

KALABAGH DAM – A POLICY DEBATE

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Abstract

In the year 2014 service sector has the highest contribution in the GDP of Pakistan i.e. 53.1% followed by Agriculture 25.3% and Industrial sector by 21.6%. However, the joint performance of agricultural and industrial sectors directly impacts service sector in order to achieve GDP targets. It is established fact that the economic growth and development of a country has much reliance on electric supply. Pakistan is facing current shortfall of approx. 15000 MW of electricity which is expected to be 35778 MW till to year 2020. It is need of time to reconsider the irrigation policy particularly related to construction of Dams. Kalabagh Dam is a multipurpose project. On one hand it can provide water for agriculture especially in the season of Rabi and Kharif which will irrigate 800,000 acres of land in KPK. It will also helpful to strengthen the small scale industries as it will generate about 3600 MW of electricity. Moreover, it will help in increasing employment opportunities and Pakistan can save huge amount of foreign reserve which is being spent in import of fuel. The paper is divided into three parts first highlighted the issue of water shortfall leads to energy crisis and eventually disturb the industrial development in an agro based economy of Pakistan. Second portion of paper discusses the importance and features of Kalabagh Dam followed by policy debate and political analysis of this project.

Keywords: *GDP, Electricity Shortfall, Industrial Sector, Irrigation, Kalabagh Dam, Foreign Debt*

Introduction

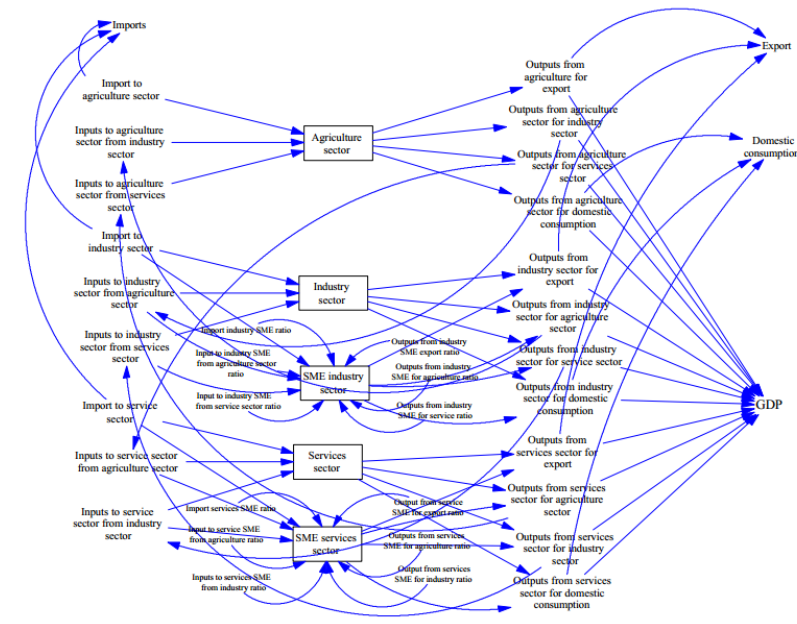
The monetary value of final Goods and Services produce in a country at a specific time period is known as Gross Domestic Product of Country (Callen, 2008). Pakistan has average growth rate up to 4.93% from 1952- 2014 which is expanded up to 5 % in 2014 reported by the Pakistan Bureau of Statistics (Economics, 2014).



Awokuse (2009) made a study over existence of short-run and long-run relationship between agriculture sector and economic growth through Autoregressive Distributed Lag (ARDL) error correction modeling approach. He used extended neoclassical growth model in which agriculture sector is a major contributor of economic growth. He applied time series data analysis on data of group of fifteen different developing and transition economies in Africa, Asia and Latin America. The studies of Awokuse explained that agriculture plays a locomotive role for the growth of economy.

