquid electrolyte eg iodine carries the electrons to the other electrode, completing the circuit. Current flows.



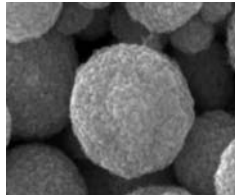
Advantages over conventional solar cells

- Low cost materials and no elaborate apparatus.
- Works in low light conditions.
- High price/performance ratio
- The disadvantage is that it produces slightly lesser efficiency

- In physics terms, DSSC's offer very high efficiencies and the economics are promising because they are based on TiO_2 , a cheap and widely available material.
- "The nice thing about Gratzel cells," comments Dr Walker, an eminent scientist, "is that you could imagine them being used in the poorest countries."

How?

- Apart from the synthetic dyes easily available, we can use the fruit dyes as sensitizers. Fruit dyes contain anthocyanin pigments of which there are many. Anthocyanins molecules absorb photons around the 520-550 nm range. These are the pigments that produce the red, blue, violet, and orange colors we see in fruits and flowers.
- The dye must be complexed to the titanium dioxide and it must be able to absorb the photons' energy, exciting and freeing some of its electrons.



DSSC and photosynthesis

- In photosynthesis, chlorophyll absorbs energy from sun and uses it to excite electrons; these electrons are moved around inside plant cells and through many reactions, ATP and NADPH molecules are formed. Through additional reactions, glucose and carbohydrates are produced.

Sub system	DSSC	Photosynthesis
Electron acceptor	Nano TiO_2	Co_2
Electron donor	Tri-iodide electrolyte	Water
Light absorber	Dye	Chlorophyll

DSSC panels: Economically viable



Hitachi's new DSSC panel has 9.3 % efficiency

Recommendations

1. Focus on applied research that is the need of the hour and appropriate funding to make that research possible.
2. Generating energy from waste would also help in decreasing pollution.
3. Setting up small industrial units to generate energy using new technology will help in creating jobs.
4. Buying cheap electricity from sugar mills.
5. Bringing down line losses

6. Minimizing power theft.

7. Alternative energy - a tool to get reimbursement from developed countries for reducing harmful carbon gas emissions. Developed countries get carbon credit for financing pollution-reducing projects in less developed countries as they are bound to reduce their domestic pollution under a global treaty.

8. Utilizing nuclear energy as clean technology under IAEA safeguards.

9. Building small hydel power plants, even installing turbines in irrigation canals.

10. Educative measure about conservation of energy.

"The energy of the mind is the essence of life".

Let's use our minds, our science and technology to bring about change in our living standards

THANK YOU

Energy Production through Solid Materials

Shaima Akhlaq



COMSATS-COMSTECH

National Meeting
26th – 28th October 2009
Islamabad, Pakistan



Meeting Title: **Challenges for Socio-economic Development in Pakistan: Role of Science and Technology**
 Thematic Session: **Energy**
 Presentation Topic: **Energy Production through Solid Waste/Biofuel**
 Presented by: **Shaima Akhlaq**
 B.Sc Hons.
 Biotechnology Major

FORMAN CHRISTIAN COLLEGE, LAHORE
 (A Chartered University)

Issues relevant to Pakistan's Socio-economic Development

1. Economic Crises

2. Political Instability

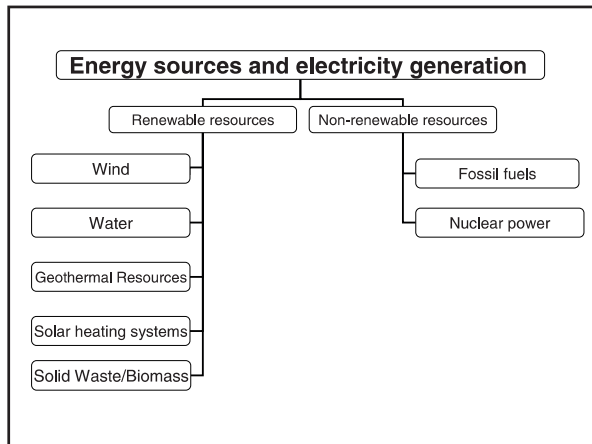
3. Ignorance of general public

4. Low literacy rate

5. Limited Resources

6. Rapidly increasing population

As depicted above there are many of kind but one which suddenly came out of dormancy and can have drastic effects is "Current Energy Crises".



According to Alternate Energy Development Board (AEDB) sources

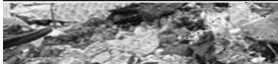
Pakistan total electrical energy capacity	19,522 megawatts
Shortfall	over 6,000 megawatts
Burning of fossil fuels	64 percent
Hydel sources	33 percent
Nuclear sources	2 percent
Estimated demand for electricity by 2030	162,590 megawatts
Increase of shortfall	over 143,000 megawatts

