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Confronting to water crisis

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Abstract

Recent studies by international institutes of Food Policy Researches and Water Management Suggest the point that continuously increasing population, burgesses and industries development is going to limit the rate of the water allocated to agriculture furthermore allocating environment water to agriculture, houses and industries consumption will create more environmental harm. Water resources in Middle-East countries encounter lots of problems due to mismanagement and absence of enough attention to future needs and also unfavorable natural condition. Iran is classified as a dry and half-dry country, because there's a little rain, which is in undesirable places or time, and in this situation, there will be high demand for water because the population is increasing, and burgesses and economic units are developing. We have transgression upon permitted natural divine rules and terribly damaged natural resources in different ways. This leads us to more eater limitation water scarcity is a relative and running concept, it way happen in any process of offer and demand which is derived from human social structure. The reason is the human interference in water cycle. Passing a long time, these changes are as a result of natural hydrological variety, but they are mostly the result of economic or politic problem, planning or managing way that by knowing the factors, we would expect decreasing of water scarcity.

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Introduction

World water in 2025 introduced by world water council (WWC 2000) suggests that the world water crisis is going to be grown and it will meet difficult days in future. All different parts whole over the world would experience the limitation of available water resources. Planning for having regarded to water resources capacity based on stable expansion principles supplement of water natural environment in watershed basins improvement of water consumption and ignored-water management, the development schedules, and also regional tests in water-shed basins to considered economic and environmental existing water. Tending to feed increasing people on the world, agriculture parts have to compete more seriously than the other portions. In all over the world decreasing drinkable water resources is strongly threatening human health and life. Ever increasing pollution over consumption of water of springs and destroying water sheds of drinkable water make this unstable and dangerous situation worse. The competition for having decreasing water resources leads to over consumption for industry and agriculture and also decreasing the level of underground water, scarcity of home water. In addition, the pollution derived from industry, agriculture and mismanagement of the human garbage is threatening safe water resources. Middle-East countries water resources have serious problems due to mismanagement lack of enough attention to future needs and natural favorable conditions in these regions. It is expected that climate changes decreasing water quality is going to be worse in some regions such as North Africa and east of Mediterranean, because of dryness. Iran is also is located in dry and half dry part in the world, because the rate of rainfall is low and the dispersion isn't in desirable time or places. In these situations growing population, developing burgessness and expanding economic, agricultural and industrial portions result ever-increasing demands for water. In central-Asia water has generally been very important both in past and now and as it was told, it is because of low rainfall level and regional conditions by which politic decision

making in these countries is effected even in 21st century. Ever-increasing expansion of needs and minds for accessing water resources and necessity of being water resources pollution over consumption of under-ground water, and favorable water resources management under the control lead Middle East to have serious problems in requirements and solution, transmute the weak sides and treats to strength and opportunities, which is not access able without mutual understanding and agreement.

Several countries experiences in water resource management show that adopting proper water management can considerably adjust scarcity of water resources problems. Here, the harmonized water management and systemic allocation phenomenon would be considered as practical solution and basic practice for accessing safety of water and stable expansion of water resources which finally means national security. The aim of this study is scarcity of water put other living resources under pressure. Accessibility of other sources such as food and Mineral materials would be scarce related to water quantity and quality scarcity.

Material and methods

Planning for water resources

Planning for having regarded to water resources capacity based on stable expansion principles supplement of water natural environment in watershed basins improvement of water consumption and ignored-water management, the development schedules, and also regional tests in water-shed basins to considered economic and environmental existing water. Management and control of water resources pollution, determination of fair and proper water price, fairly observance of national benefits and rights regarding to inter basin transmission and exchange of water, decentralizing of water resources management structure and cooperating several beneficiary groups, enforcement of proper managing schedules for drought prevention, public warning plans, extraction of the exact water resources statistics adopting punctual measurements net, stable

improvement and revenue of historical water factors are some of long-term practices of water management in Middle-East and particularly in Iran based on the importance of comprehensive attitude and alternative harmony among different responsible parts.