Moreover, Anthony (2010) presented an empirical analysis of the impact of agriculture credit on economic growth to the GDP in Nigeria. In order to examine this impact he specified a functional and operational form and established a causal relationship between GDP and agricultural variables. The findings of this study revealed that agricultural variables have significant impact export of a country. (Anthony Imoisi Ilegbinsosa, 2012). However, for an agro based economy *Japanese Model* of economic growth is most suitable in which all three sectors of

economy creates a cyclic process to achieve its GDP goals. (See Illustration below)



(S.Kameyama, 2001)

View source: http://www.systemdynamics.org/conferences/2001/papers/Kameyama_1.pdf

The empirical study of Pakistan shows that agriculture, industrial and commercial are the three main contributing sectors into its economy. The great reliance is on an agricultural sector which contribution into the GDP is reaching to 25.3%. Moreover, 43% of the total employment is generated from this sector and approximately 20% of national income is due to export of agricultural goods (Hussain, 2012). The growth from an agriculture sector entirely depends on an *area* under cultivation and *irrigation* facility available.

The statistics report of 1998-1999 claims that total 79.3 million hector of land is available for cultivation but only 19.82 million hector is under cultivation which means 75% of available cultivable land is unutilized (See Table 01). However, Pakistan has the world oldest and largest irrigation system established by the British rulers in the mid of 19th Century. The river Indus and its tributaries are the

main source of water in Pakistan. They receive water from glacial melt, snowmelt, and seepage from geological formation and run off generated by seasonal rains in the watershed areas. Annually 154 MAF water is induced in the river Indus i.e 144.91 MAF water from western tributaries and 9.14 MAF water from eastern tributaries. Existing irrigation features of Pakistan is illustrated below:

Irrigation Feature

Reservoirs	Tarbela Mangla Chasma
Barrages	23
Inter River Link	12
Canal	45
Water Courses	90,000
Serving Area	38,000
Rainfall	250 mm

Table: 01

Provinces	Area Available in Million Hector	Cultivable Area in Million Hector	Underutilized land in Million Hector
Punjab	20.60	11.04	9.56
Sindh	14.10	5.45	8.65
Balochistan	34.70	1.40	33.30
KPK	10.20	1.93	8.27
Total Area	79.60	19.82	59.78

View source: <http://www.pakistaneconomist.com/issue2001/issue37/i&e4.htm>

It is statistically proven that Pakistan has been facing drastic water shortfall from 2004 which is adversely affecting the output in both season of *Rabi* and *Kharif* crops (USA, 2012). In the year 2004 shortfall of water was 11 MAF and now it has reached to 21 MAF. This shortfall is increasing day by day and estimated that it will reach to 31 MAF by the year 2025. Moreover, Pakistan does not have

enough storage facilities of water. Thus huge amount of water is wasted annually i.e. 36.94 MAF in Kharif season and approx 2.44 MAF in Rabi season (See Table 02).

Table: 02

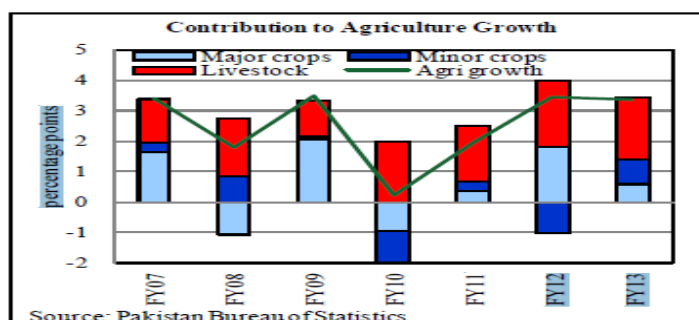
Particulars	Water Use	Proportion of Water
Irrigation	104.73 MAF	68%
Wastage of water	39.90 MAF	26%
system Losses	9.90 MAF	6%
Total Water	154.53 MAF	100%

View source:

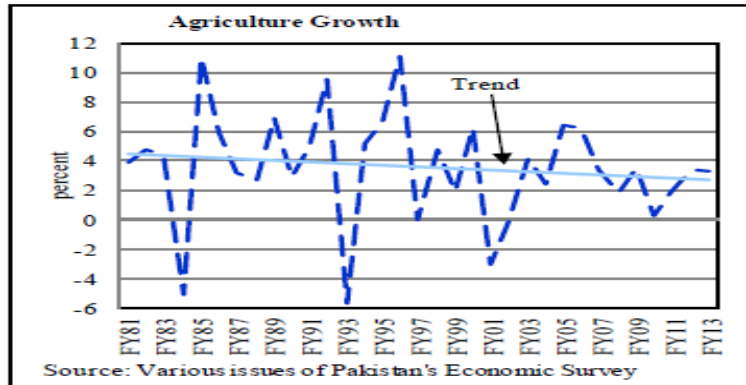
<http://waterinfo.net.pk/sites/default/files/knowledge/Pakistan%20Water%20Situation%20Analysis.pdf>

Moreover, it is ironic fact that Pakistan, mostly relies on water as an energy generation source. These shortfalls of water hamper cultivation capacity on one hand and energy generation on the other. Financial year 2013 Agriculture Sector showed growth of 3.3% which was lesser than previous year's growth of 3.5%. Major crops caused this slowdown as minor crops posted a strong rebound (Pakistan, 2013). Quarterly report of financial year 2013 showed shortage of water was one of the main factor in declining growth of Agriculture in 2013 (Pakistan, 2013). The graph below illustrated the decline performance of agriculture sector in past several years.

Graph # 01



Graph # 02



Pakistan 2013

It is not surprising if one states that industrial sector in Pakistan is facing problems to achieve desired GDP targets as it is highly dependent on agricultural product produce and energy generated. Agriculture provides input to various agro-based industries like Cotton, Jute, Tea, Coffee etc. The textile industry which is 57% of total export of Pakistan and constituted 9.5% of GDP is dependent on agriculture sector for its input. The higher the quality and quantity of cotton produces in Pakistan the higher the output of Textile industry (Dr. Rizwan Siddiq).

As a consequential of low agricultural productivity and energy shortfall many industries of Pakistan are shifting to neighboring countries like Bangladesh and India. The Government of Bangladesh took some notable and effective measures in the last five years for the development of industrial sector. They are providing electricity without load shedding to their industries on 35% low electric charges; they reduced tax rate, providing special tariff, free access to European market and also providing tax free status for units of textile industries. Moreover, they have low cost labor. These factors and effective measures attract Pakistani investors to establish their industry in Bangladesh instead of Pakistan. Recently 60% to 70% local Textile industry of Pakistan has shifted to Bangladesh (Khan, 2013).

However, recent years witnessed the improve performance by service sector which increases its contribution into the GDP of a country (Ayaz Ahmed, 2011).

From 1975 to 2005 increase in the value of goods is 35.5% while the increase in the value of service is 41.7%. However, service sector which is 53.1% contributor of GDP of Pakistan is also affected by shortage of water and electricity (USA, 2013).

In 1970s Pakistan was facing similar energy crisis but the then government launched massive Dams i.e. Mangla and Tarbela, These Dams provided a handy support to respond the demand of water and energy. As a result economy of Pakistan was boosted.

Currently the government of Pakistan took many measures for generation of low cost electricity but still unable to respond the demand of country. Increase population and urbanization trend hindered in the introduction of new industries. Moreover, shortfall of electricity is continuously increasing and now it has become a national demand (Kugelman, 2013). Currently, Pakistan is facing shortfall of electricity approx. 15,000 MW which will be 35,778 MW till to 2020 as mentioned in Table # 03 (Sifat Shah, April 2010).