Biomass as an Alternate Energy Source

Types of Biomass



Wood fuel



Rubbish



Alcohol fuels

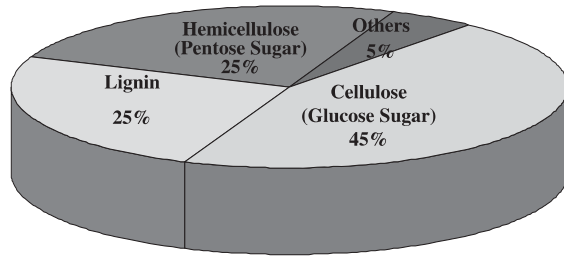


Crops



Landfill gas

Biomass Composition



FRUIT AND VEGETABLE WASTE IS IGNORED RESOURCE OF ENERGY



1. Estimated Lahore waste as a potential resource of energy.

Name	Quantity [kt/day]
Household waste	150
Subzi mondi waste	40
Park and garden waste	10
Food Industry waste	25

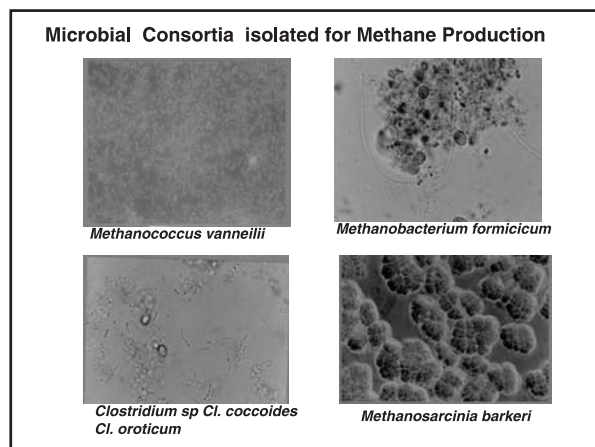
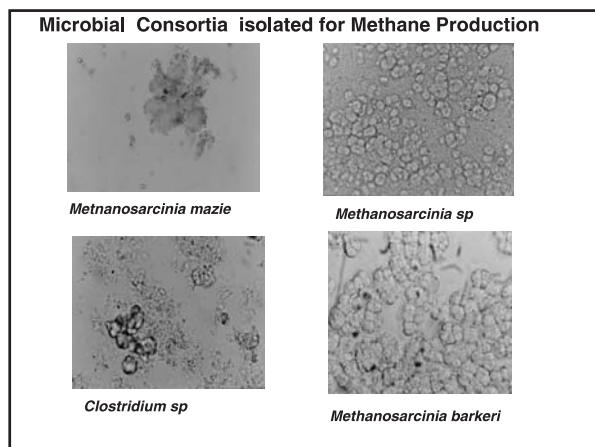
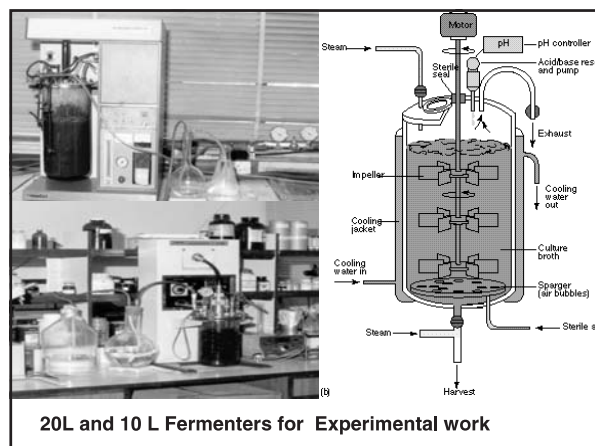
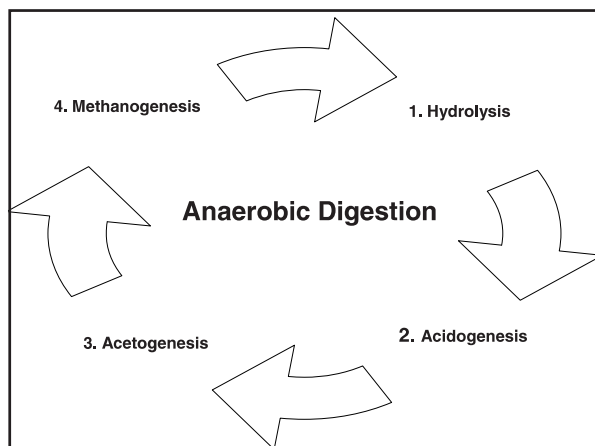
ANAEROBIC CONVERSION OF BIOMASS (Fruits & Vegetables Waste) INTO METHANE

METHANE AS BIOFUEL:

- Renewable Natural Gas is 70% methane (CH_4) & 30% carbon dioxide.
- Methane production is environment friendly and produces less pollutants as compared to coal.
- Methane gas can be used for the generation of electricity as one cubic meter of biogas retains 2 kWh of electricity (can be produced by combusting biogas in co-generation unit).

Typical composition of biogas

Matter	%
Methane, CH_4	50-75
Carbon dioxide, CO_2	25-50
Nitrogen, N_2	0-10
Hydrogen, H_2	0-1
Hydrogen sulfide, H_2S	0-3
Oxygen, O_2	0-2



Our Goals at FC College are to:

1. Design a model for optimum conversion of fruits & vegetables waste into methane.
2. Optimization of fermentation procedure.
3. Developing genetically engineered microbes for efficient degradation of lignocellulose into biofuels

Shakarganj Sugarmill, Pakistan

Shakarganj sugar mill, Pakistan had already stepped into this technology by hiring Pakistan's first sugarcane-waste based plant for biofuel production and 8MW energy is being produced by it, not only meeting the energy demand of mill but also forwarding some of its portion to PEPCO.

