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TITLE PAGE PHOTOGRAPH

A group photograph of Senior Engineers who attended a meeting at Lahore on 24.6.1995 at the invitation of Pakistan Engineering Congress President, Mr. Mazhar Ali.

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IN THIS ISSUE

June is the month in which budget is presented. The budget and the related issues, development strategy, International Aid Agencies therefore get lion's share in this issue. Editorial page 4 IMF's role page 5.

We have some interesting technical papers on standardization and reclamation - page 14-17.

Hydro-electric power is hitting headlines. A world

conference on hydro power was held in Spain. Pakistan sent a strong contingent. A report is given on page 6

P.E.C. called a conference on 'Problems of Engineers'. The conference was attended by prominent engineers. The proceedings of that conference are given on page 40.

The forum carries an open letter from a PEC

member on Code of Ethics. There are few other interesting letters from our readers.

In the profile, we present Mr. Abdul Rasul Memon, Vice President of P.E.C. and a very prominent Engineer from Sindh.

We always welcome opinion from our readers. Why not pick-up your pen and throw a brick or bouquet! We welcome both.

Concert Vanity

In nature most of the impurities cleave to the lower ground. The hilltops are bare of undergrowth, the tall trees stretch above the creepers. Human beings obey another law. The higher they climb, the grosser the temptations they meet. Few who reach the summit can be acquitted of vanity or conceit, whatever other vices they are strong enough to resist. I make a distinction between the two. Vanity is a failing suffered by those who care too much what others think of them. Conceit is self-satisfaction, the mark of people sufficiently sure of themselves to hold the opinion of impedes their progress. Both vanity and conceit are defects, but neither need be destructive of personal charm or of zeal to serve the community. They are seldom fatal and they do not necessarily strangle virtues. They are more exasperating in some than in others.

IF WINTER COMES CAN SPRING BE FAR BEHIND

This may be an odd heading for an editorial on budget. But just as spring follows winter and summer follows spring the budget follows summer - an annual ritual going on for umpteenth years. In fact, with spring starts preparation for budget. Newspapers start splashing all sort of stories, lobbyist start their campaign, officials of concerned ministries start touring provincial capitals, some start preparing for visits abroad, others prepare briefs for the creditor banks or donor countries' ambassador. The Economic Committee of the Cabinet meet, N.E.C. meeting is held. And then comes the final day. The Finance Minister starts reading his speech, the more he raises his voice the louder the thumping gets. All types of experts come to congratulate the Government. Opposition tries to pick holes and prove that every thing is wrong. Among bickering, walk-outs, the budget is passed. Every body pats one another, dinners are thrown and thus ends the charade.

As the dust and din settles, stark reality starts staring in the face. Take for example last year's budget. The 1994-95 budget set out to reduce deficit to 4% of GNP. It could not achieve this. Inflation was to be 9%. It could not be contained, unemployment was to be reduced but it increased and still stalks the land. Government expenditure was to be reduced but it increased and had to be financed from borrowing and printing of notes. Exports are falling, local industry is endangered by tariff cuts.

Now take the 1995-96 budget. It is apparent the figures in the budget do not add up. Revenue is a bit high pitched, budget out lays are a shade underestimated as usual. The target for deficit will not be met. This will not only jeopardize Aid but also add to inflation. Tariffs are being cut without protection against onslaught of multinational and our industrialization will be affected thus increasing unemployment. Export figure show 17% increase. On close scrutiny it will be almost nil. The ex-Finance Minister, after his visit to U.S.A. says IMF is not happy and will not chip in the promised cash. The Finance Minister says it not true. IMF is sympathetic and will be visiting us in October and decide our fate.

This charade goes on for years in and years out. Wrong figure, unrealizable targets. Why our economic bureaucracy does so? Why should it fool itself or the nation. International agencies cannot be hoodwinked. They have their own sources to find the truth. According to one commentator the economy is trotting if not galloping towards a collapse.

Why is this happening. It is because our ruling classes lack will to take hard decisions. Or our masses are unwilling to make sacrifices. Have we stopped thinking and cannot find an alternate road to development? Countries that were at our level/or even poorer are far ahead of us. Why have we not reached their level. All sorts of arguments are given. From Puritan ethics to Confucius culture, religious backwardness to low literacy rate, lack of leadership to our geopolitical situation. There may be some truth in all this, we may not deny. But the root lies in the fact that those who are producers of wealth, the engineers, technologists, small entrepreneurs workers and peasants have no say in the policy making. It is the landlord neo-capitalists, graduates from management school and economists who lay the policies. You need capital for development, so borrow from abroad and we start borrowing for development, but end up borrowing for consumption. The carrot of Trade not Aid is dangled before us and we fall for it. But access to markets are blocked by quotas. One day we are told to set up Authorities and Autonomous Bodies - power of Government with flexibility of private enterprises, next day we are asked to privatize and open our doors to foreign capitalists. While these palliatives are being tried the country is going down the drain. Poor are getting poorer, our sovereignty is being eroded and rudderless and directionless, we are at the mercy of winds. If we do not get floundered or grounded it is because powers to be have not willed it so.

Is there a way out? Yes, there is one, which Engineers of Pakistan and many right thinking people have been suggesting. It is development through self-reliance, not the self-reliance banded about by the politicians, economists, management school graduates. Pakistan Engineering Congress had the distinction of suggesting this strategy long ago. Ever since fifties volumes have been written. Apart from Congress Seminars and papers there is the report of Independent Planning Commission published under the heading "Federal & Sovereign" and the "National Productivity Report of 1980" just to mention only two.

Briefly, self-reliance implies (1) Austerity by all, specially the affluent classes (2) Putting the saving in increasing production, both in agriculture and industry (3) Sharing the increase in wealth between all classes not only the rich (4) Participation of all, including the workers, farmers, small entrepreneurs in management resources. But above all No Begging, which deprives a nation of its self-respect, breeds corruption, sloth and sycophancy.

Let us as engineers, give the Nation a lead. Let's then arise, put our shoulders to the wheel and march ahead. There is still time. Let the voice of sanity prevail!

SEMINAR

REPORT ON INTERNATIONAL CONFERENCE HYDROPOWER INTO THE NEXT CENTURY BARCELONA - SPAIN 5-8 JUNE 1995

By
*Engr Dr Izhar ul Haq

PURPOSE

The visit was undertaken to attend the international conference on "Hydro Power into the Next Century" which was held from 5th to 8th June, 1995 at Barcelona, Spain. The conference was organized by Hydropower and Dams, an international Journal. More than 300 delegates from 40 countries across the world attended the conference. The opening address was delivered by D. Adrian Baltimore, Garcia, D.G. of Hydraulic Works, Moptina Spain.

DELIBERATIONS OF CONFERENCE

The conference mainly discussed the following:

1. Hydro potential and opportunities for development.
2. Environmental and social issues.
3. Finances.
4. System Planning.
5. Proposed Storages.
6. Turbines-Research and Evaluation.
7. Innovations in small Hydro-technology.

8. Condition Monitoring and control.

The conference evaluated the hydro potential opportunities and challenges in the Asia, Latin America, Africa and Europe. Of special interest was the potential in China, Pakistan, India, Thailand and Africa. Prof. Emeritus Dr. Monsonyi of Karlsruhe Germany was the key note speaker and main proponent of Hydropower development. It was the consensus of the participants that carefully planned hydro power schemes represent the most environmentally benign source of power. A vast amount of hydropower remains to be exploited throughout the world especially in the developing countries. Europe provides an excellent example how even small river basins have provided tremendous amounts of hydropower through construction of a



series of dams and power stations. They have realized how environment friendly is the hydel power as compared to the other sources of energy. From this conference, the message that comes out clear is that as in the western Europe, we in Pakistan also need to give high priority to hydro power development.

The developed manufacture were shared by the manufacturers, researchers and planners This would allow planners to plan more effectively future hydro power plants. Countries have exploited most of their hydropower potential while Pakistan has exploited less than 15% of its available potential.

*Chief Engineer, Dams Safety Organization, WAPDA/Secretary, Pakistan Engg. Congress

EXPOSITION

During the conference there was an exposition by the various manufacturers, organizations and contractors which displayed the catalogues, brochures and models of their latest machinery and state of the art technology.

PAKISTAN DELEGATE

Twenty engineers from Pakistan WAPDA SHYDO Ministry of Water & Power and GTZ headed by M(W) WAPDA attended the conference. Four papers were presented by the Pakistani authors. The delegates actively participated in the discussions. This provided an opportunity to discuss our problems with other countries and benefit from their experience.

CONCLUSIONS & RECOMMENDATIONS

These were mainly as under:

1. Hydropower was still the cheapest, environment friendly and renewable source of power.
2. In combined system, hydro plays an important role in peaking load. This opportunity should be seized in power system development.

3. Private sector should be encouraged for the development of hydropower.

4. Many technical aspects of State of the art technology for turbine and generator.

5. It was resolved to form hydropower lobby. The broad strategy would be to convince the people, the politicians and the media about the benefits of hydro power. National and international associations should be formed and interdisciplinary conferences organized.

6. This provides a good opportunity to interact with the members of financial institutes, hydro power organization of different countries., consultants, contractors, manufacturers and researchers.

TECHNICAL TOURS

At the conclusion of the conference, three technical tours were organized in Spain by the conference organizers. Five member Pakistani delegate headed by M(W) participated in the western Spain tour from 9th to 11th June. Spain has developed the river Douro basin by a series of hydropower plants and interconnected pumped storages.

The delegate visited on 9th June, Almendra a

202m high arch dam on Tormes river, with a reservoir capacity of 2649x108m³. The dam is founded on granite, a very sound rock. On the left side of main dam is a small concrete gravity dam while on the right side low valley is closed by a rockfill concrete faced dam. Four horizontal galleries at different levels run along the axis of the dam. These galleries serve for grouting and drainage. Five plumb lines have been installed in the dam to measure the movements of the dam. The movements of the dam are measured by a network of survey markers. Until now the max d/s movement has been 11 cm. Most of the movements are elastic. The settlement has been only 2mm upto now. The seismicity in the area is very low. There are two spillways one at lower level and the other at higher level.

A 7 kms long tunnel leads from the Almendra reservoir to Villarino Power Plant in a side valley. This power house was visited in the afternoon. It has 6 reversible pump turbines with a total installed capacity of 810 MW. The plant has an energy reserve of 3415 GWh/yr.

At night, the turbines pump back the water from the reservoir on Duero river to the higher reservoir on the Tormes river.

On 10th June Aldeadavila Power Plant was visited. It is a 140m high concrete arch dam with a reservoir capacity of 115x108m³ and 1140 MW power plant. It has 434 MW tow reversible turbines for pumped storage. The power house is underground 18mx100mx48m high cut into granite rock, the rock is standing without any support.

In the afternoon Sancelle Power Plant was visited. This was also an underground power house refurbished with reversible turbine pumps.

VISITS IN GERMANY

The Pakistani delegate visited "BAW Bearbeitung Liner Wasser Baulichen Aufgabe" German Federal Waterways Engineering & Research Institute at Karlsruhe. This Institute has (i) Department of Structural Engineering (ii) Department of Geotechnical Engineering (iii) Department of Hydraulic Engineering (iv) Coastal Engg. and (v) Department of Information Technology;

processing of technical and administrative data.

It is in this institute that GTZ sends Pakistani engineers for training. The Institute showed their hydraulic models of power houses and river channels for navigation. They also showed Dynamic, air models of the rivers. The Institute engineers explained their monitoring and safety inspection of dams and embankments. They showed the monitoring of a 4m high model dam built in their premises by hydraulic, thermal and geophysical methods. They also showed their geotechnical Labs.

The thing which came out clear during discussions was that use of geosynthetic membrane as filter was not a good solution where large repeated variations of head were involved. We should re-consider our decision to use geosynthetic membrane in the approach channel and tailrace of Chashma Hydropower Project.

On 14th June the undersigned alongwith HEPO, WAPDA group visited Iffezheim, low head power station on river Rhine in Germany. The maximum discharge of the

power house is 1100m³/second, the head is 11m. Four bulb turbines produce 108 MW of electricity. The river has two navigation locks which pass 120 ships/day. The spillway is equipped with 6 taintor gates each 20m wide with total capacity of 7000m³/second.

In the afternoon of 14th June, the tunnel boring machine factory "Herrenknecht GBbH" was visited. They make tunnel boring machines (tmb) upto 308m dia. They make Micro tunneling machines from 250mm to 1.6m dia. These remote controlled machines can drill horizontally in soft strata

avoiding trenching and open cuts in cities. They also make excavators and pumps. They not only sell the new machines but can also lease the machines and sell reconditioned machines with full guaranty.

This visit provided an opportunity to obtain first hand knowledge of underground power houses, pumped storage plants and the low head hydro power stations. This was an extremely useful visit.



A general view of Senior Engineers attending a meeting at PEC Bldg. Lahore.



Dr. Izharul Haq, Secretary, PEC attending an International Conference on "Hydro-power into the Next Century", held at Barcelona, Spain in June 1995.



Mr. Johu Lowe III is seen delivering a lecture in WAPDA Auditorium, Lahore on June 29, 1995 on " Roller Compacted Concrete Dams ".



The Punjab Governor, Lt. Gen. (R) Raja Saroop Khan, inaugurated a Seminar at WAPDA Auditorium, Lahore on Standard Conditions of Contracts".

ENGINEERING EDUCATION AT GHULAM ISHAQ KHAN (GIK) INSTITUTE OF ENGINEERING SCIENCES AND TECHNOLOGY

By

**Professor Dr. A. Raouf*

INTRODUCTION

Ghulam Ishaq Khan Institute of Engineering Sciences and Technology has been set up to provide an alternate for engineering education in Pakistan. The main objective of this Institute is to establish a Centre of Excellence in the field of engineering sciences and technology in response to the country's need for research and training of a high standard and of national relevance. One of its aims is to be an effective model which other engineering universities in the country could emulate.

