Cumhuriyet Üniversitesi Fen Fakültesi
Fen Bilimleri Dergisi (CFD), Cilt:36, No: 3 Özel Sayı (2015)
ISSN: 1300-1949

Cumhuriyet University Faculty of Science
Science Journal (CSJ), Vol. 36, No: 3 Special Issue (2015)
ISSN: 1300-1949

Identification Places Suitable Direction Building Dams Underground (Feasibility of underground dams)

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Received: 01.2.2015; Accepted: 05.05.2015

Abstract. Ine from issues important and able attention at throughout world protection and maintenance resources water that studies and research lot of background performance from and one from solutions proposed underground dam is. This type route groundwater flow to cut and and with prevention from move natural water; store good to prepared the. In countries as iran that level water underground swing great to at seasons dry and wet show of suitable dam solve useful direction purification and store water considered is. The research at boyer city of the province kohgiloye and boyer to purpose determination areas suitable to building dam ground to reserve and security drinking water and agriculture. At areas dry the city following planning from is. At this therefore, with identify options and suitable studies field and was conducted in the laboratory and finally, two home selection presented information necessary from places round obtained, and proposed options in the city provinces. Home pyrzal tight and javrdh the river charvsa that any two points on the basement is located. And pyrzal deposits with the maximum and minimum, respectively, 5.6 and 5.1 m, porosity of 15% and 10%, respectively, the maximum and minimum slope of 10 to 20% and 1,728,414 cubic meters of runoff and javrdh deposits with the maximum and minimum, respectively, 75/3 and 1 m, porosity of 20% and 10%, respectively, the maximum and minimum slope of 10 to 20% and 2,315,912 cubic meters of runoff selection respectively. Next from selection final earth studies cognitive, geophysical and hydrology on the areas focus and investigation respectively.

Keywords: Dam underground, basin watershed pyrzal and javrdh, water underground, city kohgiloye

1. INTRODUCTION

Water ground source major water fresh that in widespread for expenditure household, industrial and agriculture at more parts of the country case use and is. Limited be water level available from a side and increase population and development expenditure industrial and agricultural the others cause from is that day to day groundwater as a source worthwhile security water more attractive indeed be. Demand face to growing to water ground to due to the increased population importance use from techniques scientific to manage correct the source expensive to full color made is. demand for to management correct and effective resources water ground at access created brought is. at years recent dams ground development resources water ground and prevention from exit without water use able consumption, case attention most from countries indeed was. price top evaporation at areas dry to title failure major dams surface, specialists to to side manufacturing underground dams guidance and is. dam ground structure is that flow natural water ground prevention made brought and flow aquifer to closed and and water to at below level earth remember is. Dams ground especially to security water at scale small areas dry and semi dry suitable are (nielsen, 1988). they as a structures against erosion and action they and direction sum collection water, raising levels water ground and at least build losses evaporation applications (prynz and synq, 200, 0) a water deficiency is one of the most serious challenges of our time, which is expected in the near future if not properly considered the major cause of conflict between human beings and nations becomes, although they are currently at different scales in micro and macro social cause of international conflicts. the underground water resources and the exploitation of water resources is one of the key issues in the sector, in comparison to water the surface is safer and higher quality. one of the ways in

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Special Issue: The Second National Conference on Applied Research in Science and Technology

which the exploitation of groundwater resources in both traditional and modern, past and present, and is mainly used in dry places in the world, dams, underground. these are structures that have a cutoff in the depth of alluvium river surface flow can not respect construction and assembly and restricted the flow of the alluvial zyrqshry there, bringing the lead to cortical surface (artificial sources) and creation of an artificial aquifer upstream too. the efficiency of this method, as well as other water supply projects related to the specific conditions of topography and geology of the region. in most regions of the precipitation to agricultural water need not match. in addition, due to the dry climate of the country, are often in critical situations, thus curbing the flows of underground aquifers to supply water in times of groundwater and using it for drinking, agriculture and industry is important. construction on waterways subsurface flows is one of the ways for continuous operation.

Dam ground in general to every structures and saying and to that at route flow water below ground building to and lead to sum collection and remember water the (zolanvar and ahmadi, 1382). the dams to purpose formation a tank below ground building and be. in the type dams usually table and existence no however, condition formation it prepared is (army, et al., 1385). and at comparison with dams surface that at width rivers made and are the dams at width dry rivers or valley and made and (see malek mohammadi, 1385). the dams from view small scale been and effects lower on environment on place and pass.