Green Bin Program, City Toronto

The Green Bin Program collects organic waste (fruit and vegetables scraps, paper towels, coffee grinds, etc.) and turns it into biogas and biofertilizer.



Benefits:

- Reduces the volume of waste 60% due to extraction of organic part.
- Easy disposal of rest of waste.
- Clean environment.
- Useful products formation.

Countries	Total biomass mill. tonnes	Total energy from biogas TWh/year	Total energy biogas PJ (Petajoule)
Austria	36.1	6.1	22.0
Belgium	52.0	8.8	31.7
Denmark	52.5	8.9	32.0
Finland	18.5	3.1	11.3
France	251.9	42.7	153.7
Germany	234.6	39.8	143.2
Greece	11.4	1.9	7.0
Ireland	70.5	11.9	43.0
Italy	112.0	19.0	68.3
Luxembourg	2.08	0.4	1.3
Netherlands	80.8	13.7	49.3
Portugal	22.0	3.7	13.4
Spain	108.2	18.3	66.0
Sweden	26.3	4.4	16.0
U. Kingdom	155.4	26.3	94.8
Total EU :	1 234.3	209	753.0

In Conclusion

Biomass obtained from Solid Waste can be converted to Bioenergy which is eco-friendly & also has a definite future. It can play a vital role in meeting the energy requirements of the country.

Energy Crises: A Challenge for Pakistan

Kaleem Anwar Mir

Energy Crisis - a challenge for Pakistan

Kaleem Anwar Mir

Global Change Impact Studies Centre

COMSATS-COMSTECH National meeting:
"Challenges for socio-economic
Development in Pakistan: Role of Science
and Technology", 26-28 October 2009,
Islamabad

Contents

- Introduction
- Energy Profile of Pakistan in 2008
- Fossil Fuel Balance Recoverable Reserves in Pakistan (2008)
- Electricity Installed capacity in Pakistan in 2008
- Reasons Leading to Switch over to the Renewable Energy Resources
- Renewable Energy Resources Potential in Pakistan
- Recommendations/Conclusions

Introduction

- Socio-Economic Development of a nation is assessed also on the basis of energy and its consumption per capita
- Per capita energy consumption in some advanced countries is as high as 7.5 TOE, in Europe 3.7 TOE, while the average for developing countries is 0.37 TOE, the same as consumption in Pakistan in 2008

Energy Profile of Pakistan in 2008

- Population in Year 2008:
162.37 Million
- Primary commercial energy consumption in 2008:
62.9 MTOE (with an average growth rate of 6.0% per annum during 2003-2008)
- Mix of different energy sources:
Oil: 30.5%, Gas: 47.5%, Coal: 9.2%,
Hydro electricity: 10.9%,
Nuclear electricity: 1.2%,
Others (LPG, Imported electricity): 0.7%

Energy Profile of Pakistan in 2008 (contd.)

- Electricity generated in 2008:
95.7 TWh with shares Oil: 32.2%, Gas: 34.4%, Coal: 0.14%, Hydro electricity: 30.0%, nuclear electricity: 3.2%
- Per capita primary commercial energy consumption in 2008: 0.39 TOE
- Per capita electricity consumption in 2008:
around 0.04 TOE (440 kWh)

Sources: 1- Pakistan Economic Survey 2008-09

2- HDIP, Pakistan Energy Yearbook 2008

Fossil Fuel Balance Recoverable Reserves in Pakistan (2008)

- Oil: 44 MTOE (is estimated to dry up after 13 years at current rate of production)
- Gas: 551 MTOE (will exhaust in 18 years at current rate of production)
- Coal: Total Resources = 83 billion TOE (sufficient for meeting total energy needs for > next 250 years)

Source: HDIP, Pakistan Energy Yearbook 2008

Electricity Installed Capacity in Pakistan in 2008

■ Hydel:	6480 MW	33.4% share
■ Gas/Oil:	12328 MW	63.4% share
■ Coal:	150 MW	0.8% share
■ Nuclear:	462 MW	2.4% share
■ Total:	19420 MW	100% share

Source: HDIP, Pakistan Energy Yearbook 2008

Reasons Leading to Switch over to the Renewable Energy Resources

- With the ever increasing growth in energy consumption and rapidly depleting fuel reserves, renewable energy resources and their development have become inevitable for a sustainable national development
- Alternatives to conventional resources are now being explored and utilized in many countries

Reasons Leading to Switch over to the Renewable Energy Resources (contd.)

- Oil imports from middle east (85 % of the total demand)
- Indigenous production is about 56,000 barrels per day, meets only 15 % of the requirement
- Coal reserves are in large quantity but several factors including depth and moisture of lignite reserves, scarcity of fresh water and over and above the present issue of global warming and climate change linked to the burning of fossil fuels hinders the development of coal reserves in the country

Reasons Leading to Switch over to the Renewable Energy Resources (contd.)

