

# Economic Evaluation plan of Chandab Flooding Station in Pakdasht County of Tehran Province

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**Abstract:** The economic evaluation of watershed activities is of great importance. one of the strategies to increase water levels in aquifers recharge groundwater and prevent damages caused by the flood is seasonal flooding of broadcast stations groundwater recharge in the second half of the 80 multiple projects throughout the country as one of the main themes of the targets has been implemented.in this regard, Tehran Province plans to build research stations and extension education Chandab city Pakdasht water spreading and implementation activities began in late 1986 began.in this study tries to analyze and evaluate investment by the government investigated and cost benefits of its implementation is monitored and evaluated.Economic evaluation of aquifer with views of econometrics during the constructional and operational plans, including mechanical and biological operations during the useful life and maintenance costs, along with benefits such as the rate of water extraction and groundwater recharge and the reduced estimate damages caused by seasonal flooding, improve the environment, etc. is desirable.the useful life of the project is 25 years old.Economic evaluation of water spreading station using current methods of economic analysis and cost-benefit estimates have been obtained.Despite the problems emerged due to the recent drought and its effects on water meet the cost-benefit results obtained with 10% discount rate provides a figure of about 1/08.This figure shows that investment costs for protection of soil and water resources, including aquifer management activities had a positive aspect from an economic perspective.Although the social and economic importance of the villages downstream of the aquifer has been obtained satisfactory results.This article is from a project entitled "Socio-Economic Evaluation of Chabab Flood Station The county of Pakdasht was taken from the villagers' point of view.

**Keywords:** econometrics, aquifer, costs-benefit, station CHANDAB ,Tehran province.

## Introduction:

Thread artificial recharge of ground water in arid regions of Iran in the past has been considered and the construction of dams on rivers to flood diversion on consecutive plains and farm land was being accomplished (Ministry of Energy.1995:12).Flood broadcast stations for optimum use of surface water and groundwater levels, reducing damages caused by seasonal flooding, improve and vegetation of the area and Moving towards sustainable development of natural resources as a strategy for protection of soil and water resources in the agenda. Economic evaluation of the implementation of flood broadcast stations may be the most important issue that the costs and economic benefits of this type of activity made it clear and Or usefulness of any costs within predetermined targets, the player is considered flood. One of the strategies to increase water levels in aquifers recharge groundwater and prevent damages caused by the flood is seasonal flooding of broadcast stations groundwater recharge in the second half of the 80 multiple projects throughout the country as one of the main themes of the targets has been implemented.in this regard, Tehran Province plans to build research stations and extension education Chandab city Pakdasht water spreading and implementation activities began in late 1986 began.in this study tries to analyze and evaluate investment by the government investigated and cost benefits of its implementation is monitored and evaluated.Economic evaluation of aquifer with views of econometrics during the constructional and operational plans, including mechanical and biological operations during the useful life and maintenance costs, along with benefits such as the rate of water extraction and groundwater recharge and the reduced estimate damages caused by seasonal flooding, improve the environment, etc

Satterland.1982.In study has concluded that watershed management plans in accordance with the logic of production and service offering to increase water harvesting and utilization of production watershed especially in the areas of water downstream and solve social problems associated with the restoration and development of watersheds cannot be considered successful design

Hudson.1991-In project entitled "The causes of success and failure of soil and water conservation projects can be integrated as one of the studies considered in evaluating the results of this experiment indicates that soil conservation structures That simple and that they comply with the basic requirements and methods of operation and maintenance of water structures.

Singh, P. 1995- An economic study of a watershed project in Rajasthan, India, concluded that improving the socio-economic status of the tribal areas through watershed programs is possible. Not only has crop yields increased, but forage resources have also improved after the project.

-Bakhtiyar, A.1998- plan entitled "Socio-economic Assessment flood spreading project Grbaygan" have provided. Calculations of the cost-benefit ratio  $B / C = 20$  is shown. which indicate that water spreading, low-cost method of great efficiency . With increasing groundwater, the acreage of crops in the region increased from dry land to irrigated cropping pattern has changed. and rural life of one conventional dairy farms have changed the status of agriculture and employment has increased. Increased income level and its value has gained ground.