It is an autonomous Institute, independently chartered and funded by the private sector. It strives to attract the best possible talent for its faculty, provide them with necessary facilities and environment so that they, in addition to teaching undergraduate/graduate courses and supervising graduate student thesis, are able to undertake world class research projects. The Institute aims to produce graduates

who will distinguish themselves by their professional competence and would be able to respond to the needs and problems of Pakistan and other developing countries.

THE ACADEMIC PROGRAMS OFFERED

The GIK Institute offers programs in the following five disciplines:

- Mechanical Engineering
- Metallurgy and Materials Engineering
- Electronics and Electrical Engineering
- Computer Science and Engineering
- Engineering Sciences (Mathematics and Applied Physics)

Each discipline is offering an undergraduate program and plans to offer post graduate programs by September 1995. To compliment the above programs the undergraduate students are required to take a set of courses offered in Social

and Management Sciences.

A brief description of each of the programs offered is given below:

Mechanical Engineering

Mechanical Engineering is involved in many areas of present technology. In addition to the traditional function, to-day's graduate mechanical engineers are concerned with developing new products, new manufacturing processes which may include sophisticated machines, improve energy conversion processes and control environments by means of refrigeration and air-conditioning. They are also involved in the safety and maintenance of operation and reliability and quality of products.

Keeping these in mind the course structure in mechanical engineering is designed to give a good background in the basic and fundamental principals and a wide variety of their applications. The

program provides a deeper study in energy conservation, heat transfer, fluid mechanics, production, machine design, control and automation. A project in the later years forms an essential part of this program of studies. In this project a student is required to integrate the knowledge that he has acquired in different courses.

This program is supported by laboratories in the area of Heat Transfer/Thermodynamics Fluid Mechanics, Refrigeration and Air Conditioning, Theory of Machines, automatic Control and Measurements, Computer Aided Design and Computer Aided Manufacturing. In addition to these laboratories this Faculty also has a Main Workshop to support research activities of other Faculties.

Faculty of Metallurgy and Materials Engineering

Metallurgy and Materials Engineering is considered to be one of the very important areas of engineering. This discipline deals with the properties and structures

of materials including metallic as well as ceramics, plastics and polymers. It deals with the selection and processing of materials, for specific purposes and their behaviour in use which includes wear, failure due to fatigue, chemical means i.e. corrosion, elevated temperature etc.

The program offered at GIK Institute comprises of common courses to develop sound background in physics, mathematics and introductory engineering courses; humanities courses and hard core materials engineering courses with emphasis on elements of physical, process, industrial and mechanical metallurgy and materials.

The laboratories in this Faculty compare with the best equipped laboratories not only in Pakistan but abroad as well. These include optical microscopy, electron microscopy, chemical analysis, micro-analytical Facilities, X-Ray Diffraction, mechanical testing, material processing, heat treatment, welding, melting and casting etc. A close contact is maintained with the local industry to assist them in

solving related technical problems which in turn helps to bring the real life problems to the class rooms.

Faculty of Electronics and Electrical Engineering

Electronics and Electrical Engineering is primarily concerned with the applications of theoretical developments to the electronic devices. Important applications of this field include communication, system which include satellite links, Control System, Information processing machines. The micro-process revolution has provided unlimited Vista to be explored by electronics and electrical engineers. In collaboration with other fields of engineering like mechanical engineering, metallurgy and materials engineering, this field is capable of making invaluable contribution towards the industrial and technological development of Pakistan.

In addition to courses in basic as well as applied sciences the electronic engineering faculty offers the areas of computer aided design and integrated circuits, wireless and satellite

communication, computer network, power system - analysis, production and control and design, and material for electronics.

These courses are supported by well equipped laboratories including digital Electronics, analogue Electronics, telecommunication and control, and microprocess design and application.

Faculty of Computer Science and Engineering

Computer Science and Engineering is concerned with the representation, transformation and manipulation of information using computers. It also deals with the principles, construction and application of computer systems. This field is based on electronics, physics and mathematics and a thorough understanding of these subjects is of utmost importance.

The important feature of this programme offered at GIK Institute include a common core of course which is taken by all students of computer science and engineering which provide breadth in the field. Additional specialized courses and

electives are chosen to provide the required depth. Core courses both in theory of hardware and software are integrated in the forms of lectures and are supported by laboratory experiments. The curriculum is flexible and provides opportunities to students with specific areas of interest through their choice of appropriate electives.

The laboratories are equipped with P.Cs so that each student is able to work independently. The Computer Centre facilities include high performance based computers using UNIX like operating system, PC lab with 50 computers, terminal servers providing access to the network through direct counter or telephone lines.

Faculty of Engineering Sciences (Mathematics and Applied Physics)

Engineering Sciences like applied mathematics and applied physics have the most important role in the development of technology. This faculty is required to offer the stream of courses in basic sciences which are required to be taken by students for other Faculties. In addition an undergraduate program is offered by this faculty as

well. The required engineering courses are taken from other Faculties. The balance of courses are provided in the form of technical electives. Some of the technical electives include modern optics, laser and its applications, spectroscopy, plasma physics, and optoelectronic devices.

In addition to model laboratories for developing basic concepts like measurements, thermal properties, electrical properties, magnetic properties, optical properties, mechanical and chemical properties, the faculty is planning Electronic microscope lab, X-RAY diffraction lab, crystal growth laboratory, optoelectronics lab and PCs and work stations.

Faculty of Management and Social Sciences

GIK Institute also plans to have an independent faculty of management and social sciences. It is essential that students are provided an exposure to management and social sciences and related topics so that they develop a well-rounded professional personality. Accordingly courses in management and social sciences are being offered and every student has to take a total eight courses

during the 8 semester undergraduate studies. Some of the courses available at present include, communication skills, Pakistan status and civilization, Islamic studies, engineering economy, financial management, environmental science, industrial management, industrial psychology, operation management and introduction to business.

Faculty

The primary goal of GIK Institute is to provide a fertile environment where knowledge is transmitted and advanced. In order to accomplish this goal while recruiting faculty members, it is ensured that the selected person is a foremost scholar and has a depth of wisdom. He must be able to communicate his scholarship to others. Every effort is made to evaluate the individual scholarship as well as the quality of teaching of a faculty member. The lowest rank that can be entrusted to present lectures to students is of an Assistant Professor. He is required to possess an earned Ph.D. degree in the subject that he is teaching from a well established and highly reputed

university. Faculty members with considerable teaching/ research experience, having established record of research publications and showing creativity, significance and effectiveness in scholarly activities can be appointed to senior positions of Associate Professors or full Professors.

A suitable number of highly qualified faculty members are offering courses at GIK Institute. Efforts are continuing to attract outstanding professionals to GIK Institute as well. Some Professors on sabbatical leave from their parent universities in the US and Europe are currently teaching GIK Institute students. The Institute has Faculty Exchange Agreement with some of the leading places of learning and research abroad.

Students

The minimum academic qualification for admission to the Bachelor of Engineering Degree Program is 1st Class Inter Science or equivalent with major in Chemistry, Mathematics and Physics. Admission is strictly based on merit for which GIK Institute holds its own admission test. For students residing outside

Pakistan the scores in internationally accepted test like SAT are accepted as well.

Institute Location and Facilities

The Institute is located at Topi, District Swabi, in the N.W.F.P. The campus lies at the foot of Tarbela lake. Some of the most important industries like Heavy Mechanical Complex, Kamra Aeronautical Complex and Gadoon Amazai Complex of industries are in close vicinity. It is a residential Institution where faculty members, students and other employees live on the same campus.

Library, medical and other support facilities are available. Most modern building to house the library is being constructed. Efforts are in progress to have access to other libraries through satellite communication (Email) as well.

To keep the programs upto date an International Advisory Board meets once every two years. It reviews the progress made in different disciplines by GIK Institute and plans for further improvements/ changes are discussed before implementation.

The aim of the GIK Institute as stated earlier, is to facilitate excellence in engineering education and research by offering appropriate curriculum, appointing talented faculty and providing an environment which stimulate teaching and learning. The graduates of GIK Institute

are groomed to become honest, hard-working individuals and are expected to be highly competent professionals and likely to be outstanding citizens of Pakistan.

It is not possible to present each and every

aspect of GIK Institute and its program is entirety through this short paper. Visitors are welcome and the Institute shall be pleased to show to them the facilities that are available.

For further information, readers may contact the author.



Half the journalists in the world are changing the meaning of words by over-use or misuse, and the other half are writing articles about those changes, maintains humorist Miles Kington, who offers some contributions of his own:

Confrontation: That dramatic stage in a series of negotiations where both sides refuse to meet each other.

Socialist: A person who is so disgusted by the way power is controlled by a few huge corporations that he proposes to place it in the hands of one giant corporation.

Totally: An adverb meaning quite, moderately, fairly, as in: " I am totally disgusted by the situation in Peru. "

Taboo: A subject or topic, like cancer or death, that is so sensitive that people talk about it the whole time.

Cinema: A place where you can get a preview of a television film.

Grant: A sum of money given as a bonus and demanded as a right..

Tip: The same.



NEED FOR ESTABLISHMENT OF STANDARD SPECIFICATIONS AND MEASUREMENTS TO BE TAKEN IN THIS REGARD.

By
*Engr. Munir Rafi

During my six years with the Inspection Department of Pakistan Steel, I came across many problems resulting from the lack of clearly defined standards for the enormous range of items being purchased by us resulting in the following faults (sometimes of a very serious nature).

1) Misunderstanding between users, stores staff, inspectors, purchase staff and suppliers causing delays and errors in important documents, such as indents, tenders, purchase orders, material receipt reports & inspection certificates. Major case is use of non-standard terminology.

2) Different materials fulfilling the given description cause incomplete or vague specifications.

3) Purchase of material not suited to the end use. Cause, wrong specifications and/or failure to indicate the exact application.

4) Purchase of same materials under different descriptions resulting in differing prices and

increased inventories. Major cause, purchase by Brand names or non-standard descriptions.

5) Unnecessarily large inventories resulting in blocking of capital, and increased work-load for store-keeping and accounting Cause (1) See (4) above (2) Unjustified purchase of non-standard sizes, grades etc. of materials when the same function could be performed by standard materials (3) Demanding of very slightly differing sizes, grades etc. of materials.

All problems such as those mentioned above, can be solved satisfactorily by the use of standards based on those already drawn up by experts all over the world. Many countries including Pakistan have their own national standards organizations who have established detailed standards for thousands of materials, units of measurements, codes of practice and safety, etc. which can be drawn upon as guides in the effort to prepare our standards.



However, since ours is not yet an extensively industrialized country, our national standards are few, we therefore have to depend considerably upon foreign standards for our needs. In this respect we need not tie ourselves to any one country, because, since the end of World War-II, more specifically since 1946, there has been considerable growth in movement for international standardization, when, as an outgrowth of the UN Standards Coordinating Committee, the International Organization for Standardization (ISO) was formed with its Headquarters in Geneva, Switzerland. In 1947, the International Electro-technical Commission (IEC)

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founded in 1906, affiliated itself to the ISO as a technical division. The ISO holds Consultative Status (Category 1) as a NGO with the Economic and Social Council of the UN. ISO in 1989 comprised of 73 full member countries and 14 correspondent members all through their national standards bodies. So more than 20,000 experts from all parts of the world participate each year in the ISO technical work which, till 1989 has resulted in the publication of 6789 ISO standards. Now the number of ISO standards exceed 9008.

All ISO standards are compulsorily reviewed once every 5 years. On occasions, depending on the progress in the particular field, it may be necessary to review a standard earlier and this is done without delay.

There are 18 member countries on the Council (Supreme Body) of the ISO, each one appointed for a term of 3 years. They include the major industrial nations, those in transition and some underdeveloped ones. The 1989 President of ISO (his term expired in 1991) was Mr. Roy Philips of Canada.

He also acts as Chairman of the Council.

A standard is defined by one dictionary as "an acknowledged measure of comparison for quantitative or qualitative value; a criterion; norm." So a well drafted standard could:-

- 1) Set a minimum acceptable level of quality,
- 2) ensure complete and correct specifications,
- 3) incorporate latest results of R&D which have become widely accepted,
- 4) help reduce inventories, resulting in decreased work-load for store-keeping and account,
- 5) provide common language for buyers and sellers, in particular a clearly understood criteria of acceptance.

The way we should go about drafting our standards should be more or less the same as it is done by ISO and the national standards organizations of most countries. A standardization cell should be set up which should act as the Secretariat for this activity.

Analogous to the ISO Council a body of top management may be constituted for final approval of any draft standard.

The draft standards themselves should be prepared by technical committees consisting of members representing major users, Technical Wing and representatives of the Stores, inspection or quality assurance and purchase, or marketing depending on whether the items are for sale or to be procured. The technical committees should follow the pattern of the ISO committees, but one committee can easily cover the work of several related ISO committees as our needs are not so varied as those of the world as a whole.

Incharge, Standardization Cell or his representative should act as the Secretary of each committee, prepare minutes of its meetings and put up drafts for approval. As far as possible, we should prepare standards based on the ISO/IEC Standards since this has the distinct advantage of opening up most of the world to us both for marketing of our products and the purchase of foreign made products.

In some cases of purchase, it may be advantageous to base our standard upon the national standard of some country which happens to be more

widely used and recognized internationally than the ISO/IEC Standard, and also in such cases where no ISO standard has yet been agreed upon. In the document of our standard we must mention the international or national standard upon which it is based, so that the standardization cell may keep itself informed of any amendments occurring from time to time in that standard and bring such changes to the notice of the concerned technical committee for approval.