- In order to allow large scale use of coal with minimal GHG implications, acquiring and adoption of clean coal technologies such as Coal Bed Methane Capture (CBMC) technology, Integrated Coal Gasification Combined Cycle Power Generation (ICG-CCPG) and CO₂ capture and storage (CCS) technology are required.
- These technologies are not only expensive, at present they are not available to Pakistan.

Renewable Energy Resources Potential in Pakistan

- HYDRO-POTENTIAL is estimated at around 50,000 MW out of which 4800 MW has been developed over the past 50 years
- Vast potential of about 2.9 Million MW of SOLAR ENERGY is available in the country being in sub-tropical region for its conversion to power. AEDB has facilitated the private sector in developing solar power in the country
- WIND ENERGY has vast potential of up to 0.346 Million MW, out of which Identified potential of 50,000 MW is in Gharo-Keti Bandar wind corridor alone. Work on this has recently been started in Pakistan by AEDB

Renewable Energy Resources Potential in Pakistan (contd.)

- BIOMASS (dung) can give 17.5 Million m³ equivalent to about 15000 TOE biogas and in addition 50 million kg of bio-fertilizer per day through bio-methanation. AEDB has taken initiative in the promotion of biomass in Pakistan
- Tidal and Geothermal Energy also have the potential for future electricity generation.

Source: AEDB, Alternative Energy Development Board

Recommendations/Conclusions

- Pakistan has been facing an acute energy deficit, the only solution to overcome this growing energy crises is to utilize more and more renewable energy resources, in view of their substantial potential in the country.
- Facilitation of such renewable energy projects can bring huge economic benefits to Pakistan, including new income streams, employment opportunities and new investments resulting in the socio-economic development of country.

Thank You

OUTCOME (TECHNICAL SESSION - 6)

Theme:	Energy
Subject Experts:	1. Mr. Ashfaq Mahmood 2. Dr. Shaukat Hameed Khan
Presentations by:	1. Mr. Ali Bahadur 2. Ms. Faroha Liaqat 3. Ms. Shaima Akhlaq 4. Mr. Kaleem Anwar Mir

Problems-Identified in the Session	S&T-led solutions
There is a prominent increase in energy-demand whereas conventional energy-resources are gradually depleting.	There is a need to: • Further develop/explore resources of unused energy-producing resources, e.g., coal and bio-fuels. • Develop renewable energy resources for intermittent usage but not for base load as these are expensive.
Pakistan has a major dependence on imported oil and there is a minimal research done in the area of exploring energy-production through alternate sources that are environment-friendly. Overuse of fossil fuels in domestic and transport sectors.	There is a need to: • Develop indigenous energy resources. • Bio-fuel can be produced from inedible crops and plants. The option is not only financially viable, but strategically and environmentally important too. • Methane and coal reserves must be explored/used for electricity generation, at the earliest possible, in the wake of present day energy-crisis. Measure should be taken to technically confirm the presence of methane near the coasts of Karachi and in Balochistan. • Generating energy from organic waste would help in minimizing pollution. The Green Bin Programme can be an effective means of collecting organic waste and transforming it into bio-gas and bio-fertilizers. • The use of solar energy based products should be more widespread. Nano-crystalline, dye-sensitized, solar cell system can be used for the production of low-cost solar electricity. • The projects, such as solar-schools should be encouraged and promoted. • Wind energy should be generated/utilized. There is a great potential of such an energy source along

	the breezy coastline of Pakistan that needs to be explored by departments such as AEDB. • Small hydal-power plants can be of great value. • Utilize the potential of tidal and geothermal energy. • Waste from animal-barns in Landhi, Jhang and Okara, each having 10,000 cattle-heads, can produce 35 Mega Watts of electricity to meet the local energy needs. • By-products (Bagasse and Molasses) from Pakistan's sugar mills can produce enough biofuel to generate around 2,000 MW of electricity.
Unchecked energy losses	• Energy loss issues must be addressed using S&T solutions, such as: - Smart grids; - Smart pipelines; - Smart meters. • These smart systems/monitors could be connected through PCs and databases for data collection to generate warnings and signals. • Awareness on and utilization of motion detectors/sensors should be increased that would only utilize energy as and when needed.

SUMMARY OF THE CONCLUDING SESSION

The Concluding Session of the meeting, comprising three activities, took place in the afternoon of 28th October 2009. First, a lecture, on the topic “Nanotechnology: A Vehicle for Socio-economic Development”, was delivered by renowned Pakistani scientist, Dr. N.M. Butt, Professor at the Preston University, Islamabad. The second activity was a ceremony of certificate distribution to young participants, rapporteurs and members of the organizing committee. All the twenty five participants, who attended all the technical sessions of the meeting and made valuable contributions towards its success, were given certificates of participation by the Coordinators of the meeting, Dr. Anwar Nasim, Advisor Science, COMSTECH and Dr. Hasibullah, Advisor International Affairs, COMSATS. They thanked Dr. N.M. Butt for his excellent lecture and the participants and the rapporteurs for making the meeting a success. The third activity was the presentation of the ‘Technical Summary of the Meeting’ by Dr. Hasibullah.