Therefore, many studies related to the design and construction of the structures in many parts of the world can be taken, including the name of the performance of dams in arid areas or areas of the insurance field, such as shingles rss and the we have a series of now or dams, dam and dam in india ata palam dodoma or townes noted. Iran is also in the mountains can be dam gold damghan zrba john maku in the west, rhine in kerman and khorasan sanganeh in point.

The benefits of the dams of the land or the very surface of the dams have to be paid to mention a few:

1. Very simple construction technology of not making it to the very bottom of the dam of the land
2. Reduces the amount of evaporation of water, high structural stability against earthquake
3. There is no threat to residents and buildings downstream
4. The long life of the structure
5. Not to reduce the volume of reservoir sedimentation of the river to reason

The most important problem in the development of underground dams to determine areas suitable for dam construction is complicated. The problem is that the criteria and standards of many factors, including physical, social and economic spaces involved finding appropriate. Determination of these factors using traditional methods and require costly It is time to be more cost-effective economically. The best way to find the right combination of underground dams aerial photos and images the study, with the field surveys and control. The use of high capacity Arc GIS spatial analysis of data is especially important in integrating layers help In choosing the best location for the dam is underground. With regard to the use of new techniques dam Groundwater development and management of water resources in arid and semi-arid regions like Iran, localization technique And provide appropriate with complex geology and hydrology of the country is very necessary (Zolanvar and Ahmadi, 1382).

2. STATEMENT OF PROBLEM

At Most From Places World To About Areas Dry And Semi Dry, The Precipitation And Runoff Product From It Low And Deal Evaporation Water From Level High Is. In addition, On This, Distribution Inappropriate Rainfall And Flow Surface At Along Year Further On The

problem Been And Lead To Out Become Volume Able Great Water From Basin Is. In Areas Low Rain Iran To Especially Boyer area, Source Important Security Water; Resources Water Ground Is And With Attention To Required Increasing The Areas To Water And And Restrictions Resources Water; And Should Conditions To Exploitation Optimization From Waters Below Ground Prepared Be. Today, Use From Dams Ground To Title A Approach Remember Water At Areas Low Rain More Case Attention And Is. In The Research Area Semi Dry Suburban Dehdasht Located in the city Kohgiloyeh to Determination Places Suitable To Building Dams Ground With Attention To Investigation Criteria Earth Of Engineering Study Out. The Purpose Characteristics Earth Studies, Topography, Hydrology And Hydrogeology Area From Through Investigation Photos Air, Image Satellite And, Map And Topography, Statistics Hydrology And Reports Available Case Investigation The Place. The Use From Information Above And To Application Methods GIS (system Information Geographic) and RS (measure From Round) layer And Information Included Slope, Erosion, Characteristics Alluvium And Etc. Provided Respectively. Layer And Information At Environment GIS Integration And Areas Suitable To Building Underground dams Localization and Direction Studies Detailed Priority Classification Respectively. Studies Field Limited Show Donor Overlap Suitable Results Research With Condition Natural Earth Been. With regard to the fact that the semi-arid region is located in the city Kohgiloyeh and in recent years has been affected by drought, as well as several seasonal rivers and evaporation in the region is on The Basis Necessary Is Methods Action Recovery Water That Least Effects Destructive Environment Environmental To Have And And Loss Water To To At least Reach Recommended From Is. From Sentence The Method And Dam Ground And Is. That One From Method And New Recovery Water Is That At Areas Hot And Dry That Evaporation rate Top Been Able Running And Results Good At Areas Similar Have Is (Army, et al., 1385).

2.1. Study And Hydrogeology Area Case Study

And so Iran is not uniform in terms of geological structure has been divided into regions or zones 1, each of them with specific characteristics. This division is the geological study of the divisions easy vamly different units of Darndbartndaz Constitution:

1. Sheraton tectonic activities and construction of various units
2. Type sedimentary deposits related
3. General trends sometimes adjacent time is different.
4. The age of the various units in a zone
5. Magmatic activities

Based on geological and constructional important units of which have been sorted according to geographical location are:

Khuzestan plain Alf1-

A folded Zagros Zagros Alf2-

Alf3- Zagros

B Sanandaj Sirjan

(C) Central Iran

D. East and south-eastern Iran

H1- eastern Alborz

E Alborz Alborz H2-

Western H3- Azerbaijan

A Zagros

The main thrusts of the Iranian territory in the West Zagros above three geological units are included.

Khuzestan plain Alf1-

Khuzestan plain of a part of the vast plains of Mesopotamia partial list of the geological structure of the platform is Arabic. The valley is completely covered by alluvial deposits and geological formations borne in mind is old. But information from various excavations oil wells and geophysical survey results suggests that there organization first time. Khuzestan plain in simple construction, only very gentle folds with north-south axis is the axis of folds platform complies Arabic.

