

Drought-Conscious Development Programs

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Introduction

Drought is home to Iran and many other countries in the Middle East. Almost every year, some parts of the country suffer from different degrees of drought impact. The country is situated in the global belt of arid and semi-arid areas, with annual average rainfall of about 252mm. In contrast to such low precipitation rates, annual evaporation rates run in thousands of millimeters- in some regions up to 4000mm- and summer temperatures in many areas are usually in the range of higher 30's to lower 40's °C.

In recent decades, the frequency of extensive and severe droughts has become alarming. Estimates are that every 5-7 years there is a drought (Eslami et al., 2000), that may last up to three seasons. Others have stated a return period of every two years(Shariatmadar, 20002). The last drought cycle hit the country, and the Middle East as a whole, during 1998-2001. Estimated losses in Iran were several billion dollars (\$1.7B for 1999-00 and \$2.6 B for 2000-01 seasons). Other damages such as diseases, suffering of the people, loss of job, immigration, and losses in biodiversity were tremendous and provoked great concerns in the country. Many governmental departments and institutions responded to the situation, but the policy mainly revolved around the concept of compensating the damages. For example, in 1999-2000, about \$185 M were given to the farmers and livestock producers who had been severely hit by the drought. For the 2000-01 season, the government approved a budget of \$ 750 M for the same purpose.

While this is appreciated, it must be realized that relief programs are not the solution to the problems caused by drought. In dealing with this recurrent catastrophe, the priority should be given to the programs aimed at getting the country prepared to combat the situation and the population educated for living with drought and adapting their way of life to it. Droughts can not be prevented and they are sure to come back sooner or later. However, their impacts can be minimized. To achieve this, suitable and large scale proactive programs must be embedded in each of the National Development Plans (NDP) of the country. The followings are some such programs to be considered in the various sectors of the NDP's.

Social Sector

From the social point of view, national development programs should be designed in such a way that the availability of quality water to all of the population is assured in all times, including drought spells. Water shortage can have grave consequences on the health and hygiene of the society and may put the lives of many people at risk. This is particularly true for the children and the old. Besides, the inconveniences caused by water shortages are innumerable and they can make life miserable. Adequate storage can curtail such tough times.

Another important social aspect of drought impacts that needs to be emphasized is immigration, particularly from villages to the cities. This should be foreseen and proactive programs for its prevention or decrease must be incorporated into the national development programs. During the recent drought cycle of 1998-01 in Iran, thousands of villages were partially or completely evacuated and the nearby cities were crowded by the rural people (Siadat et al.,2001). A team of UN Technical Mission to Iran reported that " over 60% of the rural population may be forced to migrate to cities" (UN Tech. Mission Report, 2000) Such immigrations create many social and cultural problems in the urban areas and for the emigrants.

A drought-conscious development program should include actions that will achieve the following objectives:

1. Controlling population growth in general and prevention of high population densities in locations that are drought susceptible. Expansion of labor-requiring economical centers in regions with limited water supply will lead to social problems proportional to the size of the thirsty population
2. Provision of adequate storage facilities for quality water, particularly in the remote residential areas, with the priority given to the most drought susceptible locations. These facilities should preferably be permanent reservoirs of adequate size, but, in areas where construction of such structures may not be feasible, pipelines or other water conveyance systems should be installed to the nearest supply source. Besides, for very remote areas, plans for emergency transport of water must be drawn up well ahead of the time of drought event.
3. Training and education of the users and consumers of water on the efficient ways of utilizing this resource. General training on this subject is to be a constant part of the public educational programs.

Water Sector

Since water resources are the first and the prime target of drought damages, development programs for drought prone areas must have particular emphasis on programs aimed at proper development and management of these resources. A wide variety of action programs and factors need to be considered in this respect, but the followings are of particular significance:

1. Preparation of National Drought Mitigation Plan. This is much needed and work on its preparation should receive high priority. In this regard, formation of a National Committee on Drought is suggested, with members from all the ministries and organizations directly concerned with water-related issues and representatives from FAO and UNDP offices in Iran. The ministries are Ministry of Energy, Ministry of Jihad-e-Agriculture, Ministry of Interior, and Ministry of Health and Medical Education. Other pertinent organizations are the Iranian Meteorological Organization, the Department of Environment, and the Organization of Management and Planning. Presence of representatives of farmers and livestock raisers from drought-prone parts of the country, as well as experienced researchers and free lance experts on the subject, is highly

recommended. The National Drought Mitigation Plan should be prepared with due attention to the following points:

2. Maximizing water productivity in all sectors of economic activities, particularly in agriculture. Specific goals must be set and the programs should contain activities that will assure the achievement of those goals.
3. Increasing above-ground and underground water storage capacities.
4. Keeping the balance between aquifers discharge and recharge. A negative balance , like the prevailing conditions in Iran, will certainly increase the susceptibility to drought damages.
5. Minimizing losses in the conveyance systems, particularly in the residential distribution networks.
6. Promoting return-flow systems and maximizing recycling of water by proper treatment of wastewater and/or use of treated water for suitable purposes.
7. Implementing strict control measures for water pollution, especially in water scarce areas.
8. Prepare alternative water rationing plans with minimum inconveniences for the residential areas.