Result and discussions

Undoubtedly regarding to growing population and water consumption and additionally lack of increasing accessible and stored water, the water crisis would be worse and more serious drinkable water is not a world resource, but regional one, which is accessible in particular water basins of the world, and because of different limitations is accessed in variety of ways. In some water-shed basins some of these limitations are related to seasons, depending on the ability of storing water in dry season periods. In other regions the limitations are affected by underground water supplements, the value of melted snow or forests capacity of storing the water presented in soil. The water is really essential and unique. And the scarcity of water put other living resources under pressure. Accessibility of other sources such as food and Mineral materials would be scarce related to water quantity and quality scarcity.

In some water-shed basins scarcity of water become more manifest. In either the richest or the poorest countries over the world the share of received water is decreasing as a result of environmental problems, the expenses of accessing water and also water scarcity. Although there's $1/360/000/000$ m³ water on the earth, but the distributions of water is not equilibrates with population distributions, over the world. From the whole water on the earth %97.5 is salt and not drinkable. Stored drinkable water is just %2.6, which is mostly as ice in poles and natural ice bergs and glaciers (%1.98). There are some underground resources which are not accessible (%0.59), so there's gust (%0.14) accessible water to use. From this small value (%0.001) is in the atmosphere, rivers, spring, plants and animals bodies, (%0.005) make the soil humidity and (%0.007) is drinkable water in lakes.

The value of annual evaporated water from oceans is 425000 m³ which almost all will return to the oceans as rain or snow falling again, but just 40,000m³ will rain on lands and flow to the oceans again as reverses or under grounds resource. The value of human annual water consumption is about 2290 km³ and about 4490 km³ is used for diluting and decreasing pollution, which comprise the half of drinkable water on the earth. If the average of water share demand remained fixed and according to international organization prediction the world population would be 9 billion in 2050, the water belongs to human will be 10200km³ which means about %82 of drinkable water on the earth. According to some studies more those $\frac{2}{3}$ of earth population would have the problem of water scarcity in 2050, and other have low water.

Addition to growing population if the water share demand also increases, before 2100, the scarcity of water will become terribly manifested. Iran has about 51 of world population and it is %1.1 of whole earth surface, It's share of all water resources of earth is %0.36 which is low in the proportion of its pollution and size. The value of the average rainfall is about 429×10^6 m³ which 305×10^6 m³ is missed and returned to the atmosphere by evaporating and perspiration. From remained 124 billion m³ 38 billion m³ goes down into the lands and flows as under-ground resource and 86 billion m³ flows on the surface, 4 billion m³ water is earned from net entered water flowing, which all are The share of from the water of the world. Therefore general potential al water resources are 128 billion m³ from which 90 billion m³ flows on the surface and 38 billion m³ under the ground. In addition, average value the rainfall in the world is 750 m/m in a year. The value of the rainfall is higher Iran in, its neighborhood. The value of the rainfall in Azerbaijan is 1150 m/m in a year, in Pakistan 1520 m/m a year, but in Iran 250 m/m a year. High demand of water due to growing population, agriculture, burgesses and industry development has been decreasing the average share of recycled water in the way that it has been 5500 m³ in 1340, 3400 m³ in

1357, 2500 m³ in 1367, about 2100 m³ in 1376 and about 1750 m³ in 1385.

Certainly the dispersion and dispersion of population is not in the same proportion of water resource dispersion. Because of natural conditions regional dispersion of water in Iran is not monotonous and the periodic distribution of rainfall is not either. The value of rainfall has been changed even in different years, and seasons, and in recent years has been creating various problems in agriculture, industry and houses. Now, Iran gets terribly into difficulties about water and the level value stored water has decreased about 20m. The maximum value of recycled water that we are permitted to use, is %60, but from 120 billion m³ 94 billion m³ is used which is %80 instead of %60.

This puts the water resources under pressure and causes the ponds such as Harmon, Bakhtegan, and Uremia Lake to be dried. Iran gets into a serious difficulty about water, and in the present situation it is going to be worse and it's the dominant problem in the third thousands year. At present we have also had 9billionm³over consumption (unit 1391), and due to decreasing water level and rainfall, strangely increasing water consumption particularly in agriculture, decreasing percentage of surface flowing water (about % 46), and with about 1700m³ recycled water share , we would have water scarcity.

Following these ways, we will have 1000 m³ recycled water share so there will truly be a water crisis in Iran, additionally in some high level water of our country like Uremia lake basin and east of Tabriz, the recycled water share is less than 600 m³. Therefore, if we don't do something about the water resources management based on harmonized water resources management, recycling water modern technology and using not very typical water resources in earning and consuming water and many other things, then we will certainly be involved in water scarcity both in developing technology and accessing drinkable water.