Detecting the folded Zagros region of Khuzestan plain facies changes is not clear that the thickness of Neogene sediments to the west of Kulob increase both covered by the same situation.

Alf2- Zagros Zagros folded or foreign

The construction unit is located in South-West Iran and its width is estimated at about 150 to 250 kilometers and probably in some areas of the Zagros Thrust drawn.

The general trend roughly northwest-southeast region in the Paleozoic sediments, Mesozoic and tertiary are at the same gradient overlay. The eastern continental margin sediments covering the Arabian platform is that in the Pliocene deformed and folded.

What this part of Iran's Zagros separates from other areas, specific developmental stages that can be summarized in three steps:

1. Early stage or platform stage, which lasts from to Middle Triassic and in the same deposits in Central Iran and Alborz past behind. In addition, deposits saltine this time parts of it were removed from the Silurian sediments Taprmyn in some places, even oil has been found in excavations. In the early Permian clastic continental sediments Zagros was later covered with calcareous sediments of shallow marine facies pool Bashyl and central Tatrys the past.

2. Tryas- syncline in the late Triassic Myvsn- big stage, this section was separated from the other parts of Iran and the depressed basin (Zagros Zagros basin or large syncline), which has been constantly meeting the Mesozoic sediments Tanyvzhn, thick More than 10,000 meters have been stacked together. These deposits are primarily made of polycarbonate and the marl, sandstone and shale have more or less seen. Evaporating and some stratigraphic deposits were short-term, a sign of vertical movements (dried jobs) in the sedimentary basin. As mentioned, all of these deposits in the slope of the Paleozoic sediments, and only during the last Alpine (Plio-) folding it and was out of the water. any type magmatism during the Alpine phase is found.

3. New stage or post-orogenic - during and after the orogenic plio- folds and thrusts appeared in the Zagros and overall it was out of the water. With severe erosion Heights, Bakhtiari conglomerate is un conformably cover the previous deposits. The deposits were in the early with folds.

Alf3-Zagros Thrust Yazagrs internal Yazagrs:

This zone has been sharply split in highest the Zagros Mountains Zagros read but crunch because split zone, zone thrust of the West Zone traceable "Geological Map of Iran, Zagros thrusts straight You detailed analysis shows that the thrusts by Dvgsl, sometimes together and sometimes disturbing parallel in accordance Ast.sn the fault of the old gsl fault thrust (thrust) that it's along the Central Zagros China been driven. "Dr plyvsn there with (Ali Darwish was born, 1373-1374).

In fact, a study area and more Zagros folded collective group that goes to the geology of the region concerned**.**

2.2. Zagros site's Geology

Narrowed study area Pyrzal Regional Water site

Regional Water site study area Javrdh

2.3. Grvh Bangestan

Group Bangestan Included From Formations Kazhdumi, Sarvak Surgah And Ilam And Is That All Belonging The period Cretaceous Are. In general, the Upper Cretaceous sediments in the Gulf region, the South West and Iran Lorestan index fossils have been found. In the Gulf region in the central part of the mountain Bangestan access to dark gray limestone and marl with thin layers of white limestone with deposits of carbonate nodules slumber (Sylyks) and the lime brown mass in the lower part of a river stone Zagros make up the Upper Cretaceous. Facies mentioned in the rule of pelagic and deep areas of the sea gradually shoal of limestone river (facies of benthic) becomes. The recent formation of nodules in the areas of Khuzestan and Fars provinces limestone with benthic fossils have been found. In this type of micro-algae, calcareous limestone fossil echinoderms and benthic foraminifera can be seen with debris. (Khosrow Tehrani, 1378)

2.4. Formation Sarvak And Ilam

Exposed The Single With Process North West - South East At North Location Plan Highest Height Basin Watershed To Formation That. At Form Geological Mountains White Exposed Rock Formations And Ilam To Title I1-SR units About Were The Formation At Area At Core Anticline Bangestan Exposed Findings Is. Lithology of white limestone pelagic limestone Ammonites regular clay layer Bamiyan dark shale layers containing pelagic foraminifera and facies of benthic clear. This formation To Because Existence Fractures And Development Event The karst Be Table And Good To Created Bring.

2.5. Formation Gurpi Gu

Exposed Formation Gurpi To Form Strip Thin With Process North West - South East At Leg Height Calcareous Formation S Observation Is. To Reason Existence Pelagic marls, shale, marl non Penetration and Is and as Barrier Hydrological Action And The. Therefore, Even Form Remember From Viewpoint Transmission Water Ground Without Value Is.