LECTURE ON

NANOTECHNOLOGY: A VEHICLE FOR SOCIO-ECONOMIC DEVELOPMENT (SUMMARY)

by

Dr. N.M. Butt

*Professor of Nano Science & Technology
Preston Institute of Nano Science & Technology (PINSAT)
Preston University, Islamabad.*

BRIEF NOTE

The power of nanotechnology is rooted in its potential to transform and revolutionize multiple technology and industry sectors, including aerospace, agriculture, biotechnology, homeland security and national defense, energy, environmental improvement, information technology, medicine, and transportation, in other words all the aspects of the socio-economic conditions of the human beings could be effected by it. It is being termed as another 'industrial revolution' in the offing. The advanced nations of the world are making annual investments to the tune of billions of dollars. USA alone has already invested about 12 billion dollars on Nanotechnology since 2001, and China, Russia, Japan and European countries are also some competitors in this field. Universities of several advanced countries are already offering courses leading to B.S, M.S and Ph.D degrees. The neighbouring countries of Pakistan, India and Iran, are also seriously following the course of development of nanotechnology for the welfare of their people. In Pakistan efforts have been made for the development of nanotechnology in a few research centres, like PINSTECH, NIBGE, KRL and some universities like PIEAS, Punjab University, Q.A. University, CIIT, GIKI and NUST. The Preston University, Islamabad, has taken the initiative to be the first university in Pakistan to establish the Preston Institute of Nano Science and Technology (PINSAT) that offers graduate and post-graduate degrees in nanotechnology so that the youth of Pakistan gets ample opportunities of employment within the country and abroad. Nanotechnology is going to be the cornerstone of all types of industries in the next 40 to 50 years. Therefore, much more is needed to be done in Pakistan, both for education and for strategic industrial use of nanotechnology lest we miss the benefits of this fast developing technology.

Nanotechnology, shortened to "nanotech", is the study of the controlling of matter on an atomic and molecular scale. Generally nanotechnology deals with structures of the size 100 nanometers or smaller in at least one dimension, and involves developing materials or devices within that size. To visualize the small size of one nanometer, we should think that the thickness of a human hair or a sheet of paper is about 80,000 nanometers. The size of a Helium atom is about 0.1 nm, and thus, 10 atoms in a line would measure 1 nm. As per the international nomenclature, the material sizes less than 100 nm fall in the realm of nanotechnology.

Nanotechnology has extensive applications in: medicine, energy, textiles, cosmetics, paints, pharmaceuticals, electronics, information and communication, water, food and agriculture, auto-engineering, sports-goods, oil and gas, and defense.

Some of the striking applications include: the treatment of cancer and AIDS at cell level without the side-effects like those of Chemotherapy; drug delivery at the targeted disease-sites; cosmetic creams; dental cements; body implants; food preservation; clean drinking water plants; oil cleaning plants; anti-terrorist sensors for explosive detection; bullet proof thin shirts; micro machines to clean cholesterol in the veins; and electronic sensors that could detect very small amounts of explosives, which even the sniffing-dogs would not detect.

These amazing applications and industrial products of the nanotechnology are attracting nations to make heavy

investments in this technology, which will dominate our lives for the next 40-50 years. It is expected that by 2015 there would be world marketing of about 1-2 trillion dollars of nanotechnology products and creation of a few million jobs, and thus, having a beneficial influence on the socio-economic development.

The use of nano materials is also revolutionizing the applications in all spheres of domestic life. The physical properties of materials at nano-scale are much different than those at the bulk scale of the same material. This is because of the fact that as the particle size of the material goes smaller the surface-to-volume ratio becomes larger, thereby improving the physical and chemical properties where the surface properties are involved. Nanotechnology is a multidisciplinary field of discovery. Scientists working in physics, chemistry, biology, engineering, information technology, metrology, and other fields are contributing to today's research breakthroughs.

In this brief presentation, attempt has been made to create awareness on the importance of this powerful technology so that the talented youth of Pakistan understands the need to serve our beloved country by pursuing nanotechnology for the betterment of our people. This is a great responsibility to which our talented youth must seriously respond to.

TECHNICAL SUMMARY

by

Dr. Hasibullah

*Advisor (International Affairs)
COMSATS Secretariat, Islamabad.*

The national meeting on “Challenges for Socio-economic Development in Pakistan: Role of Science and Technology” was held from 26th-28th October 2009. The basic objective of the meeting was to provide young students, researchers, teachers and thinkers an opportunity to prepare themselves for dealing with the socio-economic challenges being faced by Pakistan and to provide a forum to freely discuss and identify the challenges and their possible S&T based solutions.

The participants comprised 25 young discussants and 12 eminent subject experts. The technical sessions were designed to discuss two topics per day. The six topics chosen for the technical sessions were education; health; ICTs; economy and S&T issues; agriculture; and environment and energy. All these areas have direct linkages with socio-economic development of Pakistan. Efforts were made to identify the most important challenges and their S&T supported solutions in a realistic and precise manner. A total of 25 presentations were made by the young participants in six technical sessions. The subject experts gave keynote addresses in the beginning of the technical sessions, thus 12 such addresses were made during the six technical sessions. Each technical session had about one and a half hour for discussions or brain-storming.

In the first technical session that was on ‘Education’, Dr. Inam-ur-Rahman, Scientist Emeritus PAEC, and Dr. S. M. Junaid Zaidi, Rector CIIT, gave the keynote addresses. Three presentations by the participants were made on: (1) Investment in Education: Panacea for Pakistan, (2) Review of National Educational Policy of Pakistan; and (3) Strengthening Classroom Instructions.