A question here arises; why prepare our standards at all? Why not simply use already prepared ISO or other foreign standards? This is because, those standards cover choices of several sizes, grades, etc. of materials which we, at present, do not need or may never need. This not only leads to confusion, but can adversely affect the efforts to delete unnecessary variety of sizes, types, etc.

To begin with each technical committee

should adopt the definition standards covering its field of activity. This is essential before proceeding further so as to ensure all those dealing with materials use the same terminology.

The adoption of well drafted standards is expected to lead to two definite savings, viz (1) the reduction of inventories and accruing savings, and (2) savings resulting from world-wide competitive purchasing of assured quality products.

Pardon, Your Slip Is Showing

From an editorial in the University of Kentucky student newspaper: "Recent reports have said number of graduates cannot even read or right."

From an Ad in the Corpus Christi, Texas, Caller: "Key pinch operator."

Announcement in a Wayne, Pa., church newsletter: "MEALS ON WHEEL-a hot noon meal and a cold (snake-type) supper."

From a listing of holiday events in the Tampa, Fla., Tribune: "1 : 15 p.m.-Hyde Park Hysterical Society Band."

From an Ad in the Friendswook-Pear land, Texas, News: "Housepeeper needed for couple."

On stock report in the Worcester, Mass., Telegram: "Down Jones."

From a Sacramento, Calif. Bee Ad for a biography of a popular singer: "Paperback by three of his closet companions."

From a report in the Athens, Greece, Daily Post: "The rains ended yesterday afternoon, and swollen Greeks and streams began to shrink."



At a meeting of Senior Engineers held at PEC Headquarters Building, Lahore on 24 June 1995 are seen (L to R) Dr. Ikramullah Dar, Mr. Illahi Bukhsh Soomro, Dr. Mubashir Hasan, Mr. Mazhar Ali, Ch. Muhammad Rashid Khan, Mrs. Naheed Ghazanfar, Rana Allah Dad Khan and Mr. Iftikhar ul Haq.



Mr. Shamsul Mulk, Mr. Amanullah Loan, and Mr. Javid Akhtar attending the Senior Engineers meeting.



Ch. Muhammad Rashid Khan, Mrs. Naheed Ghazanfar and Rana Allah Dad Khan attending the Senior Engineers meeting.



Mian Mazhar ul Haque, Mr. Masood Hassan, Prof. Syed Ali Rizwan and M.S. Khan attending the Senior Engineers meeting.

EFFECT OF CHLORIDE AND SULPHATE IRRIGATION IONS ON YIELD OF WHEAT CROP

By

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ABSTRACT

The comparative intensity of toxicity of chloride and sulphate ions was monitored in specially designed 3x3 feet pits, having well plastered walls. The pits with no connection with one another, were filled with permeable fine sandy loam soil having an average EC_e , 1.4 dS m^{-1} ; pH_s , 7.8; ESP, 6.0; available P₅ and potassium 138 mg Kg^{-1} . Artificial saline waters prepared separately from NaCl and Na_2SO_4 salts having EC 4.0, 4.5, 5.0 and 5.5 dS m^{-1} were used to raise wheat cultivar Pak-81 for three consecutive years (1990-91 to 1992-93). Tubewell water having EC, 1.02 Ds m^{-1} was also used as a control treatment. Data recorded showed a progressive decrease in

grain and straw yield but an increase in SO_4 and Cl^- contents of the soil with the extending time period and increasing levels of the salinity in irrigation water. Grain yield was found to be more affected compared to straw yield. The specific effect of Cl^- ion was more pronounced. Although SO_4 ions hindered the yield of wheat crop, yet the degree of severeness was mild.

INTRODUCTION

The concentration and composition of dissolved constituents in a water determine its quality for irrigation use, which is an important consideration in any appraisal of salinity and crop production in an

irrigated area (U.S. Salinity Lab. Staff, 1954). It indicates that the success of agriculture, mainly depends upon good quality surface irrigation (Chaudhry and Rafiq, 1986), but unfortunately, the surface water supplies are not sufficient to exploit the full potential of soil and crop. Hence the additional water has to be made available from the groundwater reservoir, but we are constraint to use it because of its objectionable quality (Khan et. al., 1990).

On the other hand, indiscriminate and injudicious use of poor quality waters rich in HCO_3^- , SO_4^{--} and Cl^- ions, besides deteriorating the physico-chemical soil properties (WAPDA, 1990)

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also hinder crop production by creating salinity and sodicity hazard which in turn, is inimical to plant growth through numerous complex interactions, including osmotic effect, induced nutrient deficiency, specific ion effect etc. (Flowers et. al., 1991)

Specific sensitivity of plant to specific ions has been noted for number of crops. Specific sensitivity of plants to high SO_4 concentration, for example, is related to the tendency of high SO_4 concentration to limit the uptake of Ca^{++} by plants. Associated with this decrease in calcium are increases in the absorption of Na^+ and K^+ , so the harmful effects of high SO_4 in a substrate may be related to a disturbance of optimum cationic and anionic balance within the plant. The Cl^- ions, similarly, have an interactive role to play in affecting the yield potential of many crops. Plants exposed to salinity, however, may overcome these problems through their inherited physiological tolerance (Aslam et. al., 1993).

To cope with such problems, it is imperative to have detailed information, concerning the quality of irrigation water with diversified nature of anionic and cationic constituents and their ultimate effect on crop yields. The effect of synthetic waters prepared from different salts mixed in different ratios has been observed from time to time, but a little attention has been paid to the deteriorious effect of the associated anionic constituent of salts in the irrigation waters. The intensity of toxicity of chloride and sulphate anions is also controversial in this regard. This study, therefore, was contemplated to determine the effect of SO_4 and Cl^- ions on the yield of wheat crop.

MATERIALS AND METHODS

This experiment, started in November 1990 and matured on April 1993; was conducted in Directorate of Land Reclamation, Punjab, Moghalpura, Lahore, in specially designed pits of 3 ft.x 3 ft. by dimension and 40 in number. The side walls of pits were well plastered to check any

lateral movements of water. The soil had a direct contact with the earth for the purpose of free drainage. The pits having no connection with one another were filled with permeable type of fine sandy loam soil with pH_s 7.8; EC_o , 1.4 dS m^{-1} ; ESP 6.0; O.M 0.6%. The available P and Potassium were 5.0 and 138 mg Kg^{-1} , respectively, the average Cl^- content was 3.54 me L^{-1} in the upper and 2.98 me L^{-1} in the lower surface (15-30 cm). Similarly the SO_4 contents estimated for upper and lower surface was 4.59 and 4.50 me L^{-1} , respectively. RCBD design with four replications was used for the experiment.

Two different types of salts i.e. NaCl and Na_2SO_4 were separately used to prepare artificial saline waters from the originally available tubewell water of 1.02 dS^{-1} , which was also used as a control (T_1). Thus in addition to control, the synthetic waters having EC 4.0 (T_2), 4.5 (T_2), 5.0 (T_4), and 5.5 (T_5) dS m^{-1} (Table-1) were used when required to irrigate wheat cultivar Pak-81, grown for three consecutive years. The

average irrigation depth was 10 cm each time and in all cases.

All other cultural practices were applied as per recommendation for the crop. Soil samples from 0-15 and 15-30 cm depths were collected at the start and maturity of the experiment. Chemical methods as given by U.S. Salinity Lab. Staff (1954) were used to analyze the water and soil samples (Table-1) and 4, respectively).

The data recorded on straw and grain yield at the maturity of crop were subjected to analysis of variance. Duncan's multiple range test (Steel and Torrie, 1980) was employed to ascertain difference among treatment's means.

RESULTS AND DISCUSSION

This investigation was planned to see the relative toxicity effect on chloride (Cl^-) and sulphate (SO_4^{2-}) ions on wheat cultivar

Pak-81, grown for three consecutive crop years. The yield results after three years of experimentation are being discussed here.

GRAIN YIELD OF WHEAT

It was not expected that this crop would be influenced much because it has some tolerance ability but data (Table-2) indicated that grain yield of wheat was affected by the application of saline water

Table - 1
ANALYSIS RESULTS OF SYNTHETIC WATERS PREPARED FROM NaCl AND Na₂SO₄ SALTS.

EC Levels Characters.	With NaCl					With Na ₂ SO ₄				
	1.02*	4.0	4.5	5.0	5.5	1.02	4.0	4.5	5.0	5.5
Na ⁺	8.7	28.5	34.0	38.8	42.6	8.7	35.7	38.7	44.3	1.1
Ca ⁺⁺⁺ Mg ⁺⁺	5.3	6.5	6.9	6.2	6.4	5.3	5.3	6.4	6.7	6.9
CO ₃ ⁻⁻⁻ HCO ₃ ⁻	6.1	7.5	7.5	6.8	7.0	6.1	7.0	7.1	6.9	7.5
Cl ⁻	6.0	25.0	29.5	6.0	40.0	6.0	6.0	5.9	6.1	6.5
SO ₄	1.9	2.5	4.5	2.2	2.2	1.9	28.0	32.0	38.0	44.0
Total Cation:	14.0	35.0	40.9	45.0	49.0	14.0	41.0	45.1	51.0	58.0
Anion:	14.0	35.0	41.0	45.0	49.2	14.0	41.0	45.0	51.0	58.0

* 1.02 dS m⁻¹ was EC of tubewell water which was originally used to develop other EC levels with desired salts. The concentration are compressed in me l⁻¹

Maximum grain yield of 6.74 t ha⁻¹ (T₁) was recorded with NaCl, during the first crop year (1990-91), that differed significantly from rest of the treatments which however,

were insignificant among themselves. A yield value of 6.26 t ha^{-1} was recorded at maximum irrigation salinity level of 5.5 dS m^{-1} (T_5), attained with NaCl salt. It was not seriously affected during the first crop year.

However, the grain yield was affected during the second and third crop years. It did not respond substantially upto irrigation salinity level of 4.5 dS m^{-1} . Statistical analysis of the data revealed a decrease in yield beyond this limit.

A minimum yield of 3.96 t ha^{-1} was attained during 1992-93 where irrigation salinity was maintained at 5.5 dS m^{-1} (T_5) with NaCl salt.

The commulative mean values of the data collected for three consecutive crop years showed a gradual decrease in grain irrigation water. The average cumulative mean grain yield for three consecutive crop years recorded in T_1 (control) was 6.28 t ha^{-1} which progressively decreased to 5.10 t ha^{-1} in T_5 (5.5 dS m^{-1}). Almost a similar trend of decreasing grain yield with the increasing salinity level and time period of the experiment was observed with the application of saline water prepared from Na_2SO_4 salt, however, there

was statistically no difference among the treatments at all the salinity levels tested during the initial crop years (1990-91) and 1991-92). Grain yield was found not affected upto 4.5 dS m^{-1} even during the third crop year, however, a yield value of 5.1 t ha^{-1} was recorded in T_4 (5.0 dS m^{-1}) that differed significantly from T_5 where a minimum yield of 4.98 t ha^{-1} was achieved. It differed significantly from rest of the treatments which in turn, showed insignificant differences among themselves. was attained during 1992-93 where irrigation salinity was maintained at 5.5 dS m^{-1} (T_5) with NaCl.

The cumulative mean values of the data collected for three consecutive crop years showed a gradual decrease in grain yield with the advancing/increasing salinity level in the irrigation water.

The average cumulative man grain yield for three consecutive crop years recorded in T_1 (control) was 6.28 t ha^{-1} which progressively decreased to 5.10 t ha^{-1} in T_5 (5.5 dS m^{-1}).

Almost a similar trend of decreasing grain yield with the increasing salinity level and time period of the

experiment was observed with the application of saline water prepared from Na_2SO_4 salt, however, there was statistically no difference among the treatments at all the salinity levels tested during the initial crop years (1990-91) and (1991-92). Grain yield was found not affected upto 4.5 ds m^{-1} even during the third crop year, however, a yield value of 5.1 t ha^{-1} was recorded in T_4 5.4 ds m^{-1} that differed significantly from T_5 where a minimum yield of 4.98 t ha^{-1} was achieved.

It differed significantly from rest of the treatments which in turn, showed insignificant difference among themselves.

Thus, it seems from the data of grain yield that in the initial years of the experiment, the use of synthetic waters did not have much effect on grain yield. However, the accumulation of salts remained in progress and yield was affected at later stages. Relatively more yield obtained in T_1 (1.2 dS m^{-1}) compared to T_5 (5.5 dS m^{-1}), showed the progressive decrease in yield with the higher EC values of the irrigation waters. The results are in conformity with findings of

Saleem et. al.,(1993) A comparative study of the data also revealed that relatively more grain yield was affected by NaCl irrigation salinity compared to that of Na₂SO₄

recorded in the initial year of the experiment compared to subsequent crop years in both types of salinity. Maximum straw yield was recorded in control (T₁). Straw yield was found not to

rest of the treatments that in turn, had non significant effect of salinity levels among themselves. It showed that straw yield was not much affected during the first two crop years.