2.6. Group Fars

Rocks Group Fars Rock Sheath Tanks Oil ASMARI At South Iran To Formation There. Name Group Fars To Description Sequencing Thick From Sediments With Age Miocene And Thickness More From 3000 Meter At Area Fars Spread Great Play. From The Group rocks At Basin Case Study Three Formation Traditional, Mishan And Aghajari Existence There.

2.7. Gachsaran MGS

Permeability At The Formation To Reason Existence Sediments Plaster, Salt And Lime Plaster At Limit Average And Is However, Existence Marl And Shale And Between Layer And That Thickness They And Most Able Attention And Is The Cut Relationship Hydraulic Between Layer And From And Cause And To That The Formation Semi Permeable To Account Is. Event Breakup Of Sediments Plaster And Salt And Seam And Gap At Layer And Lime Plaster, The Permeability To At Level The Formation Increase And The That Consequently, It Attraction And Remember Precipitation Weather Limited And Is. The The process Breakup Of Attraction And Remember Groups Subsurface To At The Formation Prepared And Makes That Then A few Day From Rainfall In Groups Delayed At Areas Back And From Wall Stream And The Formation Out And Be. These conditions Background Good To Especially At Areas High The Formation To Culture Trees Dryland At Area Prepared Made Is. It belongs to the lower Miocene formation is between Asmari and Nyshan. Existence Sediments Evaporate Breakup IBS Plaster And Ayndryt And Low Become The Permeability At Sediments Fine The Their causes Reduction Quantity And Quality Resources Water Ground From Is. At Section And Middle Basin Section Some From The Formation To Scattered Found And Be.

2.8. Mishan Formation

The Formation From Viewpoint Ability Remember Water Natrava And From Viewpoint Hydrological Role Rock Floors Resources Blue To Play And The. Of course there Layer And Calcareous And Lime Marl The Formation Sometimes Contains Seam And Gap And Fractures Been That At Form Having a thickness Enough And Be Part From Precipitation Heavenly To Attraction And The Formation Table Limited And Be. This Type Table And Has the potential Little Been And From Viewpoint Quality And Make Section Not This formation in its type section on gachsaran under Aghajary is, the lower to middle Miocene age of Mishan Limited From Basin At Section North West Basin South West Basin To The Formation Formation And A.

2.9. Aghajari Formation

At The Formation To Because Existence Gypsum marl of And Clays Silty Sand And At Between Floors Sand Rock A Formation And Is However, Part And Sand Rock The Formation That Sometimes Contains Fractures And Seam And Gap And Is, Ability Attraction And Remember Building Groups of precipitation Heavenly To Dara And Is However, At Total The Formation From View Potential Water Ground Important Not Is. Section Great South And South West Basin From The Type Formation There Is.

2.10. Asmari

Rocks Calcareous At Height Area With Slope High There Is. The Formation To Cause Spread Damage And Vulva And Seam And Gap Secondary And At Consequently, Offers Karstification, From View Hydrological And Dara Be Remember Water Ground From Importance Especially Great And Is. The formation of the anticline has been Asemary mountains. The Late Oligocene-early Miocene age formations, the youngest rock Zagros zone and therefore extensive studies have been done on the properties of rock strata.

2.11. Terraces Alluvial Young And Cone Alluvial And

The Type Formation Range Great From Basin To Own Assigned Data Is That More At Section And South And South West Area The There. The Formation At Parts Post Area With Slope Low The To That Fine And With Penetration Of Moderate Is.

2.12. Select the dam site

Geology and hydrology At The City Kohgiloyeh 2 Region Suitable To Building Dam Ground To arrange the names and tight Javrdh Select Pyrzal Were That Tables (4-1) and (4-4) Site And The proposed To Building Dam Below Ground Province Kohgiloye And Boyer To Along Specifications Location And Selected Cited Respectively. To So That To Every What From Areas View Studies Earth Of And Geophysical And Form Was.

Select any two points on the profile of the dam basement, change the morphology of the deposits, effective porosity and gradient were seasonal river sediments were identified and where the results of the operation in Tables (4-3) and (4-5) Options are one and two respectively.

2.13. Option 1

Option 1 is located 10 km Dehdasht place in the valley or narrow Pyrzal which geological map on page 61 images (table 1-6) appearance to showcase the region. Total width of 210 meters and a depth of alluvial valley 50/6 meters. Basement phyllite and slate includes rock type is changed. It is 1,285 meters above sea level. The volume of the reservoir useful storage, including 26% for the equivalent of 140,000 cubic meters, which can be exploited if the. placed with respect to the objectives of the operation can be utilized in addition to the Continuing save mode discharges used in this case a monthly average of a Peru discharged. land covering about 1222 hectares of farming some of the land, water and irrigation water them by wells with depth provided in recent years faced with water shortages. Rainfall in this region is all the rain that rainfall from mid-December to mid-spring is the start (of agriculture-rural-water and waste water business area of the province).