In the second technical session on ‘Health’, Dr. Sania Nishtar, Founder President and Executive Director, Heartfile – Pakistan and Dr. Birjees Mazhar Qazi, Executive Director, National Institute of Health, Islamabad, contributed as resource persons. Three presentations by the discussants included: (1) Role of Taxonomy of Medicinal Plants in Socio-economic Uplift of Pakistan; (2) Health-Issues Hurting Socio-economic Well-Being of Pakistan and their Possible Solutions; and (3) Role of Science and Technology: Health Challenges of Pakistan.

The third session was on ‘ICTs’ in which Dr. Arshad Ali, Director General, School of Electrical Engineering and Computer Sciences, NUST, Islamabad, and Dr. Khalid Rashid, Professor, Department of Computer Sciences, CIIT, Islamabad, gave their keynote addresses. Three technical presentations by the discussants included: (1) Role of Science and Technology in Media Development; (2) Role of Information and Communication Technology in Entrepreneurship Development; and (3) Role of Information Technology in Development of Pakistan.

The fourth technical session was on ‘Economy and S&T issues’. In this session, Dr Tariq-ur-Rahman, Chairman Pakistan Council for Science and Technology, Islamabad, and Dr. Asad Ali Shah, Former Member, Planning Commission of Pakistan, contributed as resource persons and gave their keynote addresses. Nine technical presentations by the participants were made under the captions: (1) University-Industry-Government Inter Linkages in Pakistan; (2) Role of S&T in Economic Issues; (3) Productivity; (4) Use of Expansion Materials in Block Mining of Marble Granite; (5) Socio-economic Development of Pakistan: Role of Engineering and Technology; (6) The Challenging Economic Problems and their Solutions; (7) Factors Influencing the Socio-economic Development of Pakistan; (8) Freedom of Information: A Tool for Accountability; and (9) Practicing ICT in Public Sector.

The fifth session dealt with ‘agriculture and environmental issue’. In this technical session, Dr. Qamar-uz-Zaman Chaudhry, Director General, Pakistan Meteorological Department, Islamabad, and Dr. M.E. Tusneem, Member (Food & Agriculture) Planning Commission of Pakistan, Islamabad, were the subject experts and both gave their keynote

addresses. Three technical presentations were made by the young participants. The topics were: (1) Rural Poverty Alleviation through Skill-Development; (2) Socio-economic Challenges of Pakistan and the Role of Science and Technology; and (3) Climate Change Challenge for Fresh Water Resources of Pakistan.

The sixth and last technical session was devoted to the issues of Energy. Dr. Shaukat Hameed Khan, Former Member Planning on Science and Technology and Mr. Ashfaq Mahmood, Visiting Faculty Member, CIIT, were the resource persons. They gave their keynote addresses to the session participants. Four technical presentations were made by the participants on: (1) Biodiesel Concepts and Prospects in Pakistan; (2) Energy Production through Solid Materials; (3) Energy Crisis - The Way Out; and (4) Energy Crisis: A Challenge for Pakistan.

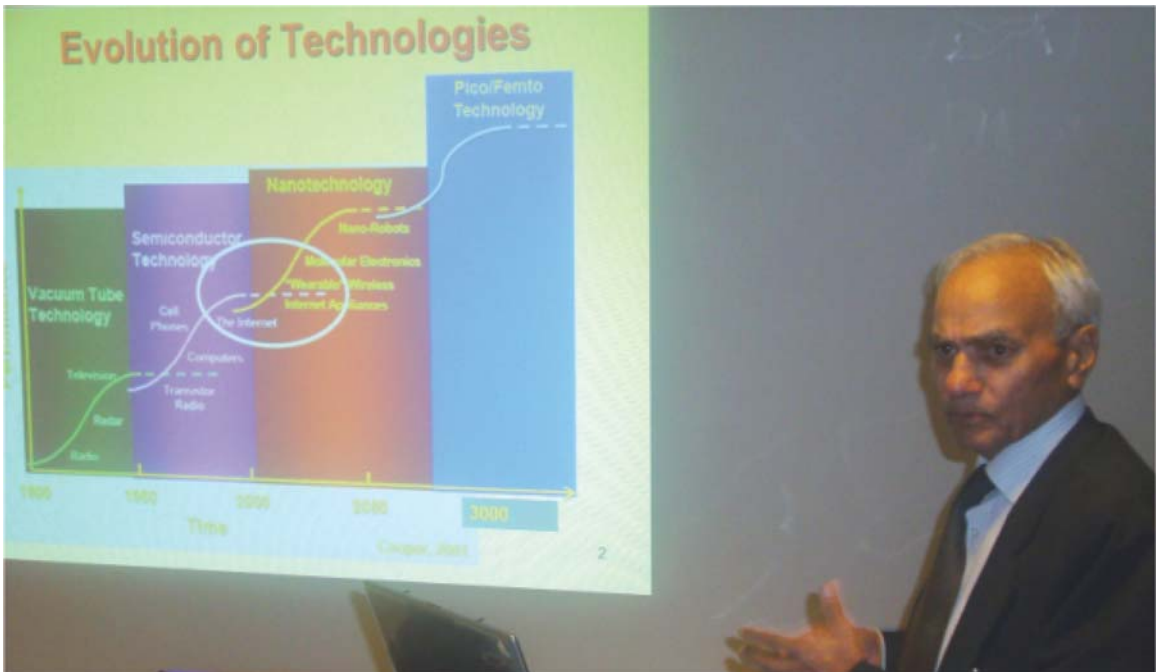
Towards the end of the last technical session, Dr. N. M. Butt, Former Director General PINSTECH and Former Chairman National Commission on Nanotechnology gave a comprehensive presentation on Nanotechnology, which is the emerging cutting-edge technology of the world. Some technical inputs were also provided by Prof. Atta-ur-Rahman who was present in this session.