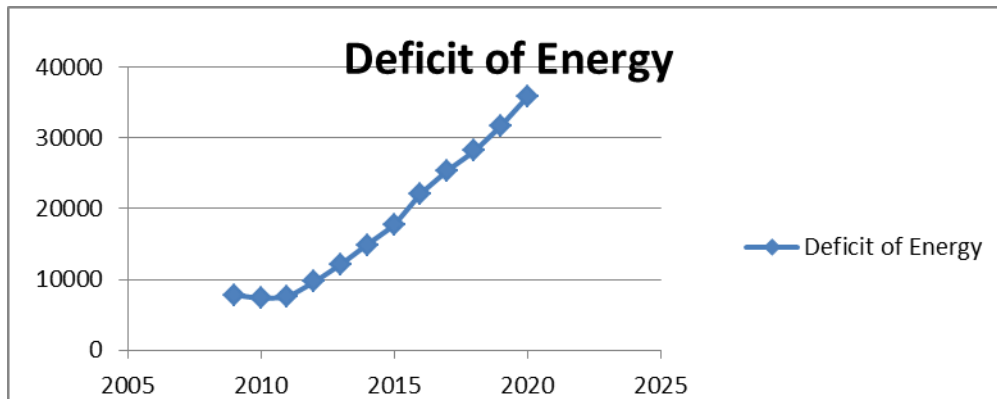
Table # 03

Forecast for Demand and supply position from 2009-2020													
Category	Years	Short Term			Middle Term				Long Term				
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A	Existing Generation												
	Hydel	6,444	6,444	6,444	6,444	6,444	6,444	6,444	6,444	6,444	6,444	6,444	6,444
	Gen Cos	3,580	3,580	3,580	3,580	3,580	3,580	3,580	3,580	3,580	3,580	3,580	3,580
	IPPS	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541
	Rental	285	285	285	285	285	285	285	285	285	285	285	285
	SSPs	70	70	70	70	70	70	70	70	70	70	70	70
	Total	15,920	15,920	15,920	15,920	15,920	15,920	15,920	15,920	15,920	15,920	15,920	15,920
B	Committed Under Process Generation	2,466	5,501	7,806	7,806	7,556	7,256	7,256	7,256	7,256	7,256	7,256	7,256
C	A+B	18,386	21,421	23,726	23,726	23,476	23,176	23,176	23,176	23,176	23,176	23,176	23,176
D	D.S x C	14,709	17,137	18,981	18,981	18,781	18,541	18,541	18,541	18,541	18,541	18,541	18,541
E	Demand Summer Peak	22,500	24,474	26,520	28,683	30,544	33,354	35,217	40,648	43,864	46,685	50,152	54,315
E-D = F	Deficit of Generation	7,791	7,337	7,539	9,702	12,163	14,853	17,676	22,107	25,323	28,148	31,611	35,778

View source: *Crisis of Electrical Energy in Pakistan and Future guide. Canadian Journal on Electrical and Electronics Engineering*

Current and Future Deficit of Energy

Graph # 03



Pakistan has growth rate of 4.4% which is expanded to 5% by this year. The major contributors of GDP of Pakistan are agriculture, industrial and service sector. It is evident from above analysis that the performances of all sectors are not achieving its targets. Pakistan has been facing huge energy crisis and current shortfall of electricity is approx. 14800 MW which will be 35778 MW till to 2020. Because of this situation agricultural sector suffers and having less 0.2% growth from GDP Target. Industrial Sector of Pakistan is also facing shortage of electricity due to which industries are continuously shifting from Pakistan to neighbor countries like Bangladesh and India. And service sector is also get affected by agricultural and industrial decline in an agro based economy of Pakistan.

Research shows that construction of Dams could play vital role in the economic development of our country. Multiple advantages can be availed through construction of Dams;

- Generation of Low Cost Electricity for industrial and domestic use
- Storage of water for agriculture and drinking purposes
- To control flood peaks in downstream areas of Indus.
- Increased employment opportunity

- Reduction in poverty

Kalabagh Dam

General Zia ul Haque initiated the project of *Kalabagh Dam* with estimated cost of approx. Rs. 250 Billion as per currency Value 1997 (Alaiwah, 2008). This Dam is located in *Mianwali* district of Punjab at 210km downstream of *Tarbela Dam* and 26km upstream of *Jinnah Barrage* on the river *Indus* (Elahi, 2014).