The international institutes' prediction about water consumption in the world is as below

1-Related to global warming effects, there is a prediction that suggests that the value of rainfall will decrease about % 50 but it is not decisive. 2- According to union Europe announcement, the effect of climate changes and its resulted damage would be increasing related to increasing temperature in the way that the resulted damage gets to about %5-%20 gross national production. 3- Until 2025 half of the world population will be living in the regions where which there will be water scarcity. 4- The drinkable water demand will be increased about % 60. until 2045- 1800 million of people have absolute water crisis. 6- Damages resulted from climate changes related to the population in 2030 is calculated in different ways which is a bout 2-4 ×10¹² dollars. 7- From all 600 water basins in Iran, in 3000 of them decreasing water level is evident.

In central Asia, the water is considered as on essential material which deter mines the livelihood and national economic schedules. Despite of natural limitation of water resources and unfavorable distribution both regional and time periodic, consuming for investment is not made well. The water crisis, undoubtedly as an international problem is getting governors or community attention. The results of international measurement of water crisis are as blow.

According to Falken Mark indicator

Which has described the water crisis based on the value of recyclable water resources share and has introduced 1700 m³ water share in a year, as an indicator of the water shortage. So while the recyclable water resources share is 1900m³ in Iran .then Iran will get into water difficulties.

International organization indicator

The constant developing commission of international organization has determined the percentage value of used recyclables water resources of a country as an indicator, if the used water is more than %40 of the

total recyclables water resources in a country, then there will be a considerable water crisis, if it is between % 20-%40, There will be a mean crisis, and between %10- %20, there will be a balanced crisis, less than %10, then it will show there is no crisis. In Iran %69 of recyclable water resources are used. So there is a severe water crisis in this country.

As a whole, it seems that present water resources crisis is the result of strategic errors, politic schedules errors legal error in issuance of voluminal permit and lack of long-term strategic plans or watercourse maps for water course maps for each water shed basin.

Knowing this fact and being an evident contradictory even to last approved program, unfortunately the investments have not been that sort which regards the priority of desirable usage of the present potentiality. In addition, being regardless to approved schedules of the programs has been caused that there is not any significant changes in the proportion of provided water by tank sluice related to irrigation and minor drainage network expansion and also equipping or modernizing farms based on the last programs. In general because of mismanagement and ignoring future needs and natural unfavorable conditions, Middle–East countries will get into serious difficulties as below.

1-Continuous growing population would decrease the average recyclable water share in primary water crisis and water crisis periods. 2- Continuous over consumption of water resources, and weak schedules, leads the water crisis to be worse. 3-Continuous pollution does not allow us to access healthy desirable resources. 4- Following present schedules as offering management leads damage and waste the water resources. 5- Undesirable usage of water resources and much water washing. 6- Too much consumption of underground water resources. 7-No regard to consumption management and using more than generation potentiality of water resources. Low efficiency in different process of water providing, transiting distribution and delivery.

Surface or underground water pollution by hogwash and sewage. lack of enough industrial or urban water refinery. Following same schedule any water management, there would be predicted threatening factors for water resources in Middle East and in Iran as bellow:

Population migration

Unstable climate and water crisis in developing countries, caused by environmental damage may lead to global disputes: and environment demolish may also lead to people movement and increasing migration. The most effected parts in the world are, Central Africa, Middle East and central Asia, which have more difficulties about low rainfall, food shortage and unemployment.

The population migration results the contracts of cultures and interruption of social rules, and also there would be the migration of working men changes of gross national production.

Water disputes

Due to climate changes, the reasons for wars will change. Now a day the petroleum is the main reason for wars and aggressions, (obviously seen in Iraq), but in next decades providing water and food would be on priority.

Water plunder

Some companies seem to be criticized for urban water, such Coca cola, and some industrial companies in Isfahan (Mubarak foolad & zobe-Ahan); some states in China accuse the others for taking more water for electrifying rain, and increasing irrigation in different regions: so in 21st century water plunder would be one of the offences.