TABLE - 2
EFFECT OF CHLORIDE AND SULPHATE IONS ON GRAIN YIELD
OF PAK-81 (T ha⁻¹)

Treat- ment	EC Levels dS m ⁻¹	With NaCl treated <u>irrigation water</u>				With Na ₂ SO ₄ treated <u>irrigation water</u>			
		1990-91	1991-92	1992-93	Av:of Cum:Mean	1990-91	1991-92	1992-93	Av: Of CM
T ₁	1.02	6.74 _a *	6.35 _a	5.74 _a	(6.28)	6.73	6.30	5.80 _a	(6.28)
T ₂	4.00	6.26 _b	5.70 _b	4.97 _b	(5.64)	6.70	6.28	5.78 _a	(6.25)
T ₃	4.50	6.26 _b	5.68 _b	4.97 _b	(5.64)	6.71	6.29	5.78 _a	(6.26)
T ₄	5.00	6.27 _b	5.15 _c	4.20 _c	(5.21)	6.70	6.27	.19 _b	(6.05)
T ₅	5.50	6.26 _b	5.08 _d	3.96 _d	(5.10)	6.70	6.28	4.98 _c	(5.99)
							NS**	NS	

* Treatment means sharing the same letter(s) do not differ significantly at 5% probability.
** NS = No Significant
Pit dimensions are adjusted and yield factor considered for convenience

STRAW YIELD OF WHEAT:

It is evident from the data (Table-3) that decrease in straw yield was successive with the increase in experimental duration i.e. maximum straw yield was

be affected significantly at any irrigation salinity level tested under Na₂SO₄ type salinity.

Maximum straw yield of 8.60 and 8.39 t ha⁻¹ was recorded in control (T₁) for the years 1990-91 and 1991-92, respectively which differed significantly from

However, straw yield, obtained during 1992-93 in T₄ and T₅ (6.68 & 6.50 t ha⁻¹, respectively) had a significant difference, showing the effect of salinity on straw yield beyond irrigation salinity level of 5.0 dS m⁻¹,

attained with NaCl salt. Thus an increase in EC beyond 5.0 under the circumstances will decrease straw yield. The overall decrease in yield parameters of wheat with the increase salinity level of irrigation water has also been reported by Bhatti and Ahmad (1978) and Saleem et. al., (1993)

CHLORIDE AND SULPHATE CONTENTS IN SOIL

The soil samples from 0-15 and 15-30 cm depths were collected at the start and maturity of the experiment. The results obtained (Table-4) after chemical analysis are discussed here. The mean Cl^- content was 3.54 me L^- at the beginning of the experiment which on the average increased to 29.4 me L^- (mean from T_1 to T_5 , NaCl case) in the upper surface, indicating the increase of about 25.86 me L^- in comparison to the base year of wheat

cropping. Data presented in the above referred table revealed that Cl^- content increased with the increasing level of water salinity. Similarly, the mean SO_4 content computed by avergin all the treatments was 4.59 me L^- at the start of the experiemnt that increased with the increment in salinity status of the irrigation waters. The results are in the line with those of Hussain et. al. (1992); Ali and Javaid

TABLE - 3
EFFECT OF CHLORIDE AND SULPHATE IONS ON STRAW YIELD OF PAK-81 ($T \text{ ha}^{-1}$)

Treat- EC ment Levels $dS \text{ m}^{-1}$	With NaCl treated <u>irrigation water</u>				With Na_2SO_4 treated <u>irrigation water</u>				
	1990-91	1991-92	1992-93	Av:of Cum:Mean	1990-91	1991-92	1992-93	Av: of CM	
T_1	1.02	8.60 a^*	8.39 a	7.65 a	(8.21)	8.72	8.4	7.64	(6.28)
T_2	4.00	8.10 b	7.33 b	6.72 b	(7.72)	8.72	8.46	7.63	(6.25)
T_3	4.50	8.11 b	7.31 b	6.71 b	(7.38)	8.70	8.43	7.63	(6.26)
T_4	5.00	8.09 b	7.31 c	6.68 c	(7.36)	8.69	8.44	7.61	(6.05)
T_5	5.50	8.09 b	7.30 d	6.50 d	(7.30)	8.69	8.44	7.61	(5.99)
						NS**	NS	NS	

Treatment means sharing the same letter(s) do not differ significantly at 5% probability.

** NS = No Significant

(1994), who reported the accumulation of salts in the soil as a result of using brackish water for irrigation purposes. Data also indicated higher EC_e values with Na_2SO_4 irrigation waters compared to that with NaCl irrigation. It revealed that salts continued to accumulate, but in contrast to higher EC_e values in case of Na_2SO_4 compared to lower EC_e values attained with NaCl, more yield was obtained in former case indicating that type of salts present in soil or irrigation water is more important than the composite salinity. The data given in

Table-4 also indicate that there is no significant difference in wheat yield upto EC_e of 4.79 dS m^{-1} , however, it was little bit affected beyond EC_e 5.10 dS m^{-1} or more was developed with single salt i.e. NaCl or Na_2SO_4 .

The effect of composite salinity may be, however, different on crop yields. The soil was of permeable nature but excessive quantity of water was not used for leaching purpose, making the role of permeability in leaching down of the salts almost negligible. However, annual rainfall of 176.60,

145.10 and 77.40 mm was received during 1990-91, 1991-92, 1992-93, respectively.

So, it was clear that the hazardous effects of Cl^- and SO_4^{2-} ions were inevitable, but the deleterious effect of Cl^- ion was more pronounced than that of the SO_4^{2-} ions. Although, the SO_4^{2-} ions hindered the wheat yield, yet the degree of severeness was mild. Thus, on the basis of data available it could be easily inferred that the specific Cl^- ion effect on wheat yield was more injurious than that of SO_4^{2-} ion.

TABLE -4
SOIL ANALYSIS RESULTS AT THE BEGINNING
AND MATURITY OF THE EXPERIMENT

Treatment	EC Levels	Depth (cm)	Before sowing crop					With NaCl					With Na_2SO_4	
			Na	Cl	SO_4	EC_e	Na	Cl	SO_4	EC_e	Na	Cl	SO_4	EC_e
EC_e	$ds \text{ m}^{-1}$		me L^{-1}		$ds \text{ m}^{-1}$			me L^{-1}						m^{-1}
T ₁	(1.02)	00-15	6.26	3.00	4.20	1.00	12.00	8.00	6.5	1.80	14.0	5.2	10.00	1.83
		15-30	6.20	2.50	4.10	0.90	12.50	8.00	5.5	1.70	12.0	3.9	9.30	1.72
T ₂	(4.00)	00-15	7.50	4.00	4.50	1.10	27.00	21.0	7.5	3.09	27.0	7.9	20.00	3.12
		15-30	6.80	3.00	4.20	1.02	26.00	20.0	6.5	3.02	25.0	6.1	21.60	3.09
T ₃	(4.50)	00-15	7.00	4.00	5.00	1.16	40.00	32.0	7.7	4.22	41.0	8.0	32.00	4.28
		15-30	6.80	3.50	5.50	1.09	36.00	30.0	7.2	4.13	36.0	5.7	30.00	4.18
T ₄	(5.00)	00-15	8.80	3.20	4.76	1.12	47.00	41.0	6.9	4.73	47.0	7.5	40.00	4.79
		15-30	7.50	2.70	4.58	1.00	45.00	39.0	6.4	4.63	47.0	6.0	39.00	4.72
T ₅	(5.50)	00-15	7.90	3.50	4.50	1.00	51.00	45.0	7.9	5.02	51.0	8.3	44.00	5.15
		15-30	6.80	3.20	4.10	0.96	49.00	43.0	7.2	5.00	49.0	7.7	42.30	5.07

*Average figures are tabulated by keeping in view the experimental design and duration of the experiment.

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50TH ANNIVERSARY OF WORLD BANK

By
*Hilary F. French

In July 1944, some 700 delegates from around the world convened at the Mount Washington Hotel in Bretton Woods, New Hampshire, to create a brave new international order in the wake of World War II. According to their vision, the institution they were establishing the International Bank for Reconstruction and Development (the World Bank) and the International Monetary Fund (IMF) - would help ensure that international economic cooperation paved the way for improved living standards and peace worldwide.

In the intervening years, the World Bank has become an extremely powerful player on the world stage. Lending to its clients, who are required to be governments, has increase sharply since the institution was founded, rising from \$1.3 billion in 1949 to \$22 billion by 1992 (in constant 1992 dollars) - enough to make it the world's single largest source of development lending. And the impact of the World Bank extends far beyond the size of its

lending programme. The Bank's involvement in a project or country often provides a "seal of approval" that opens the spigot for additional bilateral and multilateral funds, as well as for loans for other banks. More fundamentally, the Bank influence the types of development paths pursued by borrower nations, through the economic and other policy advice it provides and through conditions attached to loans. Under controversial "structural adjustment" loans, which now account for 17 per cent of total Bank lending, recipients receive large cash infusions ("balance-of-payments" support) in exchange for implementing agree-upon internal policy reforms designed to return the country to credit worthiness such as reducing inflated exchange rates, cutting government subsidies, and lowering trade barriers.

But in the half-century since Bretton Woods, the optimism expressed there has faded. Rather than

being lauded as agents of material well-being and peace, the Bretton Woods Institutions find themselves increasingly under fire as promoters of a development model that, despite spurring a five-fold growth in world economic output since 1950 still has left 1.1 billion people-more than fifth of humanity-living to crushing poverty. In addition, the prevailing view of the 1940s, that the earth was "infinitely blessed with natural riches," as US Treasury Secretary Henry Moergenthau put it, has run up against the sobering realities of global ecological decline. The Bank has attracted heavy criticism for its role in financing environmental destructive projects; dams that generate power but flood out communities, agricultural development schemes that cut down pristine rain forests, and mines that produce export revenue but contaminate rivers.

Now, as we reach the 50th anniversary of the Bretton Woods Conference, critics are asking whether the World Bank is capable of transforming

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itself into an organisation that reflects the increasingly urgent priority of promoting sustainable development. The Bank, for its part, has been quick to announce its devotion to the cause. In 1993, it created a new vice-presidency for Environmentally Sustainable for three departments; environment; agriculture and natural resources; and transport, water, and urban development.

How it works

A first step in trying to change the Bank is understanding how it works - no simple matter. The process by which loans come to fruition within the World Bank - and by the which overall lending priorities are set - is a complicated and delicate dance between the development interest of borrowing nations, the political priorities of funding nations, and the inclinations and bureaucratic inertia of the institution itself.

Of the total of \$23.7 billion lent in 1993, \$17 billion was in regular International Bank for Reconstruction and Development (IBRD) loans, which are made to middle-income countries at near-market rates over 15 to 20

year payback periods. This money is raised primarily in World capital markets with the backing of member governments. The remaining \$7 billion was in International Development Agency (IDA) credits. A programme initiated in 1960, IDA makes interest-free, "soft" loans (with a small annual service charge) to the World's poorest countries - those with per capital annual incomes of \$805 or less with payback periods spanning 35 to 40 years. It is funded almost entirely by direct contributions from member countries.

Officially, the Bank is answerable to a Board of Directors composed of representatives of donor nations. Voting power is related to the level of a country's financial contributions; for the IBRD. The United States holds 17 per cent of the voting shares, Japan holds 7, and Germany 5. Twenty-four Executive Directors representing the Bank's donor and borrower members meet regularly to consider policies. Major contributors have executive directors of their own; others share representation. This voting system has had the practical effect of making donor countries more willing to

supply funds. Yet the disproportionate power of the funding countries has a high political cost; it is deeply presented by developing countries, who see the World Bank as a Northern dominated institution that is often used to promote the economic and foreign policy priorities of its primary benefactors. To be truly a "bank for the world," the institution would need to adopt a different voting scheme that gives more, if not equal weight to recipient nations.

Technically speaking, the directors approve all projects, as well as any major new policy directions. In practice, however, international civil servants may have more real power than the directors. The staff, after all, identifies and prepare the loans, and thus plays a central role in influencing lending directions. Members of the board sometimes have difficulty obtaining the documents used in the project preparation process, meaning they are all too often presented with a project to either approve or reject when it is too late to materially influence its course. In deed, of the more than 6,000 staff-written proposals over 50 years not a single project

has ever been rejected by the World Bank's board, though several have been opposed by individual directors on environmental grounds.

Unfortunately, although it includes many dedicated and talented people, the Bank staff as a whole is not particularly well equipped for the task of promoting sustainable development. To begin with, most of the staff - some 6,800 members are based at the Bank's comfortable headquarters buildings in Washington, DC. far removed from the on-the-ground realities while only 314 professional staff are assigned to field offices elsewhere in the world. In addition the heavy concentration of economists and engineers on the staff has meant that other ways of viewing the world whether through the eyes of ecologists, cultural anthropologists, or grass-roots activists tend to be neglected. This bias is reinforced by the fact that their official counterparts in borrower nations are often much like them; finance and planning ministry officials with degrees in similar fields and from the same northern universities.

The missing voice in this equation has typically

been the affected public - either those that are intended to benefit from projects or those who may be forced to suffer their unfortunate side-effects. Despite the fact that consulting with those involved with or touched by Bank projects has repeatedly proven to improve their effectiveness, the Bank itself admits that this kind of participation is the exception rather than the rule. With only limited access to the relevant documents, and until recently no channel for their complaints, ordinary citizens in developing countries have often been left with little opportunity to influence projects that might relocate them, pollute their environment, change property rights, or otherwise greatly alter their lives. A campaign, for far-reaching reform began to gather momentum in the 1980's, when activists began to document examples of some of the Bank's more damaging projects. In one infamous case, World Bank support for the Polonoeste regional development scheme of road building and agricultural settlement in the Brazilian state of Rondonia contributed to rapid deforestation of the area during the 1980s; by one estimate, the share of

the state that had been deforested increased from 1.7 per cent in 1978 to 23.7 per cent by 1988.

At about the same time, the debt crisis burst onto the world scene, posing new changes in the effort to fight poverty. Structural adjust lending rose quickly in an effort to inject cash into debt-ridden countries. But the domestic policy reforms required in exchange exacted a heavy human price, particularly from the poor. As austerity took a bitter toll, protests in developing countries over the condition attached to adjustment loans began to mount, as did pressure on the World Bank to change course.

Since the mid-1980s, the Bank has responded to these challenges by announcing a number of new policies intended to respond to environmental and social concerns. Often as not, these reforms have followed threats by the US Congress itself under pressure from environmental and social activists-to withhold funds.

