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**CAPACITY BUILDING IN WATER SECTOR
AND CPEC, PAKISTAN**

BY

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WATER SECTOR

CHALLENGING STATEMENT

“Under an average economic growth and an actual efficiency improvement of 1% a year, the world wide water demand and supply gap will be approximately 40% by 2030”

Charting Our Water Future (2009), The 2030 Water Resource Group

PROBLEMS BEING FACED

1. Pakistan below threshold of water scarce country
2. Variation in water availability both temporal and seasonal
3. Groundwater depleting; not sustainable
4. World largest contiguous irrigation infrastructure, century old and needs up gradation
5. Climate Change: Floods and Droughts

Indus Basin - Pakistan

SURFACE WATER 145 MAF/Annum

GROUND WATER 50 MAF

**WESTERN
RIVERS**

Indus

Jhelum

Chenab

Ravi

Sutlej

Beas

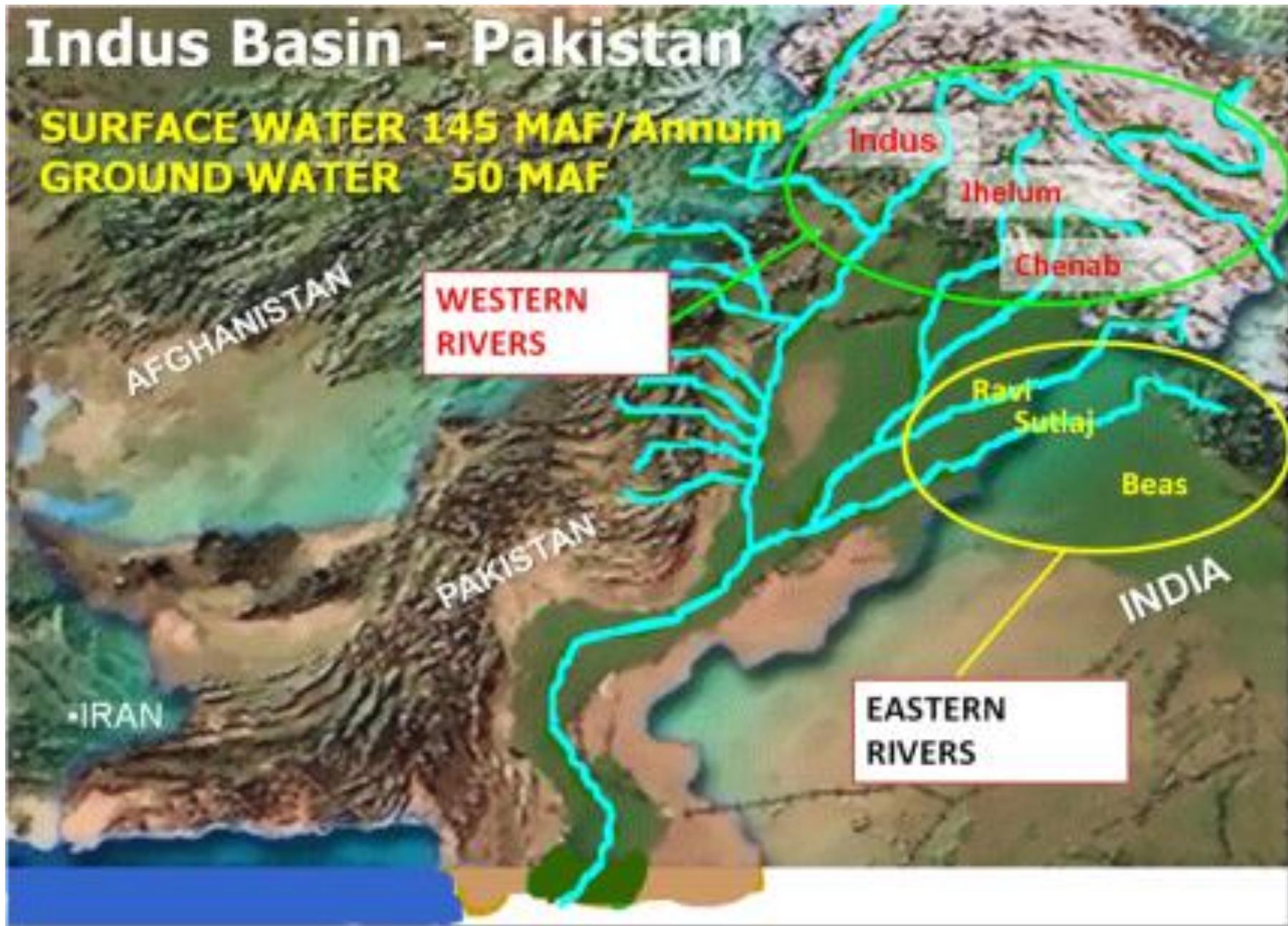
**EASTERN
RIVERS**

AFGHANISTAN

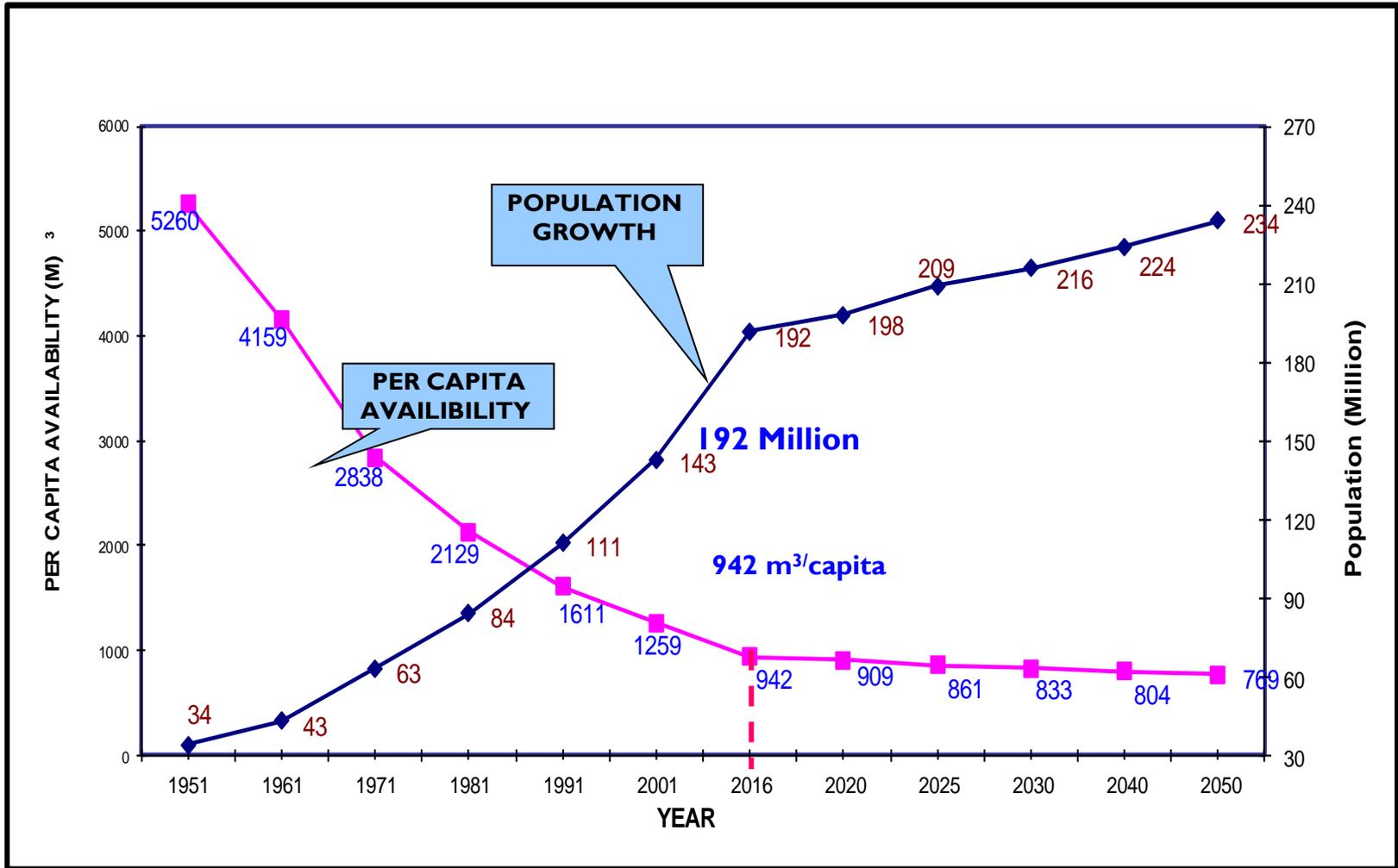
PAKISTAN

INDIA

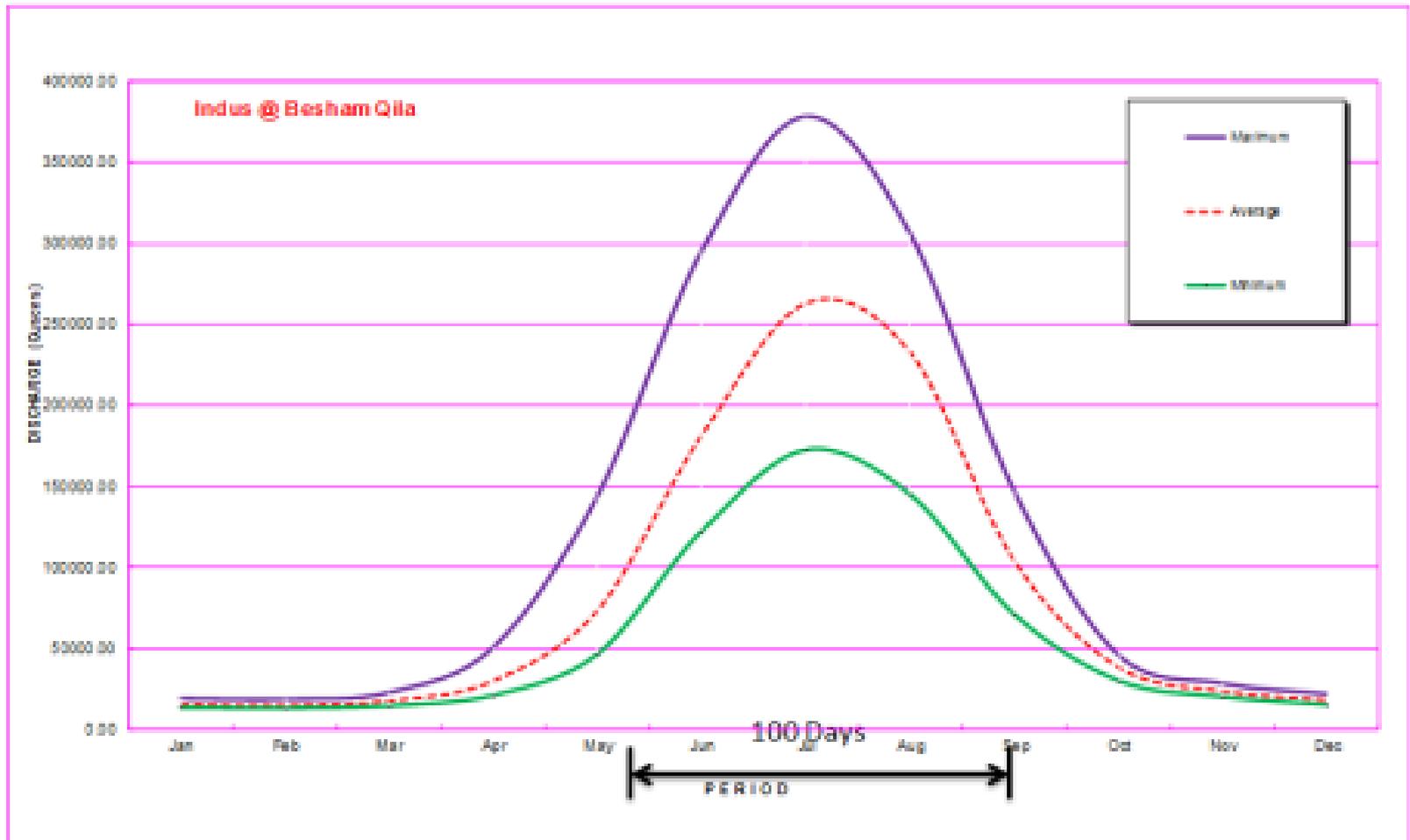
IRAN



WATER AVAILABILITY Vs POPULATION



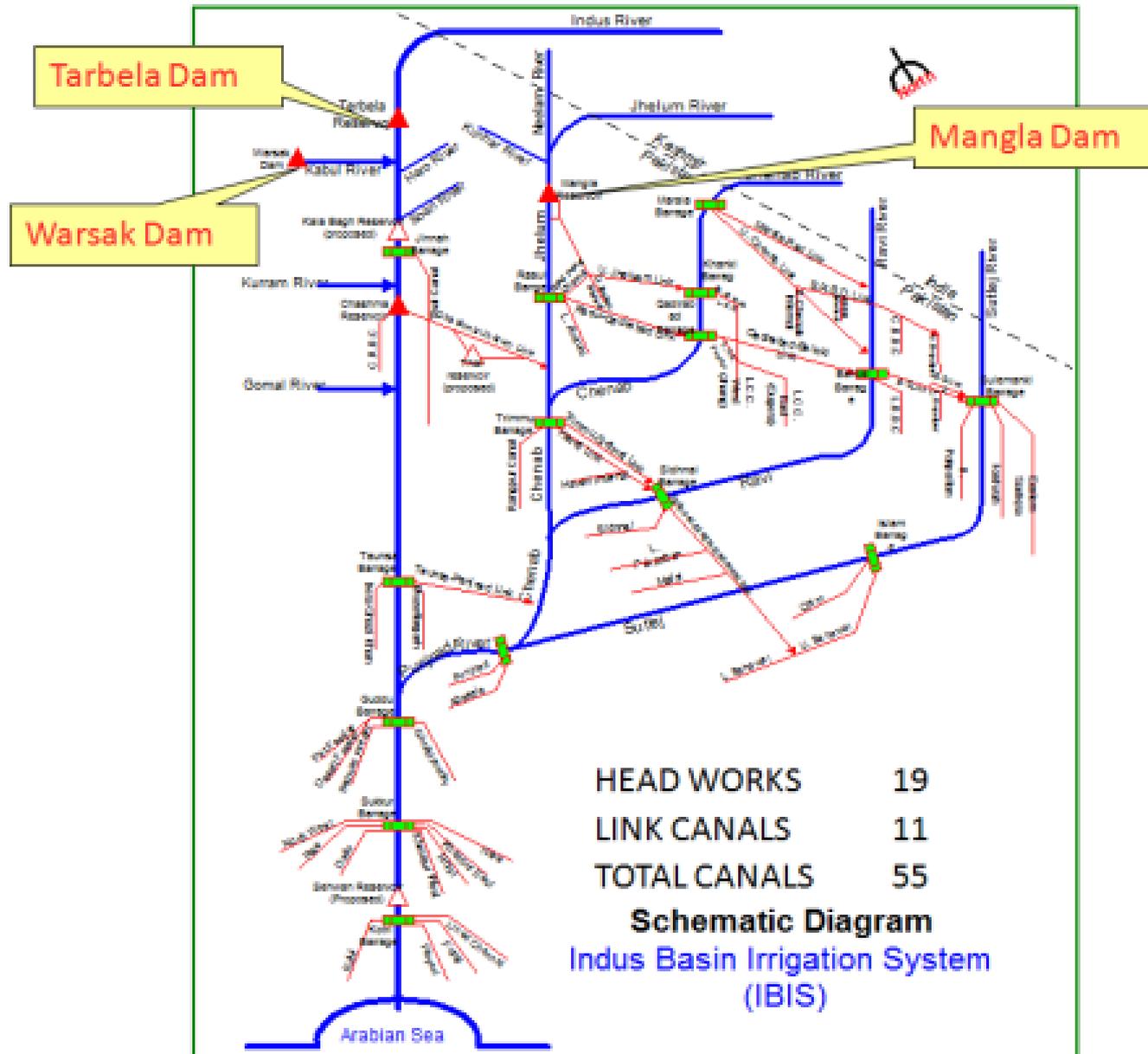
UPPER INDUS BASIN WATER VARIABILITY



Total System Availability – 100 days, 80% of inflow, rest 20% comes in the rest of the year

Variability - Minimum 98 MAF to Maximum 183 MAF

Uncertainty



WATER QUANTITY AND QUALITY

A. Water Quantity

1. Population increase, Urbanisation, More demand on water and sanitation
2. Groundwater Depletion
3. Increased demand for irrigation for food security
4. Global Warming – More demand for water

B. Water Quality Issues