In all the aforementioned sessions, the keynote addresses by the subject experts and presentations by the participants were followed by exhaustive discussions and question-and-answer session. As a result of these brainstorming sessions the following points emerged:

1. Pakistan's socio-economic fabric was being seriously eroded due to the crisis-level challenges related to education, health, agriculture, energy, environment, etc. These challenges were restricting Pakistan to come out of the abyss of poverty, hunger, ignorance, backwardness, extremism and deteriorating the law and order situation.
2. The meeting is convinced that science and technology can play a crucial and effective role in eliminating or reducing the aforementioned problems.
3. The main technologies that can be useful for the identified socio-economic challenges are: biotechnology; hydrology; mining engineering; electrical and electronic engineering; civil engineering; medicinal and chemical process engineering; alternative energy technologies; nanotechnology; and ICTs. Result-oriented applied research and development is necessary for this purpose. Adaptation and assimilation, rather than only basic research, will be more profitable for Pakistan under the present circumstances.
4. Institutional capacity building and human resource development for the identified skill development in targeted fields of interest should be given priority.
5. Educational reforms, elimination of class-system in schools and enrichment of curricula with science teaching at primary and secondary school levels, preferring English as the language of teaching, should be adopted so that proper manpower should be produced to understand and apply science and technology to solve socio-economic problems being faced by Pakistan.
6. Policies, planning and strategies should aim at applying science and technology to solve the identified socio-economic problems of Pakistan and all the relevant stakeholders should be involved in this process. Strong emphasis should be given to implementation and evaluation. Access of the common man to the proposed technologies for solving socio-economic problems should be made easier.
7. Corruption was identified as the major retarding factor for Pakistan's progress. Technologies like e-governance and e-management in public and private sector should be extensively applied.
8. Government of Pakistan should make serious efforts to promote university-industry linkages. Utilization of academic potential for industrial growth in the current era of globalization and world competitiveness will serve in the best interest of Pakistan.

9. The meeting unanimously agreed to continue the present debate through a think-tank that should be established as early as possible. More young students, researchers and thinkers from all walks of life should be included in the debate. It was also decided that a follow-up project should be made to create a web-portal dedicated to the work of the prospective think-tank. Many young participants volunteered to help COMSATS and COMSTECH for continuing the interaction and connectivity among the present and future groups of the participants, and to implement the programmes agreed by the think-tank.
10. The participants showed strong desire that the findings and recommendations of the meeting should be brought to the attention of policy and decision-makers of the country for their effective implementation.

Note: This Technical Summary was unanimously approved by the participants of the meeting.





CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

The meeting reached the following conclusions and recommendations:

1. The participating youth of the meeting were of the view that Pakistan's socio-economic fabric is being seriously decaying due to the crisis-level challenges related to education, health, agriculture, energy, environment, etc. These challenges are badly restricting Pakistan's ability to come out of the abyss of poverty, hunger, ignorance, backwardness, extremism and law and order deterioration.
2. The meeting was convinced that science and technology can play a crucial and effective role in eliminating or reducing the aforementioned problems.
3. The main technologies, which can be useful for the identified socio-economic challenges, are biotechnology, hydrology, mining-engineering, electrical and electronic engineering, civil-engineering, medicinal and chemical process engineering, alternative energy technologies, nanotechnology and ICTs. Result-oriented applied research and development is necessary for this purpose. Adaptation and assimilation of the results of already proven applied technology, rather than only basic research could prove to be more beneficial for Pakistan, under the present circumstances.
4. Institutional capacity-building and human resource development for identified skill-development in targeted fields of interest should be given priority.
5. Educational reforms, such as eliminating class-system in schools, enriching curricula with science teaching at primary and secondary school level, and preferring English as the language of teaching, should be adopted so that capable manpower should be produced to understand and apply science and technology to solve socio-economic problems being faced by Pakistan.
6. Planning, policies and strategies for applying science and technology to solve identified socio-economic problems of Pakistan should be carefully made and all the relevant stakeholders should be involved in this process. Strong emphasis should be laid on implementation and evaluation. Access of the common man to the proposed technologies for solving socio-economic problems should be made easier.
7. Corruption was identified as the major retarding factor for Pakistan's progress. Digital applications/platforms like e-governance and e-management in public- and private-sector should be extensively applied.
8. The Government of Pakistan should make serious efforts to promote university-industry linkages. Utilization of academic potential for industrial growth in the current era of globalization and world competitiveness is in the best interest of Pakistan.
9. The meeting unanimously agreed to continue the present debate through a think-tank, which should be established as early as possible. More young students, researchers and thinkers from all walks of life should be included in the debate. It was also decided that a follow-up project should be developed to create a web-portal dedicated to the work of the prospective think-tank. Many young participants volunteered to help COMSATS and COMSTECH for continuing the interaction and connectivity among the present and future groups of participants and to implement the programmes agreed upon by the think-tank.
10. The participants showed a strong desire that the findings and recommendations of the meeting should be brought to the notice of policy- and decision-makers of the country to ensure effective implementation.