In the first major reform effort, in May 1987, newly-installed Bank President Barber Conable created a Central Environment Department, announced that all loans were to be

screened for their environmental impact, and promised that non-governmental organisations (NGOs) would be more actively consulted in both donor and borrowing countries. Conable also committed to a range of new lending programmes aimed at achieving environmental goals, including increasing the number of projects aimed specially at environmental protection, incorporating environmental components in other projects, and increasing lending for forestry projects. In 1989, the Bank instituted a new policy requiring countries to prepare comprehensive environmental action plan in order to be eligible for IDA loans. These plans are intended to identify environmental needs and define a strategy for responding to them, including policy changes, institutional and educational reforms, and investment priorities. Bank member countries also agreed that countries that had demonstrated a special commitment to reducing poverty were to be given preferential access to IDA funds.

Several other Bank policies, too, have aimed on paper, at least to re-orient lending towards

sustainable development. A policy first established in 1982, and updated in 1991, requires that before funding any project affecting indigenous peoples, the Bank must prepare a plan that addresses a number of critical issues, including land tenure. A policy on the resettlement of displaced peoples, which dates from 1980, states that any projects that cannot avoid resettlement must provide plans to ensure that affected individuals are left no less well off economically than they were prior to the move. A 1986 wildlands policy stipulates that any project involving the conversion of wildlands should be offset by other investments in conservation.

In 1991, responding to charges that its lending promoted deforestation, the Bank developed a new forestry policy in which it pledged under no circumstances to support commercial logging in primary tropical moist forests. In late 1992, the Executive Directors approved energy policy papers on efficiency and the electric power sector. These called for more aggressive Bank role in supporting efficiency, both

through the standard approach of encouraging energy pricing and other policies that promote it, such as the removal of subsidies, and through more hands-on-policy interventions to encourage efforts to improve end-use efficiency. And in September 1993, the Bank issued water resources policy calling for adoption of a "comprehensive approach" to water management, in which competing demands for the resources can be assessed—the hope being that the most cost-effective and environmentally benign option will be adopted.

Follow the money

In the years since most of these initiatives were launched, some limited progress has been made in implementing them. The environmental screening process announced by Conable has been in place since 1989. Environmental action plans have been completed for 22 of a total of 70 IDA-eligible countries, as have 20 detailed poverty assessments. The amount of money devoted to free-standing environmental loans has increased. In 1993, the Bank committed nearly \$2 billion for 23 projects specifically

designed to improve environmental quality and husband natural resources. This amounted to a doubling in the funding of such projects over 1992 and a thirty fold increase from 1989, though at least some of that increase is due to a change in the classification system.

Some headway has also been made in orienting Bank lending towards investments that directly combat poverty. In 1993, 73 projects valued at nearly \$5 billion were earmarked for the poor-accounting for 26 per cent of total investment lending. Non-governmental activists are pushing for this figure to be increased to minimum of 45 per cent. In addition, the Bank has worked to increased lending for education, population, health, and nutrition, on the grounds that these sectors are of particular benefit to the poor. Lending in these categories increased from 5 per cent of the total in fiscal years 1981-83 to 14 per cent in 1990-92.

But the overall direction of lending remains unsatisfactory, with the bulk of it still devoted to large infrastructure projects. For instance,

despite the low energy policy, less than 1 per cent of the \$45 billion loaned for energy efficiency, according to a study by the International Institute for Energy Conservation (IEC) in Washington, DC. In contrast, demand-side management programmes garnered rough 7 per cent of all US utility expenditures in 1992. In the water sector, a similar pattern is apparent; despite abundant evidence that small-scale alternatives to the construction of large-scale projects merit support, an analysis by the New York-based Environmental Defence Fund (EDF) and the International Rivers Network funds that of the \$35 billion invested by the Bank in water projects over the 1980s, less than 4 per cent of it was devoted to the development of small scale irrigation, water conservation, and watershed management. Moreover, environmental damaging and socially disruptive projects continue to be funded. For instance, the World Bank appears to be moving ahead with a planned series of loans to India totaling \$1.2 billion for the construction of nearly 17 gigawatts of new coal-fired electric generating capacity over 10 years. According to EDF,

no serious consideration was given to energy efficiency as a alternative, nor has a full environmental analysis been completed. Local communities were no adequately consulted, and a resettlement plan was not formulated. Meanwhile, a US Agency for International Development study finds that an aggressive effort to promote energy efficiency in India could reduce peak power demand by 22 to 36 gigawatts by 2005, saving 250 to 400 billion rupees (\$8 to 13 billion) in investments to expand the supply. Nevertheless, the first \$400 billion was approved by the board in June 1993, despite the abstentions of the Belgian, German and US governments.

A recent study by EDF and the New York-based Natural Resources Defense Council concluded that 46 power sector loans totaling over \$7 billion that are currently in the pipeline for 33 countries, only five devote more than lip service to end-use energy efficiency, and of these, only two are in the line with the new policy papers on energy efficiency and power. As far the resettlement policy, an on-going internal Bank review of the resettlement policy

suggests that it is routinely violated: An interim report documents 134 on-going projects that are currently displacing 2 million people.

Much-needed attention was focused on the Bank's sorry record of compliance with its own policies in June 1992, with the publication of a report by the first independent Commission set up to evaluate a controversial World Bank project. Under its Chairman, former UNDP head Bradford Morse, the Commission concluded that the World Bank's involvement in the controversial Sardar Sarovar and Narmada Sagar dam projects in India had been badly bungled from the outset. The Bank's own rules on environmental impact assessment and the resettlement of displaced peoples had been blatantly violated, vindicating the decade long projects of thousands of local peoples and international NGOs. Though the Bank at first refused to back away from the project, negotiations, behind the scenes led to the Indian government's announcement, in March 1993, that it was withdrawing its request for Bank funding for the project (The State of

Gujrat appears to be moving ahead with the project on its own).

The best explanation for this seeming schizophrenia in the way the Bank does business-policies that appear impressive on paper, yet are contradicted in actual practice-comes from within the Bank itself. In June 1992, an internal report written by former Bank Vice President Willi Wapenhans concluded that World Bank projects were routinely failing to live up to the Bank's own criteria for success, such as rates of return and other lending conditions. The report cited Operation Evaluation Department data showing that the share of Bank projects deemed "unsatisfactory" in their results increased from 15 per cent in 1981 to 38 per cent in 1991. In addition, the report found that 78 per cent of the financial conditions attached to loans were not being complied with.

Wapenhans blamed the situation on what he called the Bank's "pervasive preoccupation with new lending"- a phenomenon that also help to explain why the Bank's environmental and social policies are so routinely flouted. This fixation with getting

money out the door has many sources, including the desire to infuse debt burdened countries with cash and the tendency - typical of many large organizations - to confuse quantity with quality. For the environment, the World Bank's lending culture can have catastrophic results, as harmful projects proceed despite breaches of bank policies, and as countries are forced to overexploit natural resources such as timber and fisheries in order to generate the foreign exchange needed to pay the loans back.

If the World Bank were to promote development that is truly sustainable, far less emphasis would be placed on large infrastructure projects that are too often environmentally and socially disruptive, and far more on smaller efforts done in close cooperation with local peoples - whether they be for health care in rural areas, ecologically sensitive agricultural techniques, or solar-powered water pumping. Lending for infrastructure would not disappear entirely but would be refocused considerably; the Bank would fund fewer highways and coal-fired power plants, and more urban rail systems, natural

gas-fired turbines, and sewage treatment plants.

Though the institution might actually lend less money under this scenario, every dollar that went out the door would contribute far more to the cause of sustainable development. Some of the savings could then be devoted to providing the extra staff time required to make these smaller projects work.

There is ample precedent for this small-scale approach. In the early 1980s' Bangladesh's Grameen Bank pioneered the concept of making small loans - \$100 on average- to poor people who would not ordinarily be able to secure credit. The Bank's extraordinary success has demonstrated that the poor are creditworthy, and that loans to them yield high development dividends. Governments have achieved impressive results through numerous bilateral initiatives including the US-funded Inter-American and African Development Foundations that provide small grants and loans typically less than \$500,000 each, to local communities, small business, farmers, entre-

preneurs, NGOs, and cooperatives in the Third World. The Inter-American Development Bank, a regional development bank similar in nature to the World Bank, channeled \$65 million in 1992 in small projects involving NGOs, small enterprises, and cooperatives-1 per cent of as total outlays. Following a similar approach should not be impossible for the World Bank, though it would require the Bank to transform itself into a rather different organisation one that is less centralized at headquarters and far more participatory in its operations. In a small step toward this end, the Bank has been engaged in a "learning process" on participatory development in which 20 innovative projects are being studied carefully to determine the feasibility of introducing such approaches more widely.

Getting there from here

A primary obstacle to transforming the World Bank along the lines of this more decentralized vision is that identified by Wapenhans- the rush to get money out the door. So long as there remains heavy pressure to infuse

large sums of cash quickly into depleted national coffers, mega-projects will continue to predominate, social and environmental policies will be treated as hortatory rather than mandatory, and efforts to involve the affected public will generally be perfunctory at best.

One of several underlying causes of the obsession with increasing the quantity of lending is a phenomenon known as "net negative transfers," in which many of the Bank's poorest borrowers have been paying more back to the Bank in recent years than they have received in new loans. To avoid the unfortunate appearance this creates of the poor bankrolling the rich, and to prevent defaults on its own and private bank loans, the Bank has so far largely pursued a strategy of lending still more money. Instead, the Bank could no its share to help countries step off the debilitating debt treadmill by devoting a significant share of its funds to reducing total debit burdens-rather than adding to them as current lending often does.

Toward this end, two small existing Bank programmes merit increased support. The first, the Debt Reduction Facility, eases the commercial debt

burden of IDA countries by underwriting the purchase of discounted debt on the secondary market. So far, five operations totaling some \$45 million have been completed, which have together had the effect of canceling out \$623 million in debt. The second, known as the "fifth Dimension" programme, lets some debt burdened countries borrow low interest IDA funds to pay the interest on the higher-interest IRBD loans. Unlike the Debt Reduction Facility, this programme addresses the problem of debt owed to the World Bank itself; fully 23 per cent of Africa's total debt burden is owed to the Bank and its regional counterparts. Besides increasing funding for these worthy initiatives, the time may have come for the Bank in certain cases-perhaps for chronically poorly-performing loans-to reconsider its policy against forgiving its own loans.

If the Bank is to become an institution that promotes sustainable development, it will also need to revamp the criteria by which it judges success. At present, the standard financial indicators usually fail to take account of the depreciation of natural assets such as forests and

fisheries, manning that economic policy making is based on a false set of books. In a recent review of 23 projects from 1985 to 1993, Bank economists John Kellenberg and Herman Daly discovered that only in a few cases was any attempt made to account for the drawing down of the natural resource base. No including these real costs in the calculation makes damaging projects appear to be better investments than they really are, thereby creating a perverse incentive to invest in projects that damage the natural resource base.

Furthermore, although the Next Steps action plan approved by the Bank's board in the wake of the Wapenhans report acknowledged that projects should be measured by their development impact, not just by their financial rate of return, the Bank unfortunately is not currently well set up to put this into practice. Indicators of sustainable development need to be developed that take adequate account of social and environmental goals-a process that is now underway. Bank staff then need to give close attention to these indicators in rating projects.

More accountability to the public is also sorely needed. In 1993, the Bank's board moved to put in place two important new policies that could help-one facilitating the release of information, and the other creating an independent inspection panel. Under the new information policy, more Bank documents will be publicly available, and an information centre has been established to disseminate them. The independent inspection panel was roughly modeled on the Morse Commission. It will provide an impartial forum where board members or private citizens can raise complaints about projects that violate the Bank's own policies, rules, and procedures.

Unfortunately, both policies were considerably weakened in the negotiating process. For instance, the coveted "project appraisal reports" that describe upcoming undertakings will not be released in their entirety until after a project is already approved too late to do much good. As for the appeals panel, its rules allow the Bank board to block an appeal from a citizens' group by a majority vote. A final priority for the Bank is to

use its leverage to promote policy reforms that will facilitate the transition to a sustainable society, rather than policies that obstruct it. As it has often been prescribed, the structural adjustment "medicine" has had debilitating side-effects in many countries, particularly on the poor. To the extent that adjustment hurts the poor, studies indicate that it can also harm the environment, as desperate people cut down forests or till marginal land in their struggle to make ends meet.

Adjustment programmes can also have more direct environmental implications for good and ill. For instance, removing subsidies to the timber industry would benefit forests and the indigenous peoples who live in them, and cuts in government subsidies to fossil fuels would provide an incentive for more efficient use of energy. Yet when currency devaluation's lead to more exports of commodities whose production causes environmental harm, the natural resource base suffers, particularly if efforts to see that environmental costs are internalized-through energy taxes, for example-

are not undertaken at the same time.

As pressure has grown to stem the tide of rising poverty, the World Bank has gradually and belatedly introduced changes in its structural adjustment loans that could cushion the poor, such as encouraging investments in primary health care rather than urban hospitals, and creating social safety nets to protect those hurt by the adjustment process. During fiscal years 1984-86, less than 5 per cent of all adjustment loans considered social issues at all; by 1990-92, more than 50 per cent did.

The World Bank has also begun to specifically address environmental issues in many adjustment loans: a sampling of loans made between 1988 and 1992 found that 60 per cent of the surveyed loans explicitly included some environmental objectives or conditions. Though this represents progress, adjustment loans are not yet routinely subjected to environmental impact assessments, let alone used as strong vehicles for promoting environmentally helpful policy reforms such as encouraging environmental taxes.