1. Clean water not available to 21 Million people in Pakistan
2. No treatment of sewerage and industrial waste drainage
3. Contamination of Surface and Ground Water

UNO SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SDGs 6: Clean Water and Sanitation

SDGs 7: Affordable and Clean Energy (Hydro Power)

SDGs 9: Industry, Innovation and Infrastructure

SDGs 11: Sustainable Cities and Communities

ACTIONS REQUIRED

- To achieve & sustain water security: invest in 3 'ins'
Institutions, Information & Infrastructure.
- Technological improvements and construction of large dams.
- Effective management of water and power resources and development of infrastructure.
- Sustained economic growth, improvements in the investment climate for water and hydropower sectors.
- Develop human resource through training and strengthen institutional capacity.

CAPACITY BUILDING

World Bank Assistance

- Capacity building and support to Federal Institutions in Water Resources Planning and Management
- Improvement in water resources management and development of WAPDA
- Project Management coordination, strategic studies and training

CAPACITY NEEDS ASSESSMENT

- Capacity Needs Assessment: Identifying the demand driven training topics
- Review of existing policies and operating procedures
- Suggestions for improvements in water and hydropower sectors
- Enlistment of training institutions in water and hydropower: Local, Foreign
- Duration and Budget for Training, Higher Studies

WAPDA EXISTING TRAINING PROGRAM

Engineering Academy Faisalabad

- Technical courses 6 months for new entrants
- Junior management course, one month
- One week courses for continued professional development

WAPDA Staff College Islamabad

- Two months middle and senior management courses
- Lectures by Specialists, CEOs and Entrepreneurs

FOREIGN TRAINING

- Post Graduate MSc, Ph.D.
- Dam Safety Training
 - i. U.S. core of Engineers, Bureau of Reclamation, ISMES, Italy.
- Central Material Testing Laboratory-WAPDA, Lahore.
 - i. Imperial College London: M.Sc Soil Mech. & Rock Machines.
 - ii. USA University Masuri Rolla, CALTEC, Colorado Denver.
 - iii. Training of Technicians, USA, Italy, Australia, RCC Mix Design Dr. E. Shrader at CMTL-WAPDA.
- Visit of IWHR, 3 Gorges Dam, Longtan Dam, China.
- Exchange of Experts: Sediment Management of Tarbela Dam.
- TBM Training in Germany, Turbine Manufacturers, Austria.
- Dissemination of Lessons Learnt, Case Histories of Projects.