Table 1. Details the narrow scope Pyrzal.

Narrow the scope of Pyrzal	Candle	45
	Spring Ryzk	37
	Susan Haider	51
	Ten pigeons	37
	Ten Khvmkar	32
	Lhras	35
	Daly Pyrmhmvd	42 people
	Daly Alipanah	61 people
	Kvrsa	248
	Lower Kalaye	1496 people
Total		2084 people
The amount of agricultural land area of narrow Pyrzal / ha		1222 people
Source of economic revenue narrow field Pyrzal	Agriculture Vdamdary	
Of arable crops in the field narrows Pyrzal	Wheat, barley, maize, rice, canola, alfalfa, vegetables melon, citrus	
Soil type narrow area Pyrzal	Alluviums coarse and fine lime bars	
The number of seasonal springs	2	
The amount of water flow per second Kvrsa springs from June until the end of January	Zero	
The amount of water flow per second from February to mid-April spring Kvrsa	800 liters per second	
The amount of water flow per second spring from April until the end of February blind Moto	Zero	
The amount of water flow per second spring from March to the end of April Moto blind	200 liters per second	
Is drinking water fountains?	Yes	
Access road	Asphalted main	

Table 2. Results Size Of Level Water At Bore And Piezometers Range Site Dam Ground Pyrzal.

Depth Drilling (Meters)	Location Bore	History Reading	Depth Level Water table (Meters)			
		Piezometers	15/09/92	15/10/92	15/11/92	12/15/92
30	At Axis Home Side Right	6 P	5.4	5.4	4	4
25	50 meters Down Wet From Axis Home At Middle Axis	1 P	5.5	5	8.5	5.6
5.12	80 meters Above From Axis Home In the middle Axis	3 P	7	7	7.5	7
15	80 Meter Above From Axis Home On the Left	2 P	3.5	3.5	3	3
20	At 180 Meter Above From Axis Home At Middle Axis	5 P	5	2.5	5	5
20	At 180 Meter Above From Axis Home At Side Left	4 P	5/8	8	3.8	2.6

Table 3. Site Tang proposed Pyrzal To Building Dam Below Ground In the city Provinces.

Home	Catchment area (Km $^{2)}$	Runoff Basin (Cubic meters)	Slope The proposed seasonal river bed (Percent)	Within Valley (Meters)	Rock Floor	Hydraulic conductivity Basement	Unsaturated thickness	Status Multilayer
Pyrzal	5/301	17	2.7	210	Limestone Sarvak	Average	15-0	Slope The upstream

2.14. Option 2

Option 2 Dehdasht location 60 kilometers in the river bed, which is seasonal Charvsa geological map on page 62 and Figure (4-9) shows the appearance of the region. Total width of 305 meters and a depth of alluvial valley 75/3 meters. Basement phy llite and slate includes rock type is changed. 1365 meters above sea level. Twenty-six percent of the useful volume of the reservoir with respect to special reserve of 120,000 cubic meters, which can be exploited if the.placed with respect to the objectives of the operation can be utilized in addition to the a steady flow of exhaust saving mode used in this case will be the monthly average discharge a Peru. Agricultural land covers about 200 hectares of land, which is mostly under rainfed wheat, barley and lentils are dry and the water supply to the area under crops used blue and orange. Rainfall in this region is all the rain that rainfall from mid-December to mid-spring begins and continues. (Jihad and Agriculture - Rural Water and Sanitation - Regional Water Authority)

Table 4. The site of the proposed Javrdh To Building Dam Below Land in the city Provinces.

Javrdh		1250 people
Some of the neighboring Azrvstahay	Blower	316 people
	Freedom Plains	700
	Prvyzk	112
	Mvrdsyd	150
Total		2528 people
The amount of agricultural land of the village Javrdh		200 hectares
Source of income for rural economic Javrdh neighboring villages		Agriculture and livestock
The amount of agricultural land near the village of Tmby	Blower	120 hectares
	Freedom Plains	180 hectares
	Prvyzk	130 hectares
	Mv rdsyd	117 hectares
Of arable crops in the village Javrdh		Wheat, barley, lentils Vpyaz
Of arable crops in the village Hmjvarjavrdh	Blower	Wheat, barley, onions amount of rice
	Freedom Plains	Wheat and barley
	Prvyzk	Wheat, barley, rice, citrus
	Mvrdsyd	Wheat, barley, onions amount of rice
Soil Type village Javrdh		Clay Vlymvny
The number of seasonal rivers		1
The amount of water flow per second in spring		30 to 40 liters per second
The amount of water flow per second in summer		Is blind
The amount of water flow per second in winter		400 to 500 liters per second
The amount of water flow per second in autumn		Is blind
Are you drinking water?		Non-Drinking
Access road		Asphalted main

Table 5. Site Javrdh To Building Dam Below Land in the city Provinces.