As the Bank completes its 50th year, pressure is growing for fundamental reforms. In the United States, 23 development, environment, and other citizens' groups have joined together in a coalition with the provocative title of "50 Years is Enough". According to the campaign's literature, this slogan was chosen "to express the strongly held belief by growing numbers of people around the globe that the type of development that the World Bank and IMF have been promoting, being inimical both to the interests of the poor and that of the natural environment, cannot be allowed to continue." The coalition is forging links with like-minded groups in Africa, Asia, the Caribbean, Europe, and Latin America.

In late February, parliamentarians from Europe, Japan, and the United States members of an association called Global Legislators for a Balanced Environment-pledged to work through their respective legislatures to encourage the World Bank to use the occasion of the 50th anniversary to engage in some deep soul-searching, including

amending the organization's charter to incorporate environmental, human rights, and social concerns.

Reactions from the Bank itself have been mixed. Leaked memos from Bank management suggest dismay, even panic, at the tone of the criticism. Some at the Bank seem inclined to treat disillusion with the Institution mainly as a public relations challenge. Yet others seem to recognize that far-reaching

changes are in order. Among the more hopeful signs was the Banks' convening of a Hunger Conference last December, at which the institution's top brass opened themselves up to the views of non-governmental observers from around the world.

Whether they can respond sufficiently will likely determine whether the World Bank can, or should, continue to play a central role in the world.

Doing so will require an enormous change of direction for an institution accustomed to building dams, highways, power plants and other massive public work projects that have—as often as not—enriched elite at the expense of ecosystems and the politically powerless. But without such a change, any centennial marking the next 50 years of this institution is likely to take place in a world of incalculable biological and human impoverishment.

Revised Versions

Sign on desk in lobby of high-rise apartment: "Do over others as you would have them do over you."

Today's motto seems to be: "Marry in haste, repeat at leisure."

A simple formula for success on Wall Street: "Nothing debentured, nothing gained."

Celebrity lawyers take the following oath: "It's not important if we win or lose, but whether we are covered on the six-O' Clock news."

Seeing the Light

Moving the clocks ahead an hour to save energy is not a new idea. Benjamin Franklin was concerned about wasting daylight as early as 1784 when he was ambassador to France. He was shocked by the Paris shopkeepers' habit of opening late in the morning and staying open until long after dark. This, he calculated, caused the unnecessary burning of 96,075,000 candles at a cost of more than a million francs each year. His solution: A daily sunrise serenade of clanging church bells and booming cannon to "wake the sluggards effectually and make them open their eyes to see their real interest."

CODE OF ETHICS

Engr. Dr. Irshad Ahmad has written an open letter to Pakistan Engineering Congress about PEC's Code of Ethics and its implementation. We produce below the condensed english version of the letter. We hope our readers will come out with their valuable comments:

"Mr. President,

A review of various programmes of P.E.C. shows the glaring omission about the Code of Ethics. Neither it has been included in the programme nor any committee has been constituted for its enforcement.

P.E.C. Code of Ethics has been based on Holy Quran and why it is not being implemented by P.E.C. can best be explained in the light of Quran. According to Surah

Asar, criteria for successful life is:

- (1) Iman
- (2) Good Deeds
- (3) Propoats of Truth
- (4) Advise Patience.

Now a days a successful life is measured in terms of wealth, property, status, fame etc. Like every one else too, engineers have adopted these criteria instead of those laid down in its Code of Ethics. This has resulted in deterioration of professional standard and many unethical practices have entered the profession. Although there have been some black sheep among Engineers, there are many who are leading their lives according to the Code of Ethics.

Mr. President,

in the light of above, Engineering Congress should set up a committee to review and enforce the Code of Ethics. Terms of

reference of this committee should be as under:

(1) Review the Code of Ethics and make Surah Al Asar (103) Surah Takasir (102) Surah Lamiz (104) part of the Code of Ethics

(2). To devise ways and means to end corruption in the light of Code of Ethics.

(3) To recommend to PEC and Government, ways and means through which bribery nepotism and corruption could be controlled.

Mr. President,

"You have been given the honour to become President of Engineering Congress. Let's hope that during your tenure of office, you will live upto the confidence reposed in you by the Engineering Community. May God bless you and help you in this task."

LETTERS TO EDITOR

THE YEAR 2000

Engr. Ashraf Qazi

We have been hearing a great deal about the year 2000. It is claimed by futurists political pundits and media men that the dawn of new millennium will bring in a new utopia.

But I am afraid they are in for a big shock. History does not move by the clock or on a time schedule based on calendar. All the great events in history are spread over a span of time historians call these spans "Watersheds of History." One such watershed was between years 500 - 500 BC. These were times of Buddha, Zoaraster, Christianity, Jueism, Toism, Confucism. Other watersheds were Renaissance, Reformation, Industrial Revolution etc. Nobody can say that on such and such date and such and such hours these events took place. These come like a flood - on a watershed and change the direction of the flow of

time. The third millennium AD started in the eighties, when the world changed from 'bipolar' to 'unipolar' power structure. First time in history one super power, stood naked in its might like Mount Everest among the peak of Himalayas. Thus next millennium has already started. Those who have fixed their sights to 2000 AD, may find that already they are too late. Already the time has passed by, imperceptibly! So let's act now and do not wait Micawber like for something to turn upon at the dawn of the year 2000. Already we have wasted enough time in dreams and plans while others took the time by the forelock and reached the destination.

ANOTHER DAM, ANOTHER TIMES & ANOTHER COUNTRY

Engr. Munir Syed

The issue of Kalabagh dam has been agitating equally in the minds of

Engineers of Pakistan. PEC's contribution towards creation of awareness of building this dam and the dire consequences of not doing so are substantial. Credit also goes to Mr. Mazhar Ali, PEC President who has been in the forefront of this crusade.

The consequence of delay in building an important dam were recently shown by B.B.C. Television. The Dam was Volta Dam, on river Volta in the country Ghana and the times were late fifties. Due to mechanization of Multi-nationals, World Bank and Aid giving agencies, the dam was delayed and when it was built, it was already too late. Inter-national political climate had changed, the Ghana Ruler, who had made plans on cheap electricity and water supplies from Volta Dam and raised hope of their people were discredited. So CIA organised a conspiracy and toppled the Government.

Dr. Nakrumha brought military dictatorship.

Ghana with the promise of being a modern progressive country with resources both natural as well as human to raise itself from poverty and join the rank of developing nations, has not yet achieved.

All this happened because of an international conspiracy to delay the Volta dam and which would have provided cheap electricity to Ghana and fueled its development and modernization.

These are signs of God for all those who think and reflect. I hope and pray that our decision makers will take lesson from this and start building Kalabagh Dam and save Pakistan from disaster like the one which Ghana had to face

From Rafiq Ahmad

Ref: Letter by Engr Shahzad Qamar the past issue about engineers failures failings. I give below few anslances when engineers working in the best interest of the country, staked their careers. I am sure so many examples of courage and highest professional ethics can rarely be matched by other professionals in the

country .So lets stop degrading ourselves and raise our heads in pride & resolve the example of these great engineers.

In seventies of the current century, it just happened that a Chief Minister's flight from Islamabad to Lahore was cancelled on account of bad weather and he had to drive down to Lahore. The road was a bit too bumpy for the Chief Minister. On arrival at Lahore, the Chief Minister called the Chief Engineer Highways and told him to suspend the S.E. for bumps on the road. The Chief Engineer submitted 'Sir' if anybody is to be suspended it should be me. So the C.E. was suspended.

As the luck would have it, the C.M. was removed from his high office within weeks. The new C.M. not only reinstated the C.E. Highways but wanted to appoint him Secretary Communication. But the C.E. refused and preferred to go on retirement.

At another time, another C.M. was going to Sheikhpura where his car was stopped at a battery of calverts by some notables of the area. They complained about quality of work and delays etc. C.M. called for the SDO

and ordered his suspension. The SDO pleaded not guilty on the ground that he was only recently posted. So C.M. ordered XEN to be suspended. XEN took the same plea. So he too was pardoned. C.M. then ordered suspension of S.E. But 'Sir' he is already under suspension. Never mind, said the C.M. "suspend him again."

A former President of Pakistan called M.D. of Sui Gas and told him that he wanted gas to be supplied to a provincial metropolis in six months. "This cannot be done Sir. It is impossible." It is a question of my prestige, I have publicly made a promise to the people, said the President. I will be dishonest personally and professionally, if I said I will do it in six months replied the M.D. But the President insisted. So the M.D. sent his resignation. The new man promised to do in six months but actually completed the job in 3 years. Yet he was rewarded for completing the work six months ahead of schedule!

An M.D. of a Construction Company was asked by his Minister to retrench staff. "You will have to retrench me before you retrench the

poor employees", pat came the reply. The Minister was taken aback and went to his party Chief to ask what should be done with such people!

An elite service wala Chairman of WAPDA was rude to one of the Chief Engineers. The C.E. replied back and told the Chairman to find a new man for his job. When some friends of C.E. asked him why he had lost his temper, he replied "what is the difference between me and the Chairman. We are both class one officers." However, the Chairman was transferred after a few months. C.E. was not only reinstated but also promoted by the next Chairman.

A Senior Engineer of WAPDA was thrown out of service by Government for his reported attachment to religion. He was reinstated later by Martial Law Regime. But when the Generals were investigating ex-P.M.'s record, they asked the Engineer to give false evidence against the ex-P.M. which he refused to do. So he was posted an O.S.D. However, he survived these trials and tribulations and is still

actively serving in the profession.

A Secretary Irrigation found serious errors in some of the Indus Basin Projects designed by the foreigners. This did not go well with foreign consultants and their lackeys in WAPDA. Some friends advised the Secretary not to take on the foreigners as it could harm his career. "I can't be untrue to my profession, let the career be damned" was his reply. And he lived long enough to get all the honours which Engineering Profession of Pakistan could bestow on an engineer.

A C.E. known for his outspokenness, refused to join the Engineers procession, taken out as a protest against the Government's treatment of Engineers.

However, the day after the procession, the same C.E. was seen attending a meeting with Chief Secretary, wearing an armed band in protest, read out the demands of the Engineers in the meeting and walked out. Later on he became Secretary Irrigation and today heads an important Government Agency. The appointment of an Engineer Fiancee Minister sent shivers down the

spine of our bureaucrats. So intrigues were started to get rid of him. Some friends of the Engineer FM advised him to take it easy and soothe the ruffled plums. His reply was, "Only a few years ago when I was thrown out of Engineering College, I had nothing to fall back on and I used to wander on the footpaths of Lahore. I would rather go back to the foot path, than sell my conscious. Friends you will never have this said that the Engineer F.M. was corrupt."

And true it has been. People blame him for many sins of omission and commission but never of corruption.

A delegation of Engineers went to see a F.M. of Pakistan to discuss Engineers demands. As the delegation entered F.M.'s room, they saw him flanked by two "heavy weights" of Establishment. Sir, you have our enemies here, said the leader of the delegation, we cannot talk, and the two heavy weights quietly left the room.

The moral is, Never sell your conscious or professional integrity for a pittance. You may suffer for a while but in the end you will triumph.

In the News



Engineers moot under PEC

At the initiative of the President PEC Mr. Mazhar Ali, a meeting was held to discuss the state of engineering profession and devise ways and means to improve the image of engineers and to make them play rightful role in the development of Pakistan. Among those who attended the meeting were Engr. Dr. Mubshir Hassan, Engr. Illahi Bukhsh Soomro, Engr. A.U. Loan, Engr. Javed Akhtar, Engr. Rana Allah Dad Khan, Engr. M.S. Khan, Engr. Iftikharul Haque, Engr. Mrs. Naheed Ghazanfar, Engr. Shams.ul Mulk, Engr. Ch. Muhammad Rashid Khan, Engr. Mian Mazhar ul Haq, Engr. Masood Hasan. After detailed discussions, it was decided that:-

1) There was an urgency and need for establishing closer ties and better working relationship between various professional engineering bodies and associations, and to have frequent dialogues and joint meetings.

2) The engineers were neither playing nor being given their due role at national and higher policy forming, projects formulation and execution levels. In fact, their scientific advance and their status in the economic development of Pakistan had substantially been reduced. The engineers felt frustrated and ignored due to powerful control by civil bureaucracy, other social and political forces and highly centralized administrative structure. There was need for engineers to take part and express their views on major issues

relating to national development such as self reliance, technological advancement and service to the people. They should establish their credibility and professional excellence. This may give them better leverage with the press and strengthen the profession. The defensive and apologetic attitude may be consciously changed. Collective efforts and mutual understanding were required to correct the situation.

3) Some of the major issues needing immediate attention were growing controls of DFIs and foreign capital in the name of privatization of canal irrigation system. Blue prints of major investment decisions, priorities and scope were being increasingly prepared and controlled by foreign DFIs and their appointed consultants to the

detriment of national interests.

4) It was important for the engineering profession to have a dialogue and better understanding with the diploma holders and the AMIE graduates, and to help in betterment of their professional and academic qualifications, and service prospects, and to build solidarity among technical manpower of the country.

5) There was need to combat corruption and wastage of public funds, and for the engineers to establish their credibility and professional excellence.

The engineers may inculcate and display a strong sense of goodwill and self respect.

The engineering profession may respond to public feelings of accountability in this regard. Introspection alone may not be enough.

6) Very costly and inappropriate projects of

power generation, development of gas fields, and exploitation of our natural resources were being proposed by foreign interests.

High energy costs would badly hit Pakistan's industry, agriculture and the common man. Price of electricity for industry was already getting beyond limits. There was need to suggest and stress on establishing correct priorities and introducing economies to save and salvage the national economy.

7) It was moved that some forum of Engineering Development and Advisory Council may be formed to take notice of major policy decisions regarding development and economic priorities and to give timely response and advice to the governments and the people.