-Baniasadi, M.1995- In his study entitled "Effects of small water aquifer management plan of Bam on socio-economic status of residents of small water" has. With the implementation of 500 hectares under cultivation has increased. Project in the region has caused many villages to work station area. also in the area of migration are quite tangible projects has decreased.

-Khobfekar, H.1999-In his study to evaluate the "*economic, social and technological watershed management activities in Sistan and Baluchestan*" Watershed's satisfaction with the activities carried out as one of the most important indicators is considered 00% of people who give their consent to the general plan of activities (watershed) have announced. Of these, 9.68% satisfaction very high, 20% high satisfaction, 7% are moderately satisfied and only 1.1% have expressed satisfaction with their loss. 99% of people's participation in watershed management activities it deemed necessary because of the benefit of the people of these activities have enumerated.

-Saberi, A. (2001). In a study entitled "Analysis of the Economic Impacts of Watershed Operations in the Pakel Basin Basin", it indicates that the investment was made and the discount rate was determined using the NPV (IRR) method of operations. Executed 11% and  $B / C$  benefit ratio is 11% which indicates profitability of the plan .

#### **Location and characteristics of the watershed Chandab:**

Chandab water spreading station in the extreme East Pakdasht city in Tehran province of longitude 51 degrees 55 minutes and longitude 35 degrees 24 minutes North in East Tehran, Garmsar city Pakdasht located in the north central axis. The station in an area of 3000 hectares located on the alluvial fan of sediment. From the aquifer until the beginning of Tehran, 50 km to 31 km is the city Pakdasht. The maximum height of 2620 m and a minimum height Chandab basin at the outlet is 980 meters above sea level. Basin average elevation of 1488 meters and And average precipitation of 187 mm per year and average annual variable 250 mm, the minimum average temperature of  $2^{\circ} C$  and maximum average temperature  $1.26^{\circ} C$ . restricted deposits are good permeability of the aquifer and the average slope is 5%. Thus Chandab aquifer region in terms of climate is arid zones and the subject of a great many restrictions on aquifer project has planted vegetation (Hosseni.1990:31).

Station construction work for research, education and extension Chandab started in 1995 and for one year mechanical operations (construction of hydrophilic channels expansion, and construction of water channels Srdhnhha, gates and biological operations include planting seedlings of fruit and Ghyrmsmr, seeding and hill-dropping and nursery construction) continued . area of study the number of wells to an average depth of 100 meters and spans 7 discharge of 25 liters per second and the level of agricultural land and orchards as a permanent form of water use area is 700 hectares(Khalilpuor1991.2:21).

#### **Activities carried out in water spreading station Chandab Pakdasht:**

##### **Mechanical operation:**

Water spreading structures with 299000 Cubic meters of earthwork, construction of water intake content 3900 cubic meters, stabilization of 600 cubic meters, 330 gates from materials such as gabion, gunny, used truck tires and stone mortar building. Thus, Table (1) mechanical operation carried out in the water spreading station Chandab specified.

Table (1) mechanical and biological activities in the aquifer Chandab

row	Explanation of operations	amount	unit
1	The contet of earthwork	299072	cubic meter
2	The tota contet l of openings are flooded	3984	cubic meter
3	Following the total contet e of construction in the rive	600	cubic meter
4	The contet of construction work for gates	2800	cubic meter
5	Construction of office building	300	Square meters
6	Landscaping	5000	Square meters
7	Construction of the Wall	300	Square meters
8	Construction of deep wells	1	ring
9	Construction of greenhouses	250	Square meters
10	Construction of meteorological stations	250	Square meters
11	Access Road	12	kilomer
12	Planting seedlings	113109	tree

Objectives of flood spreading station:

- Controlling rapid, low cost, economical and floods, coupled with reduced flood damage.
- Coarse alluvium rangelands become unusable land.
- Creation of green spaces in the heart of the semiarid and creating planting forests.
- The development of research activities, education and promotion for students.
- Socio-economic development in flood spreading

Biological operation :

In years 1985-88 in the spreading area of 113 000 trees planted various trees that contains one of the design goals was to improve the environmental situation and vegetation of the area.due to the erosion of sand formations such as marl, sandstone, limestone, Knglvmrh thousand valleys, rocks, silt and other sediment from rivers and streams adjacent Chandab is very high and this has created limitations for biological treatment(khalilpour.1990-1:23). most of the seedlings planted in the region for various reasons have been referred to some of these factors:

- Improper management of irrigation in the area
- Problem budget.
- Insistence on demanding plant species
- Type of plant species and intolerance to climatic conditions
- Sedimentation
- Tree planting and tree planting in inappropriate locations and failure to comply with the.

**Methods:**

Economic evaluation plans for flood spreading the decline in profit at the expense Cost Ratio B / C - Benefit is appropriate that we use for agricultural projects(Moris.1995).

Economic cost-benefit analysis of the cost benefit ratio is assessed with the capital cost benefits. Thus estimation method using a significant amount of interest in a cost-benefit analysis of groundwater recharge benefits and prevent flood damage is anticipated.Thus estimation method using a significant amount of interest in a cost-benefit analysis of groundwater recharge benefits and prevent flood damage is anticipated (Mizakhani.1983).

**Benefits:**

**-The water:**

On the basis of the information contained of 6 million cubic meters, about 48% or accidental flooding of 9.2 million cubic meters of water to the aquifer digit Chandab is fed, while we know the cost of water produced from this method compared to costs of other modes with a lot of water loss , power, running costs, and so on (Khlilpour1991.2).Years 1987-90 each year about 2.1 million cubic meters of the total volume average intake of groundwater supply has been Chandab of which an average of 56.0 million cubic meters of water per year to the region's ground water holes and In estimating the benefits of implementing the water spreading station is one of the most important benefits is the amount of water fed by the current rate based on 10% discount rate for the useful life of the aquifer is calculated using economic analysis (Tahari.1984:45). Table( 2) Estimated feed water in the aquifer Chandab

Table 2 - Estimated feed water in the aquifer Chandab

YEARS	The total contant volume of dehydration (m <sup>3</sup> )	Estimated fed water (m <sup>3</sup> )	Fed water content (%)
2007	47545	28527	60
2008	- *	-	-
2009	393549	222633	57
2010	2523694	673916	27
2011	2628549	1456845	55
<b>TOTAL</b>	<b>60670792</b>	<b>2889818</b>	<b>48</b>

\* This year's flood has occurred.

**-Reduce flood damage:**

One of the special interests of reducing damages caused by seasonal flooding in areas downstream villages aquifer is Chandab. in addition to this threat, rural housing, facilities and roads, including craters river bridge on Tehran, Garmsar the damage inflicted on them had made relationship-driven, based on a 25-year return period floods are estimated. The sum of the damage (damage to farms, rural housing, facilities, roads) in this period amounted to 410000 \$ us.(Khalilpor.1991.1:28)

**Job creation:**

The creation of three permanent employment on the economic value of the aquifer is estimated that during the life of the project.

**-Forest vegetation planting:**

Since environmentally appropriate conditions prevailed in the region and thus the survival of planted seedlings 1.3 percent on the supply of water spreading, interest income is negligible.

**Discussion:**

Given the number of households in each village totaling 30 questionnaires is filled. Based on their data to assess and analyze the issues raised about the effects of socio - economic information has been spreading in downstream areas. So the people downstream villages stated that they are ready to participate and cooperate in flood spreading project so that 47% of them are in top form in this area and 66% of them helpful flood playback operation.