CHINA PAKISTAN ECONOMIC CORRIDOR (CPEC)

- China-Pakistan Economic Corridor (CPEC) is the most visible part of the “one belt one road” project.
- Under the long-term framework of CPEC, several projects in areas of Energy, Transportation, Infrastructure, Industry and port construction are being undertaken.
- The projects under CPEC would accelerate economic development and further link Pakistan with China, Central Asia and other parts of the world.

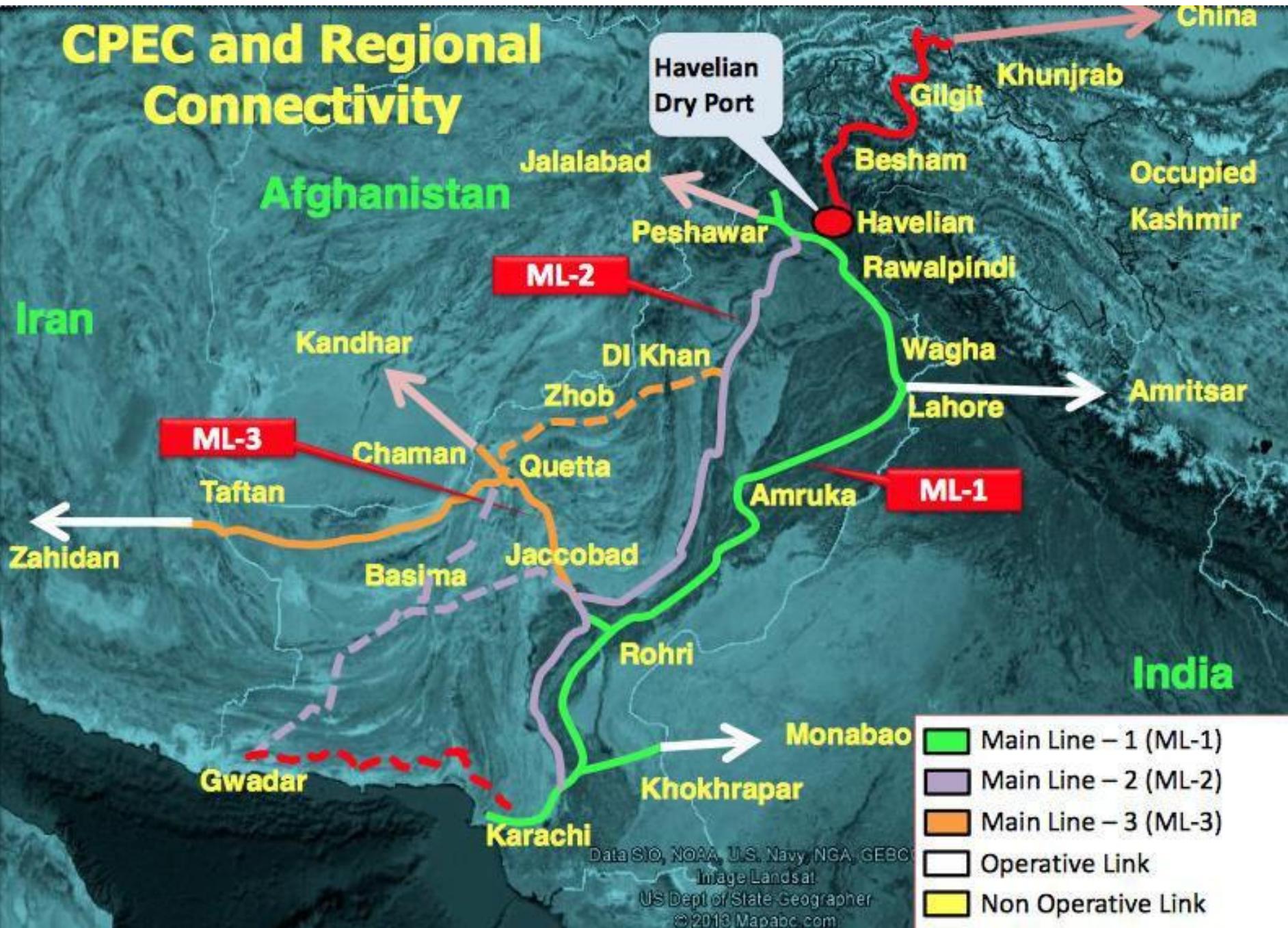
Highways Network of CPEC



INFRASTRUCTURE PROJECT

- CPEC investment of \$12 Billion has brought major improvement to Pakistan's transportation infrastructure.
- The Economic Corridor would extend all the way from Kashgar, Khunjab to Gwadar, a port on the Indian Ocean.
- A shipment from Shinghai which used to take more than 3 weeks to reach Pakistan shall now reach Pakistan in two days via silk route.
- Up-gradation of Main Line Railways from Karachi to Peshawar and Regional connectivity worth \$8.6 Billion has been started.
- Orange Line 27 KM Mass Transit Project in Lahore is nearing completion.

CPEC and Regional Connectivity



- Main Line – 1 (ML-1)
- Main Line – 2 (ML-2)
- Main Line – 3 (ML-3)
- Operative Link
- Non Operative Link

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
US Dept of State-Geographer
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ENERGY PROJECTS

- \$36B plan was formed to set up Energy Projects with the Chinese investment.
- GOP has also set up of Thermal LNG projects with its own investment.
- Two coal-fired power projects equipped with the latest state of the art environment friendly technology have already started production.
 1. 1,320 MW Sahiwal coal-fired power project in Punjab Province.
 2. Port Qasim coal-fired power plant with the same capacity in the southern port city of Karachi.
- About 10,000 MW Power has been added to the system.

CAPACITY BUILDING IN ENERGY PROJECT

- For capacity building in Thermal and Hydro Power Projects, teams of engineers were sent to China for training and up grading their knowledge.