8) Pakistan Engineering Council may assume a major and more positive role in promoting goodwill and in resolving differences between engineers and engineering

organizations, and personal differences and interests may not be allowed to vitiate the atmosphere and create confrontational situations. Recent bitter controversies and litigations between Pakistan, in derecognizing AMIE diploma, and in disqualifying engineers were matters for serious reflection.

9) Pakistan Engineering Council may review its role of registering contractors and consultants. It may review its priorities. There has been no reported case of action about unethical or unprofessional conduct and practice against any engineer or engineering body.

10) There was need for constant close liaison between the Engineering Universities, Research Organizations, Engineering Departments and practicing engineers. Engineering Sciences were rapidly advancing and there was need for periodic in-service training and refresher courses for engineers. The engineering education standards and scope have to remain under Constance review.

PEC Delegation meets the Governor



A delegation of the Executive Council of Pakistan Engineering Congress (PEC), headed by its President, Engr. Mazhar Ali, called on the Punjab Governor, Lt. Gen. (Retd) Raja Saroop Khan. Other members of the delegation were Engineers Dr. Izhar ul Haq; Rana Allah Dad Khan; Mrs. Naheed Ghanzanfar; Iftikharul Haq and Khalid Latif Khawaja.

The delegation explained to the Governor that Pakistan Engineering Congress was the oldest body of professional engineers' whose contribution in the country's development on major issues includes (a) Development and management of water and land resources (b) Floods (c) Canal Irrigation system (d) Energy policies and pricing, and (e) Management and restructuring of technical services.

In a memorandum presented to the

Governor, the PEC delegation explained that the floods had become a regular phenomenon. To prevent the country from the flood havocs, they recommended the establishment of a multi-disciplinary Flood Task Force for preparing long and short term plans for integrated approach for flood fighting and flood control by constructing storage dams and relief for riverain areas.

The memorandum stated that the World Bank and Asian Development Bank were continuously pressurizing Pakistan to implement their proposal on commercialization and privatization of canal irrigation system which would certainly result in manifold increase of abiana and complete disruption of irrigated agriculture and the rural society. "The Pakistan Engineering Congress would actively make their contribution for a study to

save the disaster," the delegation made an offer to the Governor.

The delegation also recommended the conservation of river water by constructing multipurpose dams like Kalabagh; Basha and Munda; extension of irrigation to vast barren tracts of land; fighting waterlogging and salinity by water management, reduction in irrigation water losses and harnessing the hill torrents.

The Governor was also informed that many Technical Departments and Agencies were headed by non-professionals and grade promotions for the engineer in many cases were blocked. The PEC delegation said that there was an urgent need to review top management policies and restructuring of technical services.

The Punjab Governor

appreciated the voluntary offer of Pakistan Engineering Congress and suggested that for creating greater awareness, the Congress should frequently hold Seminars on matters of national importance like (a) Control of floods; (b) All-weather water-proof roads; (c) Inter-connection of rivers through link canals; (d) Environmental improvement; (e) Proper drainage system and (f) Conservation of flood water in desert areas.

The Punjab Governor assured the PEC delegation that the recommendations made by them during these Seminars would receive proper attention by the concerned authorities.

PEC Computer Centre

A most modern Data Information and Computer Training Centre, established by the Pakistan Engineering Congress (PEC) at its Headquarters in Lahore, has started functioning.

This Centre, which is equipped with the latest computer equipment and accessories, has been set up by the PEC to provide specialised training particularly to the engineers and engineering students in modern learning systems on computer technology and software uses.

Initially short term training courses in

different fields of computer have been started. In the next term, scheduled to start by the middle of next month, advanced training courses will be held. These include AutoCAD; Windows; Winword; MS Excel; MS Project; Lotus; MSDOS & Foxpro.

The Centre is being supervised by a PEC Computer committee which has planned a number of short term and advanced training courses for the benefit of engineers and technical students with an aim of higher research in engineering.

The establishment of this centre is in line with the Prime Minister's Computer Literacy Programme in Computer Science which is relatively a new field of study having wide ranging impact on all sphere of life including different engineering disciplines.

According to a spokesman of Congress, the Director General, Pakistan Computer Bureau of the Federal Government, Islamabad, Dr. A. Sattar, made special efforts in the supply and installation of computer equipment after a series of meetings with PEC President and other members of the Computer Committee. He also paid rich tributes to President Farooq Ahmed Khan Leghari for the donation of computers which he had announced at the 65th

Annual Session of PEC held here in July last year

PEC PROTESTS AGAINST NEW TAXES ON CONSTRUCTION INDUSTRY

Pakistan Engineering Congress (PEC) has described as highly unfair and unjust the levy of 5% Income Tax and 4% withholding tax on the construction industry as it will be an unbearable burden on the contractors in the country. At a meeting of the Executive Council chaired by PEC President, Engr. Mazhar Ali, the Council members strongly supported the demand of the Federation of Punjab Contractors Welfare Association for immediate withdrawal of the additional income tax and withholding tax imposed on construction contractors in the 1995-96 budget. The PEC Council felt that if these taxes were not withdrawn, the construction industry which is already sick and needs Government patronage, will collapse and thousands of people will be out of business and million of workers will become jobless.

It was pointed out at the meeting that if new taxes were not withdrawn, the development projects would receive a serious set back which will be a great national loss.

PROFILE

ENGINEER A.R. MEMON

Engineer A.R. Memon is a Vice President of Pakistan Engineering Congress and a very senior engineer of Pakistan. He is a Member of Indus River System Authority and holds a key position in development & distribution of Water Resources of Pakistan, maintenance and to provide for matters connected therewith and ancillary thereto.

He is amply suited for this job in view of both experience and education, he is an expert in Irrigation & Drainage.

He was born on 1st March, 1923 in the small village of Khahi Rahu on the National Highway, 3 miles off Naushahro Feroze (Now Naushahro District). He had his primary education in his village and Secondary Education upto Matriculation in Government Madressah and High School Naushahro Feroze for 7 years. He stayed in the hostel where "Nimaz" was compulsory. Every student had to finish reading "Quran" upto third English and "Fiqha" upto

5th English. Arabic was optional language from standard 4th upto Matriculation. He stood second in the whole District and got scholarship and joined Bahauddin College, Junagarh State (Gujerat) where the education was completely and of any fees for every Muslim student.

He hails from middle class educated family of Memons of Naushahro Feroze. His two uncles were in Government service. He had no particular hobby but school work and five times prayer were his primary interest.

Engineer A.R. Memon graduated from N.E.D. Engineering College, Karachi in 1945 and joined Sindh Irrigation Department in 1947 as Assistant Engineer and served the department and later WAPDA for over forty years. His experience includes all fields of Irrigation Engineering from design and construction of Barrages, Flood Control & Drainage, Operation of Canals, Maintenance & Planning of Irrigation



Systems. He was associated with construction of Indus Basin Project as Director Barrages and Link Canals. He was also responsible of Moro-Dadu Bridge during his tenure as Chief Engineer, Sindh Irrigation.

When he joined WAPDA in 1974 as G.M. (South), hardly 10-15 percent job was done on Hub Dam and its ancillary works. Main Canal, Lasbela Canal with aqueduct on Hub River and Hub Dam itself including spillways as saddle embankment were completed within a record period of 4 years. He is also responsible for changing the site of spillway from main river to saddle embankment which was nothing short of a miracle in the whole construction period of 4 years.

His vast experience in Irrigation Engineering in Pakistan led to his appointment as Member, Water Apportionment Committee which made presentation before Justice Anwarul Haque and Justice Haleem Commission. He was also Chairman, Technical Committee under Justice Fazale Akbar for sorting out technical issues of water. In January 1993, he was appointed Member of Indus River System Authority (IRSA) set under the Indus Water Accord. He is very active and senior Member of IRSA. He remained as Member Executive Committee of Pak. Eng. Council for 4 consecutive terms.

Engr. A.R. Memon is author of many important reports which include (1) Canal Remodelling (2) Reappearance of Cracks on Sukkur Barrage (3) Numerous reports on River Training Works.

He has been contributing articles in Technical Journal and Papers in Seminars and Symposia organised by P.E.C. & I.E.P.

Apart from his professional and service matter, Engr. A.R. Memon has been working voluntarily in various

organizations. He was an honorary Member of National Commission on Agriculture and an Advisor, University of Sindh for 4 years.

Engr. A.R. Memon is a man of deep religious conviction and works voluntarily in various religious organisations.

A varied and active life spread over half a century is difficult to compress in a few lines, but it is quite obvious that it has been well spent in the service of Engineering Profession and the nation.

We interviewed Mr. A. R. Memon and our Questions and his answers are reproduced below:

Question: 1

You have been associated with various Commissions appointed for apportionment of Indus Basin Waters leading ultimately to Water Accord in 1990. What in your view is the basis of this Accord and how best it can be worked to get optimum use of Indus River System Waters?

Ans. Water is one of the most essential requisites that nature has provided to

sustain the agriculture, the life for plants, humans and animals. Unfortunately water is not evenly distributed to a large section of global population and as such is normally addressed by central resource management administration.

In Pakistan, Water Accord was signed in March 1991 and an Indus River System Authority, comprising Provincial and Federal Representatives, was formed in January 1993 to implement the Water Accord signed by the provinces. The Accord defines the various shares of the provinces.

The long term average total water available to Pakistan below rimstations through Western Rivers (Indus, Jhelum and Chenab) after handing over 3 eastern Rivers under 1960 Treaty to India, is 116 MAF during Kharif and 23 MAF during Rabi - About 16 MAF is lost as losses in the Indus River system and 15 MAF is transferred to 3 on line

reservoirs viz. Tarbela, Mangla and Chashma, built under 1960 Indus Basin Treaty, leaving 85 MAF for use by all the provinces. Out of 85 MAF, 75 MAF has been distributed below rim-

stations under the Water Accord to the provinces, leaving 10 MAF which has been provisionally earmarked as minimum flow below Kotri for maintenance of environmental balance. Besides, under the 1960 Treaty, India is entitled for 4.0 MAF for future development in the upper catchment area of 3 western Rivers. NWFP has been allocated 3 MAF extra under the Water Accord above rim stations.

Under the circumstances, the present allocation does not leave any water for transfer to new storage as recommended by Task Force vide page 43 para 8.6 in the Report of Prime Minister's Task Force on Agriculture. This also establishes that any further transfer of Kharif flows to any new storage has reached the optimal conditions. Let the provinces start remodelling the canals and draw their allocated share and surplus flood flows for limited period as and when it becomes available.

Question 2:

WAPDA has been lobbying that on the line the dams are silting up, what will happen to the future of Pakistan if no

new dams are constructed?

Ans. It is stated that the present dams are inter-seasonal dams. In other words, they transfer water from Kharif to following Rabi and very small quantum is left over, say 2.0 to 2.5 MAF to cover early Kharif shortage. The fact is that these dams do not increase the annual water supplies but they only transfer Kharif surplus to following Rabi. This Kharif surplus flow could be drawn by remodelling existing/constructing new canals or by transfer to the existing dams. It is the carry over dams which transfer one or more year's Kharif surplus to the following consecutive years of Kharif and Rabi. High Aswan Dam in Egypt is a cause, in the point, which successfully supplied 9 consecutive (1978-87) drought years. Only 2 years flow was needed to fill the lake. Even Hub Dam near Karachi is designed to cover at least 3 following drought years with one surplus year's flood.

Unfortunately, Pakistan lacks the natural site for carrying over dams. Bakhra was one such site in East Punjab which

could cover following 3 drought years. In view of the alleged alarming condition propagated by WAPDA that the present dams are silting and what will happen to Pakistan during Rabi, has been considerably augmented by the construction of 3 seasonal dams under "Indus Basin Projects."

Following are the options which need immediate consideration of the Government of Pakistan in particular and farmers community in general who would be affected if every thing is left to WAPDA.

(1) Raising of Mangla by 40.0 ft.

During inaugural ceremony of Mangla in November, 1967 a paper was written by Mr. S.S. Kirmani, who is now Consultant to World Bank. He state, "when Mangla is raised by 40 ft. in the future, it will provide additional storage of 3.7 MAF. The 8 MAF off-channel storage reservoir at Rohtas, will provide adequate replacement in the future for the loss of Mangla storage capacity due to silting. These potentialities ensure the availability of the Mangla storage for several centuries". In fact, while

constructing the Mangla Dam, the provision had been made at the cost of Government of Pakistan for future raising. In other words, the present Mangla Dam and Power House have been constructed to cater for 40 ft. raising. This question, therefore, in all seriousness, requires to be addressed to WAPDA as to what are the bottlenecks which prohibit WAPDA from raising the Dam by 40.4 ft. specially when the Government of Pakistan has already made investment and this would prove very cost effective. This requires to be included by Task Force in their report in lieu of the new storage proposed by them. It is regretted that the Task Force has consulted, perhaps, none of the provinces and has taken WAPDA's verdict at its face value.

(2) Silting of Tarbela Dam

Tarbela was commissioned in 1976 with live capacity of 10.3 MAF. The capacity has reduced to 8.4 MAF upto 1994. A second periodic inspection was made by "Chinese along with NESPAK" during April-September 1991 and they made the following important observation in their support for sediment management/sludging.

Quote - "The invert of T 4 is 65 lower than those of T 1 and T 2. If T 4 is used for sediment sluicing, the local scour funnel of T 4 may reach T 1. Consequently abrasion of Turbine, the blades of T 1, T 2 and T 3 will be much reduced. It is recommended to build a separate higher intake for power generation of T 4 say at el. 1225 and keep the existing out-let at el. 1160 for sediment sluicing. By doing so, the abrasion of Turbine blades T 1, T 2, T 3, and T 4 will also be reduced. This should be considered in the proposed study." Unquote.