Political migration consequences

In fact climates risks might even which means stronger storms, and ruining drought and flood. Too high temperature and missing water result to have resident less regions as we see in some villages in our country– In system–Baluchistan and Yazd. This kind of migration certainly will ruin stability and constancy

not only in Iran, but also all over the world. Other social political consequence of migration is the movement of population, and consequently security risks which are presented in two ways. Firstly there would be some objection or even revolution and tribal dispute, (like that happened in east of Isfahan or karoun of Khuzestan, for water transition). Secondly, there would be security risk because some states would resident less near the boundaries.

Crescent of government debt and economical consequences of water crisis

Since one of the most important phenomenon in the world is the crescent of government debt as shown by the failure of strong economic poles like the U.S.A. The consequences such as unemployment, expenses crescent, decreasing economic growth, allocating more share from the state budget for decreasing damage caused by drought and increasing demand for drought insurance will aggravate the mentioned phenomenon. There will be more be more serious control about water and economic efficiently relation. It seems that the water crisis is a basic matter, particularly in china (In present state 400 cities will affect on development model). As was mentioned according to Economy world Association report the damage cause by drought is between %5 to %20 of gross national prediction.

Food security

About 8 billion people are living on the earth now. If some species are declined, it does not affect us a lot but if the declension happens for human, it will be so important. The main result climate changes about which the politicians have to be worry is how the drought threatens the food security of millions or one hundred millions of people. More than %90 (%94 in Iran) of rivers water underground resources is used in agriculture, but the present generation needs twice as much food in the proportion of the last generation, so we need thrice as much water. No cracked desert can feed the children. The consequences of drought are worse on poor countries. All around the world, decreased drinkable water resources, severely

threatens livelihood and health. Ever-increasing pollution, over consumption of springs water together with destruction of drinkable watershed basin brings us make the dangerous and unstable existing situation more threatening. A global plan and action is need in order to provide excessive healthy water for world in habitants .Adopting national and regional schedules and increasing international contribution for developing or un developed countries, particularly in Middle-East is also necessary. Water management should be based on both offer and demand efficiency, general perspective of water cycle, stable development principles and preparing the lands in supported water shed basins; and in order to adopt the comprehensive management of water resources, reciprocal harmony among social, economic, cultural, fundamental and servicing parts would be provided. Revenue operation of water resources in any water shed basin should be planned regarding to the bearing effacing so that the value of accessed underground water would never be negative and factor non-factor actions should be adopted to balance different part and provide future needs. The structure of water consumption should be adjusted in the way that it changes agricultural water consumption, but increases irrigation efficiency and allocates more water to more valuable products. Water management has to determine the economic value of water including essential value of water in any watershed basin, based on environmental or regional, value of water providing, transferring, distribution and recycling investment, in different consuming part so that they be adopted in consuming parts development programs. The consumers action should be managed in the way that firstly. The pollution caused by their action be under the control, and secondly the water quality indicators be eventually increased.

Conclusion

The water rate should be mined in the way that it could be provided for drinking and sanitary in priority and for other consumption parts based on provided financial sourced and their variety. In first step notices the revenue operation and storing

expense, and then provide the recycled investment expenses. Regarding to the role water in development and economic value of it in regional marketing exchange of water with neighbors either read or figurative should be done with regard to technical, economic, environmental and social explanation. Providing development schedules should consider the shortage of water both in quantity or quality, local or periodical distribution, and essential value of water and the program for agriculture, industry, energy, and reconstructive development have to be provided in every water basin. The schedules for transferring water among basins should be examined based on stable development perspective, regarding interested parties right; it must provide different needs base on technical economic, and social explanation. Providing and operating drought and flood management programs should be done jointly by all related organization and relying on preventing management. Favorable schedules should be adopted in consumption management, and wasting water should be prevented in transferring and distribution net work. Awareness of public for keeping water (both in quantity and quality, and favorable revenue operation are also needed. Controlling output water, using party water, and boundary improvement and Hydro politic regarding to economic and the environment should be considered. It is necessary to have complementary quantity and quality measurement, water consumption network and completed data. In addition, protecting revival and revenue operation from water historical factors should be proved to be true. As a whole it is not clear what is going to happen for water because the climate changes are not under the human's control. In the other hand, other crisis creating including people's income growing

population the value of water fundamental investment, proper water management, technological changes in agriculture and long term decision making schedules for billions of people may cause some other substitution for water future.

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