Features of Kalabagh Dam (Haq, 1983)

Hydrology	
Catchment Area	110,500 Sq miles
Max Recorded Flood	1,200,000 Cusecs
Average Annual Flood	91.4 MAF
Reservoir Storage Capacity	
Gross	7.9 MAF
Live	6.1 MAF
Dam Details	
Max. Height above river bed	260 Feet
Total Length above	11000 Feet
Total fill Volume	60 million Cu Yds
Spill- ways	
Overflow Spillway Capacity	1,070,000 Cusecs
Orifice Spillway Capacity	980,000 Cusecs
Power facilities	
Unit Size	300 MW
Pen Stock	12 No
Turbine design head	170 Feet
Installed Capacity	2400 MW
Ultimate Capacity	3600 MW
Average Annual Energy	11400 GWh
Estimated Total Investment (1997)	Rs. 250 Billion

View source: Site Selection Kalabagh Dam Project. Lahore: Dams Review Cell WAPDA

Kalabagh Dam is a multipurpose project with which all issues of Pakistan can be resolved without any foreign aid and loss of sovereignty. It is estimated that around 30,000 people will be employed during the construction process and eventually large number of employment could be created in different sectors of Pakistan. It is only Kalabagh dam that could irrigate 800,000 acres of cultivable land located 100-150 feet above the Indus river level in Khyber Pakhtun Khawa. (Anwar, 2013).

It will provide water storage of 7.9 MAF. The water storage from this dam will be helpful to increase the cultivated area and will also provide additional water to the provinces under Water Apportion Accord (WAA) of 1991 at the time of irrigation of Crops (Al-Kobar, 2000). This project restores water which is previously lost by sedimentation in existing reservoirs at Mangla, Chashma and Tarbela. The dam will provide further storage which can be useful in achieving the present water shortages faced during early *Kharif* season, i.e. the sowing period of April-June. It will also provide efficient directive to Indus River in order to meet the additional *Kharif* allocations of the provinces under WAA, 1991. The construction of Kalabagh Dam will also be useful to control flood in river Indus during high flood seasons during July to September. Pakistan has been facing approx. 20% shortage of water in both seasons Rabi and *Kharif*.

The employment generated from agriculture sector significantly impact on GDP because approximately 60% of population of Pakistan is attached to profession of agriculture for their livings. Increase in employment in agricultural sector directly affects the GDP. If 1% change occurs in employment produce by agriculture sector than economic growth will be affected by 0.65% Labor force participation in agri. Sector is an important variable to determine agriculture performance; it causes to increase agriculture production and their income. It will cause to improve the living standard of labors that will boost up economic growth (Hina Safdar, June 2012). The higher growth of Service Sector gives a new dimension of stability to Pakistan's growth process (Ayaz Ahmed, 2011).

This project will provide low cost electricity as compare to other energy production method such as coal project, solar energy, wind energy, rental power system and other thermal projects. It will provide electricity at per unit cost of Rs 1.5 compared to very low from other project by which cost is up-to Rs. 12 per unit

(Commerce, 2013). According to expert opinion KBD can produce electricity at an average cost of Rs. 3 to Rs. 5 per Kilowatt hour in upcoming five years. The generated energy from this dam will be helpful to boost industrial sector of Pakistan especially many SMEs can be established to increase employment opportunities and foreign exchange of Pakistan. Output from different SMEs commonly in fishing, farming and lives stock can be used as input for other big industries. Moreover, the additional hydropower will also be helpful in reducing load shedding for domestic purposes.

It is estimated that energy shortages have cost the country up to 4% of GDP over the past few years (Kugelman, 2013). Estimated cost of 2% of GDP is up-to 380 million due to energy crises in Pakistan (Bhutta, 2012). By generation of electricity \$ 4 billion dollar can be saved annually which are using in purchase of fuel (Khursheed, Engineering Design of Kalabagh Dam, 2014). It will provide ultimate 3600 MW of electricity (Khursheed, Engineering Design of Kalabagh Dam, 2014) which is the sufficient amount of electricity to reduce current energy deficit of energy as mention in Graph # 03. By this we can reduce load shedding of electricity in different areas of Pakistan.