Home	Catchment area (Km^2)	Runoff Basin (Cubic meters)	The proposed seasonal river bed slope (Percent)	Within Valley (Meters)	Rock Floor	Hydraulic conductivity Basement	Unsaturated thickness	Status Multilayer
Javrdh (River Charvsa)	4/645	23	2/3	305	Limestone Smary	Average	10-0	Slope The upstream

Table 6. Results Size Of Level Water At Bore And Piezometers Range Site Dam Ground Javrdh.

Depth Drilling (Meters)	Location Bore	History Reading	Depth Level Water (meter)			
		Piezometers	15/09/92	15/10/92	15/11/92	12/15/92
10	At Axis Home Side Right	6 P	8.2	3	3	2.5
5.14	At 50 Meter Down Wet From Axis Home At The center axis	1 P	4	4	3.5	3.5
12	At 80 Meter Above From Axis Home In the middle of the	3 P	5	5	6.5	2.5
18	At 80 Meter Above From Axis Home On the Left	2 P	6.4	5.4	4	4
20	At 180 meters Above From Axis Home At The center axis	5 P	6	6	8.5	5.5
13	At 180 meters Above From Axis Home At Side Left	4 P	3.5	3.5	2/3	3

2.15. Weather

The climate of the region, according to 20-year-old was determined. based on climate zone, with hot and dry.

Precipitation in the rain. The average rainfall At Area 400 Mm Meter Estimates From Is Most Rain in December, January and To me And Least At August And September To Occurrence To Joins Average Evaporation 2950 mm Meter Estimates made From Is. Events To Form Seasonal And At Time Failure To Inside Rivers discharged.

2.16. Impermeable basement

There is a dense and impenetrable basement of the basic conditions for underground dam (Fykl 2 1978, Amak 3, 1983). Regional geological map and reviews outcrops show that both the proposed area is located on the basement Marnie. LIMITS OF WHICH Asmari is based on maximum reservoir water level elevation, the rejection of water from the axis between 550 and 500, respectively Pyrzal and Javrdh meters.

2.17. Changes in the width and depth of the main channel of the river sediments

During season two parameters, width and depth of the main channel of the river was measured. Within the current context of the path along the river and in the direction perpendicular to the plane of the substrate size was measured. Disruption maximum width of 210 m and at least 8 meters Pyrzal rivers and streams Charvsa at the maximum 305 and minimum of 6 meters.

Changes in the depth of the river alluvium deposits in the current context of the wells drilled during the two channels was measured. The maximum depth of 5.6 meters and minimum of 1.6 meters Pyrzal catchment basin in output and Charoosa area 75/3 meters and minimum 1 meter at the bottom of the basin.

2.18. Changes in sediment porosity rivers

Effective porosity river sediments are important parameters in the storage and flow of surface water is essential (Eric Peterson, 1998).

To achieve these parameters wells both samples were taken and effective porosity size was measured. Pyrzal pool Hdagsr effective porosity of 15% and a minimum of 10% and a maximum porosity of 20% and at least 10% Charoosa area was estimated.

2.19. The slope

Tilt the patient Hv Direction Assessment Related To Behavior Hydrological watershed, especially " Conversion Pour To Flow Case Check The Is. Slope Relation Complex And With Deal Penetration And Flow Surface And Humidity Soil And Interference Water Under Terrestrial At Dubai River To Slope steep The Flow High Water And Erosion is. slope Area Case 10 to 25% Is.

2.20. The slope of the region

Direction General Slope It Is That To Deal Heat Sun To Control To And At Result The evaporation And Sweating To Changed The If Slope General To Side South Is The Melting fast snow And At Spring Along Rainfall The Outburst Water Rivers The But when the seasonal

streams of water from melting snow and the sun is less affected by the slope, Therefore, In both Area Case Study Slope General At Direction South Is.

2.21. Area

Deal Runoff two Area With Method Justin Mhasbh be:

1. Pyrzal 1728414 m cube Water Able Penetration At Area Estimates Was.
2. Charvsa 2315912 m cube Water Able Penetration At Area Estimates Was.