Four years have elapsed and it appears no action has been taken by WAPDA on this study. It is high time that the farming community of all the provinces may be informed about abnormal and disastrous delay in taking up the proposed study. Alternatively "FAP" may apply pressure on WAPDA so that the proposed study is taken in hand and life of Tarbela is enhanced indefinitely. China has constructed thousands of Dams and they do not allow their dams to be converted into silt tanks. Pakistan would be better advised to benefit from Chinese

experience where every effort is made for silt management/desilting from Day one. "Sanmexia" on Yellow river" is outstanding example in China for sediment exclusion.

(3) Carry Over Dams

There are no natural Carry over dam sites in Pakistan but a series of small "Run of the river" power project dams may be constructed so that in the years of plenty, the water may be conserved and allowed to flow in subsequent drought year/years. Basha, Dasu, Thakot and Bunji etc. have been identified as "Run of the river" power projects by MECO of Canada. It is the time tested practice in China to build the series of small dams on a river like Indus. It is, therefore, considered that these dams should be built but with reduced height say 200' to 250'. They would, if constructed, during the course of time, will serve as a substitute for carry over dams. Besides, upper Indus lies in highly seismic zone and dams with big heights are prone to great seismic risk. Even on this account, we should not, and must not venture to build high dams on upper Indus catchment area.

M/s Tams who have built Tarbela, is understood to have come up with recommendation that Tarbela storage should be reduced from R.L. 1550 to 1530 in view of high seismic risks involved. It is their view point that Tarbela was constructed when science of **seismology** was not developed. It was the "State of Art" under which this dam was constructed at that time. Even they have suggested that in view of high seismic risk, seismic acceleration of 0.5g to 0.65 may be used instead of 0.1 to 0.15g to check the whole structure. In view of the above, it is recommended that "FAP" may consider this aspect and give their considered opinion and suggest series of small dams based on Chinese experience instead of high dams on the upper Indus for future sustainable Agriculture and Power.

(4) Lastly, water conservation is, perhaps, lasting solution for sustainable agriculture. The canal withdrawals are of the order of 105 MAF. The losses from the canal system, comprising main canals, branch canal and minors are estimated to be 40 MAF, a major part of which is the ground water recharge. The lining of canals could be of high potential value in saline ground water areas as it

would perform the twin function of water supply as well as drainage requirement reduction. Efforts should, therefore, be continued to recover this lost resource.

Question: 3

The Government of Pakistan is planning to privatize distribution of Irrigation Water and reorganize Irrigation Departments of the provinces. What are your comments about this policy?

Ans. I am strong opponent of privatization or distribution of irrigation water. I have been opposing privatization on every available forum viz. Pak. Engineering Council, Ministry of Water & Power including World Bank Consultants. The privatization would be tantamount to ruination of nicely designed and laid out irrigation network in Pakistan. If irrigation works have suffered any setback it is due to lack of finances whose strings are with Finance Departments of the provinces. In fact whole economy of Pakistan depends on agriculture or agriculture oriented industry.

Question: 4

Pakistan has a high drainage problem. Both wells and tile drainage has been tried. Do you have preference for one or the other?

Ans. I have executed both types of drainage viz. Tube Wells as well as Tile Drainage. I am all out for tile drainage although it is cost intensive on Capital but on O and M side, it is cost effective. If I had any say, I would replace all worn out tube wells with tile drainage with one stroke of pen. It is the biggest folly of foreign consultants to have suggested vertical drainage and thus increased salt content in healthy soil of Pakistan.

Question: 5.

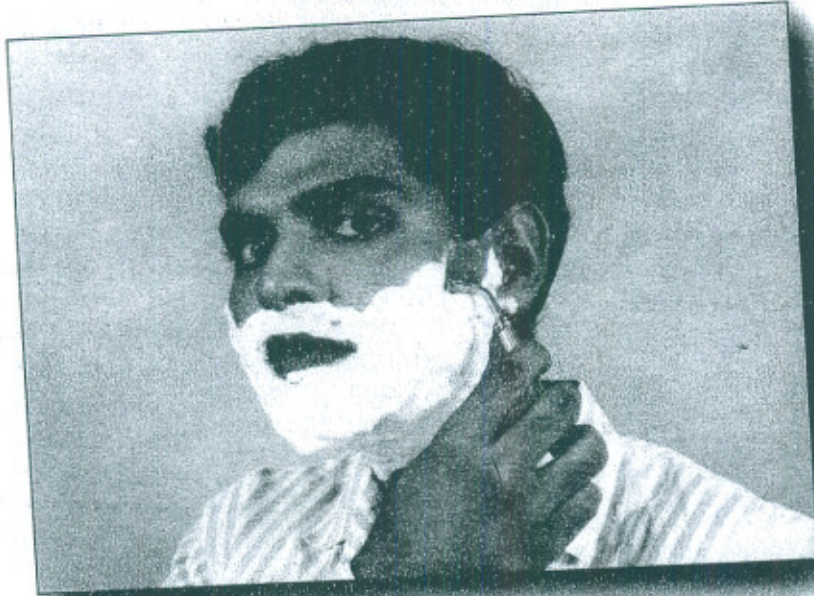
You are a pious and religious person. How has this affected your professional career?

Ans. I have tried to offer five times prayers. It has immensely helped to put my professional career on the right track and helped in taking right decisions.

Question: 6

What message you would like to give to engineers, particularly the younger generation?

Ans. Offer 5 times prayers, keep your hands clean and act swiftly. Even a wrong decision is better than no decision. Have full faith in God, the Almighty. Once you take the decision according to your conscience, please leave the rest to Almighty.



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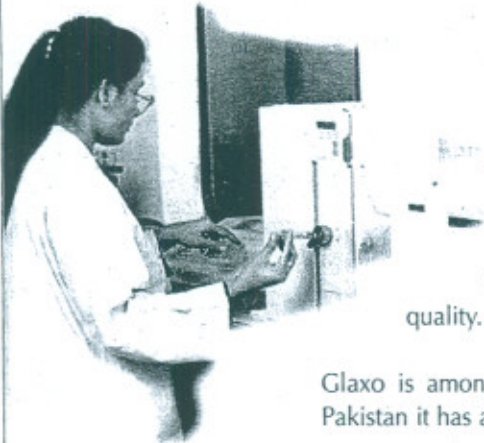
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5. Fordwah Eastern Sadiqia South Drainage Project.
6. Chashma Right Bank Canal Stage-III Project of NWFP & Punjab
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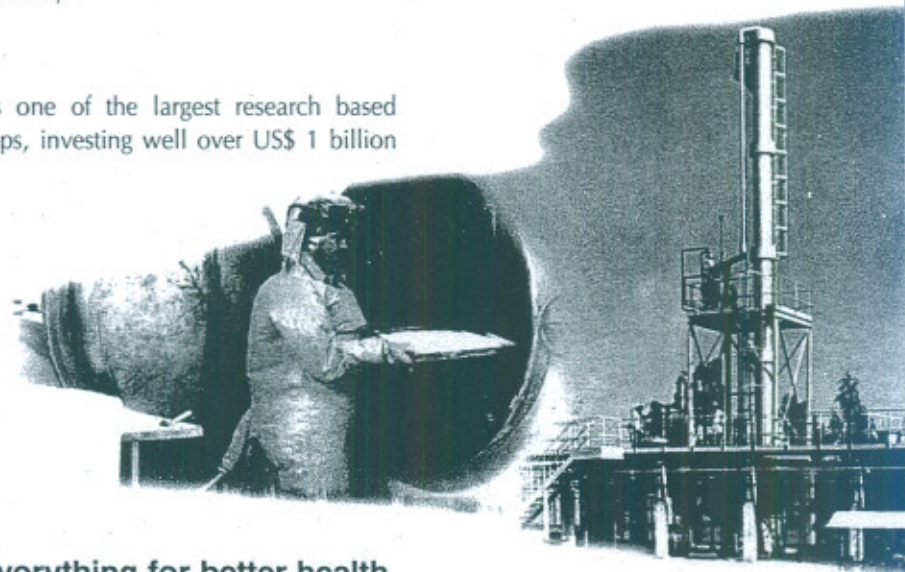
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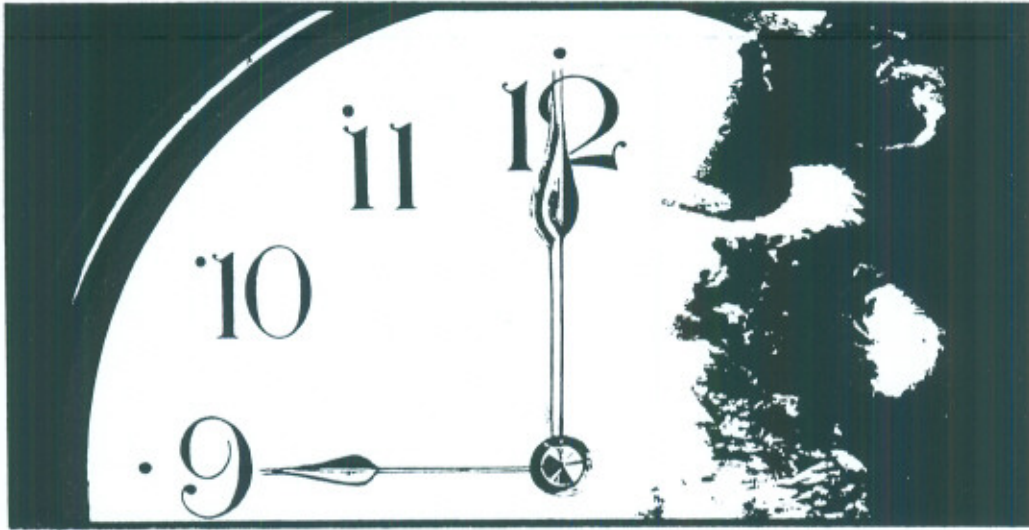
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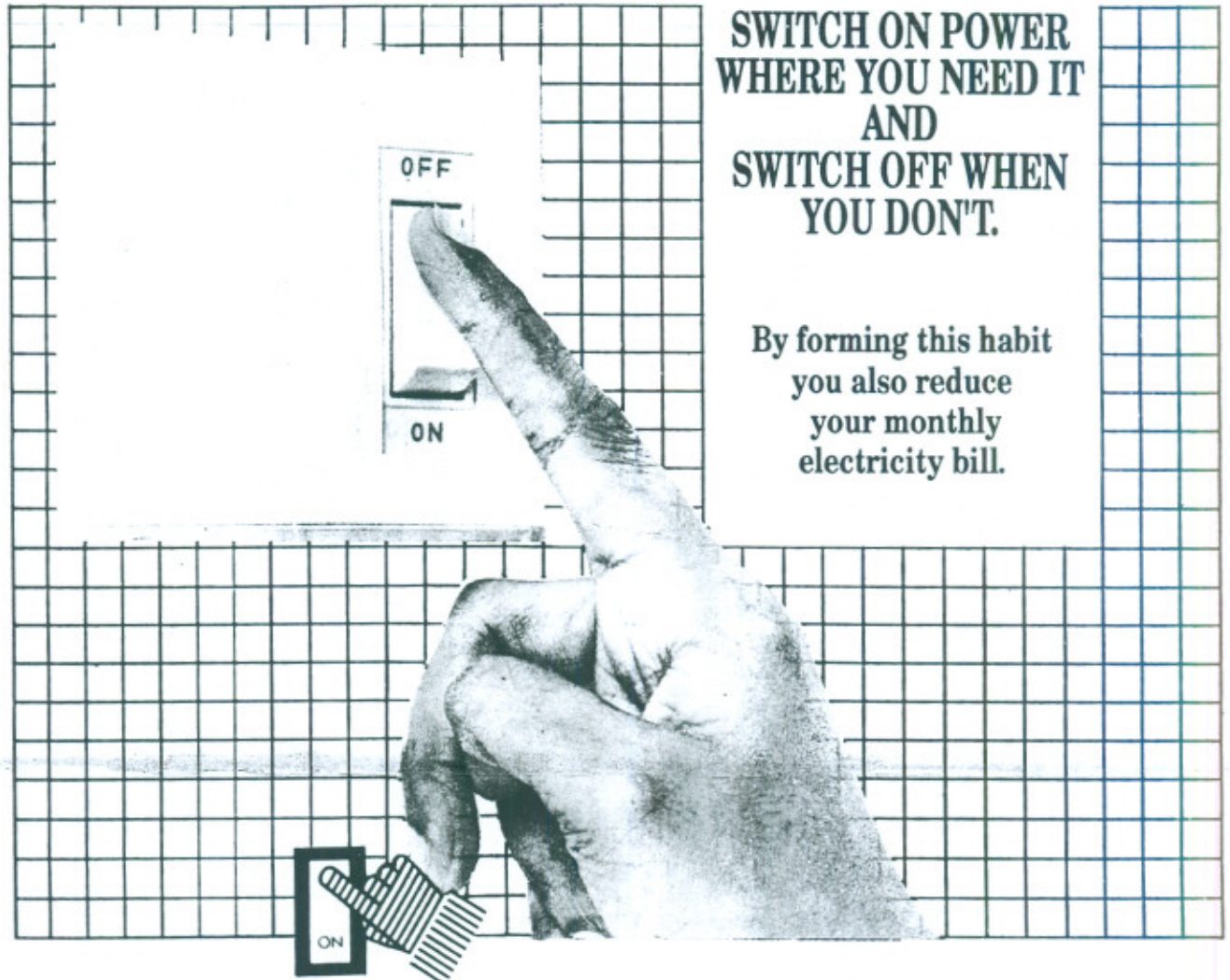
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