Kalabagh Dam would be helpful to produce 15 billion units of hydropower. By production of low cost electricity Pakistan can save approximately Rs. 300 billion, which we are using in import of Oil for the production of electricity. It would be helpful to boost the economy, stabilize the currency and increase savings & foreign reserves of Pakistan. (Mulk, 2013). It can produce electricity which would be affordable to all people of Pakistan in next five years and it would also be helpful to continue sustainable growth of Pakistan (Shah, 2013). It is estimated that output from an industrial sector could be increased up to \$5 to \$6 billion per year and agricultural output could go up to \$10 billion a year. (Lashari, 2013).

Construction of Kalabagh Dam will create approx. 30,000 employments in construction and manufacturing industry which will have some impact in the reduction of unemployment (Ahmed, 2012). There is positive correlation exists between economic growth and growth rate of Agriculture. Increase in rate of growth of Agriculture will lead to increase in growth of economy. Increase in rate

of economic growth can reduce poverty from Pakistan. For sustainable growth Pakistan need to a long term growth in Sector of Agriculture (Hina Safdar, June 2012).

Policy Debate

It is established fact that Kalabagh Dam is a project of national prosperity. Research revealed that KBD has many reservations from different corners of Pakistan and it has become bone of contention among various groups.

Kalabagh Dam is not only beneficial for Punjab it also helpful to reduce poverty from Sindh (Anwar, 2013). This project provides 37% excess water to Sindh and Punjab both in the season of *Rabi* and *Kharif* while KPK and Balochistan will get 14% & 12% respectively.

Kalabagh Dam is useful for expanding irrigation area in all provinces of Pakistan. It would be helpful to irrigate 2 million acres of land in Sindh, 700,000 acres of land in Balochistan and 800,000 acres of land in province KPK which is located 100-150 feet above the river Indus. It would also produce 30,000 employments in KPK.

There will be no scarcity of water in River Indus. The annual escape of water from Kotri to Sea from River Indus is 35 MAF and Kalabagh Dam will be filled by 6.1 MAF of water.

Moreover, there is no chance of conversion of Sindh into desert because Dams do not consume water they just store which is valuable for irrigation purposes especially in those seasons when water is not available in Pakistan.

Sindh has feared that Punjab will take control of water again as it did earlier and use water to irrigate approx. 380,000 acres of land on the both bank of river Indus in the three main districts i.e. Mianwali, Khusab and Jehlum. It is in 1972, an agreement was signed between Government of Punjab and Sindh that without the permission from Chief Minister of Sindh, Punjab will not take water from Chasma Link Canal. But irrigation officials alleged that Punjab is continuously taking water without permission which results into water shortage in the province of Sindh. This is the reason Sindh is not accepting any guarantee from Punjab.

Under the regime of General Pervez Musharraf, 60% construction of Dam had been completed. General Pervez Musharraf and Prime Minister Shoukat Aziz offered constitutional guarantee in favor of the development of Kalabagh Dam that no canal or link will be build which is not mentioned in feasibility report. Unfortunate during the meeting with Moonis Elahi's son of Chaudary Pervez argument stared about the construction of canal to irrigate both banks of river. This argument results into the controversial issue with reference to this mega project. Later, Ex. Prime Minister Yousuf Raza Gilani stated that KBD will *only* be built *if* thorough consensus will be generated among all provinces. Lately, Ex. Prime Minister Raja Pervez Ashraf finally stopped this project after receiving strong objections from Sindh.

Conclusion

Study concluded that main contributing factors into the GDP of Pakistan get directly affected by the construction of Kalabagh Dam. Experts are of opinion that this dam is highly beneficial for all provinces of Pakistan in aspects i.e. location, storage capacity, energy production and irrigation (Ahmed, 2012).

KBD will provide boost to the economy of Pakistan. The employment generated through agriculture and industrial sectors will increase the share of service sector in the GDP of Pakistan. Moreover, Pakistan could save billions of foreign exchange by generating electricity through this project. The saving can be used to promote other sectors and give relief to the people of Pakistan.

It is suggested that Dams should be constructed for national prosperity and conflicts related to Kalabagh Dam should be addressed and resolved by developing a national consensus.

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