Table-1- The impact of increasing groundwater resources

	The impact of increasing groundwater resources	%
1	Very high	0
2	very	0
3	little	23.2
4	Very low	76.8

Source: fieldwork and questionnaire

Table-2- What are the main problem areas downstream

	What are the main problem areas downstream	%
1	Water	67.1
2	soil	14.4
3	Capital	15.3
4	Ownership	4.2

Source: fieldwork and questionnaire

Table-3- Spreading in reducing the impact of damage on farmlands

	Spreading in reducing the impact of damage on farmlands	%
1	Very high	60.2
2	very	18.0
3	little	14.6
4	Very low	8.2

Source: fieldwork and questionnaire

Table-4- The impact of the reduction of water loss

	The impact of the reduction of water loss	%
1	Very high	65.2
2	very	32.1
3	little	2.7
4	Very low	0

Source: fieldwork and questionnaire

Economic evaluation of cost-benefit in flood spreading Chandab using available data to estimate the cost of benefits based on a discount rate of 10% by the year 1395 (period of useful life of 25 years) provided. Thus, based on economic analysis methods in Table (3) Chandab is estimated benefit-cost water spreading station. Thus, based on economic analysis method.

Table (3) Estimation of interests - economic evaluation of the cost of water spreading station Chandab (million rials.)

row	Description of benefits and costs	Cost (\$ us.)	Benefit (\$ US.)
1	construction costs, maintenance and repair water spreading station includes mechanical operation, biological, human resources, facilities, equipment and activities carried out	265000	
2	The benefits of the aquifer		105000
3	The benefits of reducing flood damage		171000
4	Job opportunities to exploit the benefits of last year		11500
5	The benefits of planting wars		500
<b>Total</b>		<b>265000</b>	<b>288000</b>

Source:Mahdaviavafa (2005).

According to current prices is estimated at 6062 million rials extraction. Thus, based on cost-benefit analysis of economic cost-benefit analysis of the data in the above table during the useful life of water spreading station for 25 years is estimated Chandab. Due to the characteristics of the natural environment appears to be significant water spreading station. according to the useful life of 25-year-old water spreading station Chandab total actual expenditure during the construction and over the years of utilization is calculated as the present value of costs is obtained.

Since the direct effects of groundwater recharge and flood control projects positively evaluated by the content of expenditure made by the studies and the amount of costs and estimated earnings on this basis Cost-benefit calculation is as follows:

$B_t = \text{year Benefit in } t$

$C_t = \text{cost in year } t$

$n = \text{years}$

$I = \text{Discount rate}$

(formula-1)

$\text{Benefit / Cost} = \text{Benefit-Cost ratio}$

$$1.08 = \frac{288000}{265000} = \text{Benefit-Cost ratio}$$

Construction on the water spreading station seems to be in terms of reducing damages caused by seasonal flooding and aquifer had good success. therefore, based on estimates of the cost of implementation and maintenance of the project during its useful life is over 265000 \$ us.. And the amount of benefits due to current prices is 288000 \$us. And cost-benefit analysis (Cost-benefit Analysis of the data obtained during the 25-year net present value (NPV) and internal rate of return (IRR) is calculated at least 12% of the amount was 2871000 \$us. Soil and water conservation projects at issue is merely a business plan is not based on the profitability looks good. The plan is to pave the way to sustainable development in arid and semi-arid as it was, so investment in these projects because it promotes the conservation of soil and water resources will need more attention. Although the benefit is negligible benefit as it may be inefficient in some areas due to specific geographical conditions is vital but its effects. The plan using cost - benefit analysis of the economic and investment costs variable with the benefits of its implementation plan, including the direct and indirect interests have been determined. Cost-benefit calculations of the  $B / C = 1.08$  is shown. and this figure indicates that the water spreading method is relatively low cost. and efficiency is good. the volume of operations is low and it is very limited environmental harm and it can be long-term management of natural resources and aquifer recharge are applied restoring desert. And the positive impact of socio-economic projects for villagers involved surveillance.

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