Annexure - 1

LIST OF RESOURCE PERSONS

Thematic Session	Resource persons	Designation
Education	Dr. Inam ur Rahman	Scientist Emeritus Pakistan Atomic Energy Commission (PAEC) (and also the Founder Director - PIEAS)
	Dr. S. M. Junaid Zaidi	Rector COMSATS Institute of Information Technology (CIIT)
Health	Dr. Sania Nishtar	Founder President and Executive Director Heartfile, Pakistan
	Dr. Birjees Mazher Kazi	Executive Director National Institute of Health (NIH)
ICTs	Dr. Arshad Ali	Director General School of Electrical Engineering and Computer Sciences (SEECS) National University of Science and Technology (NUST)
	Dr. Khalid Rashid	Advisor COMSATS Institute of Information Technology (CIIT)
Economy and S&T Issues	Dr. Tariq-ur-Rahman	Chairman Pakistan Council for Science and Technology (PCST)
	Dr. Asad Ali Shah	Former Member (Infrastructure) Planning Commission of Pakistan
Agriculture and Environment	Dr. Qamar-uz-Zaman Chaudhry	Director General Pakistan Meteorology Department (PMD)
	Dr. M. E. Tusneem	Member (Food and Agriculture) Planning Commission of Pakistan
Energy	Mr. Ashfaq Mahmood	Visiting Faculty Member COMSATS Institute of Information Technology (CIIT)
	Dr. Shaukat Hameed Khan	Former Member on S&T Planning Commission of Pakistan

LIST OF YOUNG PARTICIPANTS

Name	Address	City
Mr. Ali Bahadur	School of Chemical and Materials Engineering (SCME), NUST	Islamabad
Ms. Faroha Liaqat	Lab # 6, Department of Chemistry Quaid-i-Azam University	Islamabad
Mr. Kaleem Anwar Mir	Global Change Impact Studies Centre (GCISC) National Centre for Physics Complex Near Quaid-i-Azam University	Islamabad
Ms. Samar Min Allah	National Institute of Civil Engineering (NICE) School of Civil and Environmental Engineering (SCEE) NUST	Islamabad
Mr. Syed Safwan Khalid	Deptt. of Electrical Engineering COMSATS Institute of Information Technology (CIIT) Chak Shehzad	Islamabad
Mr. Asad Raza	Military College of Signals (MCS) NUST	Rawalpindi
Dr. Khalid Latif	Department of Computing School of Electrical Engineering and Computer Sciences (SEECS), NUST	Islamabad
Mr. Aamir Muhammad	Dimension Stones Centre, PCSIR Complex Peshawar	Peshawar
Mr. Wahid Bux Mangrio	Mehran University Institute of Science and Technology Development (MUISTD) Mehran University of Engineering and Technology	Jamshoro
Mr. M. Jawad Qarni	Faculty of Mechanical Engineering Ghulam Ishaq Khan Institute (GIKI)	Topi-Swabi
Syed Qudratullah	Balochistan University of Information Technology, Engineering and Management Sciences	Quetta
Mr. M. Kashif Munir	Pakistan Medical Research Council (PMRC) T.B. Research Centre KEMU, Mayo Hospital	Lahore
Mr. Shabeh-ul-Hasson	Global Change Impact Studies Centre (GCISC) National Centre for Physics Complex Near Quaid-i-Azam University	Islamabad
Ms. Shumaila Afzal	Fatima Jinnah Women University	Rawalpindi

Mr. M. Masood Azeem	Department of Development Economics Faculty of Agricultural Economics and Rural Sociology University of Agriculture	Faisalabad
Ms. Hina Fazal	Medicinal Botanic Centre PCSIR Laboratories Complex	Peshawar
Ms. Safia Bibi	Pakistan Medical Research Council (PMRC) Jinnah Post-graduate Medical Centre	Karachi
Dr. Saira Bashir	Pakistan Medical Research Council (PMRC) (Fatima Jinnah Medical College)	Lahore
Ms. Saadia Ishtiaq	Department of Communication Sciences Fatima Jinnah Women University	Rawalpindi
Mr. M. Iqbal	Small and Medium Enterprises Development Authority (SMEDA)	Quetta
Ms. Shaista Bibi	Department of Education Fatima Jinnah Women University	Rawalpindi
Ms. Zubda Rashid	Kinnard College for Women	Lahore
Ms. Shaima Akhlaq	Forman Christian College University	Lahore
Ms. Tahira Yasmeen	Pakistan Town near Lohibhair	Islamabad
Dr. Dur-e-Nayab	Pakistan Medical Research Council (PMRC)	Nowshera