2.22. Sediments in the bottom of the river

Sediments Inside River And At Stream Home River deposits are. These deposits From Particles Coarse (Kidney stone, gravel, sand Round And Sand) Formation Are That At The bottom stream On Instead Remaining And Conglomerate floor Bed To Creation Added. The Sediments At Inside Rings Those who River To Form Dam Cape targeted Formation Are. At Inside Basin floor The Type From Sediment at the bottom of the river And Seasonal And Waterways To Deal Great At Areas Low Slope And More At Section Close To Output Basin is found. The Deposits youngest sediments of rivers flood Are And More Penetration IBS Are. The Type Sediments At Bottom of the river And Seasonal tight Pyrzal and Charvsa To Frequently found there.

2.23. Study Effect Formations Area Quality Resources Water Ground

The formations That Distribution place It Most Units Hydrological area Case Investigation To Under Effects The And, The formation Traditional, Mishan, Aghajari And Sediments Evening Present And Is That Effect They Quality Resources Water Ground To Description The following is:

2.24. Formation Traditional

The Formation At Comparison With Other Formations Important Range Case Investigation From Levels More Sediments Evaporate As Plaster, Salt And Marl More Is And Most Effects Negative On Quality Water To And At Type Waters Ground Ions Sulfate Calcium Dominant And Is. At Assigned Classification Table (4 - 7) the Formation Component Code Single Permeability 3 And Is However, To Reason Absence Quality Suitable Blue At Locate Component Classroom The Data The That With Value Numerical 1 And Is.

2.25. Formation Mishan

The Formation From Deposits of limestone And Marl Formation From And From View Effects Quality Resources Water Ground better Ratio To Other Formations Group Fars There.

2.26. Formation Aghajari

Quality Water Ground The Formation To Reason Period marl And Crushed stone And And Time The sustainability of groundwater At The Sediments From Quality good More Not Is.

2.27. Rsvbat Evening Online

Seed Classification The Sediments are part of the fine Seed At Limit Clay And Silt And Is And The quality of groundwater Formation From At The Sediments Inappropriate And Is And Only At Areas That The Sediments Related To Stream seasonal and permanent Are Can that aquifer At Scale Small form. Porosity and Permeability Units Rock With Too Others Different

Respectively. Center Research Watershed some From the Units Rock and sediment To from View Penetration of 7 class division of the Is That At Table (4.7) Come Is.

Table 7. Classes permeability of some Units Rock Iran.

Name Single Penetration Of	Code Single Permeability	Formations, Units Rock And Alluvial
Very Permeable	7	Qal - QV
Permeable	6	Qf - Qt1 - Qt2 - Q
Permeability Average	5	PL - q - Qc
Trvayy low - permeable	4	Qt1 / M-PL
Permeability Low	3	M-PL - Olc - Sh - Em - Eak - Ek1 - Tb - V - Pecf - Pescf - di - ks- k12 - kc - km - J1 - qc - Jd - Js - Jssh - TR1e - TR2e - TR3e -Cm - CLm - Ca1 - Pcz - PCBt - Psc- Oma- Mm- Sr - Il - Mgs - Ma
Permeability Low - Very Low	2	Omq - M - M1 - M1-2 - Olv - Ekn - Sm - Et3 - Etbk - Et2 - Es1 - ez - Pef - Ktm - Pr - Pd
Permeability too low	1	M2m - M3c - Eomt - Eg - Ols - Olg - Smg - Ekg - EV - K2

2.28. Studies Map Vector And Geophysics

Studies Map Vector and Geophysics At the same time on 14.11.92 With Too At Area Start out. In Studies Map Vector To Purpose of 2 Stand Mark Concrete To Name And Coordinate Local Below Provided Was.

Table 8. Coordinates Local Bench brands of concrete study area.

z	Y	X	
100	1000	1000	S_1
106.35	788.23	12,104.11	S_2

2.29. Studies Updates Water Well And The two axis Dam The proposed

Next From Selection Two points Javrdh and tight Pyrzal To Title Options proposed To Way Monthly Height Water Well And Building From At Sections Upstream, Down Hand And Axis Dam To Count 6 The point of harvest That Depth Level Water wells And At Location And The proposed At Tables (4.2-V4-6-) presented Is.

3. CONCLUSIONS

To Construction At Area Case Study Should Condition Special Fashion View Is. Should the aqueduct To Cut the and on Discharge It Effects Leaves and In addition, On the Media alluvial Should Coincident On Structures line As Faults Be. From Geologically Too Construction At Formations geology That Lacking Permeability (the conditions Formation Aquifer not) With Domes salt Are And Or With Salts Great Are (Like Areas Desert), Possible IBS No. GROUPS With Potential Manufacturing Included Land Industrial, And Housing is not. To This Reason The Areas At Discussion location To Fashion View The Be.