- China has rich experience in Building Dams and Hydropower Projects. Most of the Dam Projects are being built by Chinese Contractors in collaboration with the Pakistanis.
- Many Pakistani's are now studying in China for enhancement of their knowledge and skill.

SPECIAL ECONOMIC ZONES (SEZ)

- Nine Special Economic Industrial Zones are being set up along the silk route of CPEC to install Industries, increase trade, improve output and efficiency.
- Chinese model of Economic Industrial Zones shall be adopted.

GWADAR PORT

- With the functionalized Gwadar Port, CPEC will benefit not only Pakistan but also central and South Asian States.
- An Export Processing Zone is being established at Gwader.
- Gwadar is one of the deepest sea port in the World. It shall have 18 terminals, regular cargo service, free zone and business centre.
- Construction of new roads, establishment and upgrading of educational institutions and hospitals, construction of a new International Airport and installation of Thermal Power House and water purification plants are in progress.

GWADAR PORT



GWADAR PORT



CAPACITY BUILDING FOR CPEC

- Higher Education Commission (HEC) of Pakistan has planned to develop linkages with leading Chinese Universities.
- Alliance of 50 Universities from each country shall be established.
- Capacity building of Existing Universities shall be carried out.
- New higher education institutions shall be established.
- Chinese Language Classes have been started.
- Science and Technology Parks shall be established.

CONCLUSIONS AND RECOMMENDATIONS

- In order to meet the SDGs Pakistan needs to conserve Water, Build Reservoirs and Infrastructure.
- Studies have been carried out for need assessment for training of various stakeholders in water sector.
- Capacity building of the Institutes both in Academic and Training for Execution, Management and Operation of the Projects shall be carried out.
- Capacity building for CPEC Projects: Infrastructure for better regional connectivity, Energy Projects, Special Economic Zones and Port Development, shall be carried out.

THANKS