It is emphasized that all of the abovementioned programs have a long-term nature and will be helpful only if they have been put into practice in advance of the drought cycle.

Agricultural Sector:

Considering the fact that agriculture is by far the biggest consumer of fresh water resources, special considerations are to be taken into account in any drought-conscious development plan for arid and semi-arid areas. Here, food security and the living conditions of farmers are at the risk of water shortage in any season. There is a threat of losing all, or a significant part of, the investment made in the production of some food stuff, due to unpredicted drought. Those responsible for planning agricultural development in areas with frequent droughts should see to it that the followings will be achieved through the programs activities:

1. Providing drought forecasts and early warning services for all stakeholders, particularly farmers in the most susceptible areas. In this respect, the Global Information and Early Warning System(GIEWS), located in FAO Head Quarter in Rome, can be asked to provide the necessary training and further support services
2. Enhanced crop water productivity through improved agronomic practices and use of genetically improved seeds or seedlings that are tolerant to drought and/or poor-quality water.
3. Adjustment of cropping patterns to the quantity and the quality of the available water resources in drought prone zones.
4. Expansion of the improved irrigation methods (both gravity and pressurized systems) on farmlands.
5. Adjustment of the size of livestock herds of the nomads in different regions to the natural forage production of the respective rangelands.
6. Proper use of non-conventional water resources.
7. Minimum drainage and extensive use of return flow systems on the farms.

8. Reduced water pollution from agriculture.
9. Extensive crop insurance programs to cover all the major crops in any region, particularly where the farmers are poor and where the local economy is dominated by agriculture.

The development program should be specific in each of the above items and the goals must be quantified clearly. This quantification will certainly require input by the research organizations responsible for improving water use in agriculture. For areas where this information is lacking or inadequate, research activities must give priority to collecting data in these regards.

Industrial Sector

While the total share of the industrial sector in the country-wide water consumption is relatively low, in certain parts of the country, where several industries are concentrated in close proximity to each other, they may be using a high proportion of the local water supplies. In such regions, further expansion of the industries must give priority to those that are "clean and water efficient". In drought-conscious development programs, the industrial technologies employed should emphasize the followings:

1. Relatively low water requirement.
2. Low waste water production.
3. Low water pollution risks.

Environmental Issues

The impacts of drought, especially if it persists over long periods, are probably the worst in the case of natural vegetation and the wild life and their habitats. Many plant and animal species may simply vanish in certain regions during such periods and they may never revive in that area. Indeed, some extinct species that are adapted only to that particular environment may disappear from the world for ever. Such irreversible losses should be prevented by proactive action programs carried out for environmental protection purposes. In the meantime, the incidence of drought provides an opportunity to identify the drought tolerant genotypes of natural vegetations and the planted crops. Full advantage must be taken of such periods to survey the country and identify the tolerant species and their genotypes.

In these respects, a drought conscious development program will always include action programs in the following areas:

1. Saving the genetic heritage and bio-diversity of the country.
2. Identifying and preserving the rare and drought tolerant wild types of different species.
3. Controlling over-grazing, with more restrictions during drought.
4. Application of strict water pollution controls measures.
5. Provision of water supply for the wild life to discourage their migration due to drought.

Economy

Impacts of drought are site specific and may be different in kind and intensity depending on the location. Nevertheless, damages to water resources and economy are always there. Economical effects come in different forms: lower income for some agricultural and livestock producers, higher food prices for the consumers, loss of job, and loss of capital investments in the cases such as destruction of orchards or livestock herds. In areas where the local economy is dominated by few activities that are highly dependent on water, drought may cause the collapse of the whole market. It is therefore very important for the national development plan to bring about economical changes in drought prone areas that would protect the economy against such catastrophes. The following policies seem valuable in this regard:

1. Diversification of jobs and economical activities in drought prone areas..
2. Providing jobs that are less water-dependent.
3. Encouraging handicrafts.
4. Provide special grants and/or loans with low-interest-rate for these areas.

It is also to be noted that loans and grants allocated to drought relief programs should be prioritized with regard to the sensitivity of local economies and the intensity of the damages in different regions. The speeds with which these programs are carried out are vital to their success, since a delay in providing the financial assistance might nullify its effects. At the same time, crop and livestock insurance against drought should be expanded to cover all crops in different provinces, or, at least, in the most drought -prone areas.

References:

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