Level Area Upstream Intervals from Viewpoint Production At least Water Case Required and with Quality to Suitable Is and Water Ground Case Required at Bed Waterways Existence Have Is. Factors Different To Locate There That With Attention To Characteristics Area Case Study And Data And Information At To Man Decision Receiver Case Investigation The And Be. Possible Is The Factors Included Factors Slope, Earth Studies, Fault, Waterways, Aqueduct, Register Land Water requirement Region, quality Water Area Space From Location Consumption And Able Access Be Area (There Road) Is. To Locate Primary in Basin Boyer, With Attention To Review Resources Factors That To Title The Factors Locate Primary About From Included Factors Dip in Area Case 10 to 25% , the Waterways, Earth Studies, Register Land About Were Were Case Use The Respectively. Dams Underground Attention To Costs And Down Method Manufacturing Easy Remember Water Health And Benefits Most That Ratio To Dams Surface. Particular With Attention To Water And Weather Dry And Semi Dry Iran And Can A Method Affordable To Advantage And Easy To Use From Waters Ground Are.

Dams Ground To And Power At Valley And Small V Fig. Following Seeking And With Use From Studies Morphological, Earth Geological, hydrogeological And Interest Of From Knowledge Geophysics Ratio To Identified Location And Suitable To Implementation Dams Ground Established. From View Earth Of Layer And Low Thickness Alluvial And Close Layer And Impermeable Rock Bed To Level Earth Along With Hydrogeological Suitable (As Move Waters Under Earth At Direction Gradient Hydraulic) to Title The best conditions Suitable At Potential Access Areas Dams Ground Considered And Be.

Option 1 site located in a valley 10 km Dehdasht or Pyrzal is tight. Total width of 210 meters and a depth of alluvial valley 50/6 meters. Basement phy llite and slate includes rock type is changed. It is 1,285 meters above sea level. Useful volume of the reservoir, including 26 percent of the special reserve of 140,000 cubic meters, which can be placed in the desired operation.

Option 2 is located at 60 kilometers of the river Dehdasht Charvsa is seasonal. Total width of 305 meters and a depth of alluvial valley 75/3 meters. Basement phyl lite and slate includes rock type is changed. 1365 meters above sea level. Twenty-six percent of special storage reservoir useful volume of 120,000 cubic meters, taking into account that the operation can be adhered to. land covering about 200 hectares of land is rain-fed crops, mainly wheat, barley and is rain fed, lentil It all begins as rain that rainfall since mid-December and continues until mid-spring.

The porosity of sediments downstream from the spring to the river rose and fell effective.

A survey conducted in the area showed that subsurface water flow in both rivers with dams seasonal control can be stored underground. Pyrzal areas and Javrdh (located on the river Charvsa) option proposed that both points are located on the basement and Pyrzal deep marl deposits, respectively 5.6 and 5.1 meters maximum and minimum, maximum and minimum effective porosity respectively 15% and 10%, the slope of between 10 and 20% and 1,728,414 cubic meters of runoff and sediment Javrdh with the maximum and minimum, respectively, 75/3 and 1 m, porosity of 20% and 10%, respectively, the maximum and minimum slope between 10 to 20% and runoff 2,315,912 cubic meters underground were selected for the construction of a dam. According to the data tables (4-2) and (4-3) and (4-5) and (4-6) were selected. According to the results of the two sites are the best places for underground dam.

4. OFFERS

1. Suggests research conducted construction projects in the region's water high mountains of the option of a (narrow Pyrzal) water to the surface of the text images Bjzdrs·h point (4-1) and (4-3) and (4-5) by the concrete wall of water withdrawal and water output to one point led Rabsth picture (4-3A) Zanja by some water to the plain pipe upstream downstream location of is transferred to the water to prevent sudden rapid withdrawal..

2. It is recommended at the option of two (Javrdh) of Zkhyz·h of sand (half buried) Grddtazmn used to store more water during the rainy season the steep surface area witnessed large deposits cascading down towards the implementation of this type of of water needed to supply materials for use in washing sand plants has imposed costs can be compensated and gave the local economy a boost.
3. Upon the recommendation is despite the fact that underground dams in arid and semiarid areas for further studies to be as high as possible in the cold lands these dams are also runoff escape of " region B that are just will not be affordable.
4. Numerical finite difference method my grd proposed location and the results will be compared with other options.
5. In further studies of spatial and descriptive models to choose more appropriate place in the region is, however, a good research has been done in this regard.

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