

Committee VI
Global Environmental Problems
152

Draft - For Conference
Distribution Only

Discussion Paper

by

A. El-Sweedy
Senior Researcher
Soil & Water Research Institute
Agricultural Research Center
Giza, Egypt

on

Gerald Stanhill's

WORLD WATER PROBLEMS: DESERTIFICATION

The Twelfth International Conference on the Unity of the Sciences
Chicago, Illinois November 24-27, 1983

© 1983, The International Cultural Foundation, Inc.

IDENTIFICATION

The paper under discussion concerns with one of the Serious Global environmental problems where man interferes in addition with the severe nature factors and both lead to a very complicated phenomenon: " Desertification ". In brief, desertification means more draught, famines and disasters. It is considered to be the problem of using soil drastically especially in arid and semi arid regions and therefore the expression is a little bit different than that for desertization. The latter expression refers to a process that can't be controlled by man, it is belonging to Nature.

In a good and integrated presentation, the writer concluded that the best way to tackle the problem usefully is by better exploitation water resources. The majority part of his discussion was mainly concentrated on precipitation source.

With no any implications about figures included in his paper, the auther contributed a respectable effort in presentation the vital necessity of the phenomenon under study. The material is very interesting regardless some comments I wish to convey in answer to whatever questions,

ideas, or criticisms the reader may have about the paper.

Besides, I just write as a specialist in the agricultural field and that I participated in that branch for more than two decades. But on the other hand, the conference and the problems under study, all members are lasting and magnificent symbol of what the pride of humanity and the feeling of international dignity can accomplish.

It is also a model for the humanity feeling and people's determination to protect, change, carry on and survive their all globe.

Thank You

A. EL-SWEEDY

DISCUSSION AND COMMENTS

It is worthy to mention that the problem under study is a phase of a complex formula that cannot be easily solved. Regarding the accountable features that may interfere with life for all societies, environmental factors; in addition of man activity, will lead to a counter man welfare. Water balance in the Globe may be changed to worse and a final irreversible resultant will be drastically achieved which in return will come over life and lead to unforeseeable future.

Discussion and comments will be dealt as follows:-

1: In unfair comparison, the auther said that " the annual evaporation loss from Lake Nasser, the big reservoir formed by the Aswan High Dam, has been calculated to lose 13.7 km³ of water, a volume considerably exceeding the amount that it was made available for irrigation ".

It should be said that the High Dam is considered to be one of the world's greatest dams, for a variety of reasons. It has the greatest lake capacity in the world (7174 km²), reaching the volume of 182.7 milliard m³ at the highest storage level (185 m).

The High Dam Lake capacity is more than four times of Lake Mead, one of the world's highest dams and the largest storage lake in the U.S.A.

The storage capacity of the High Dam Lake, moreover, is $1\frac{1}{2}$ times greater than the total storage capacity of the seven grand rockfill dams of the world that follows the High Dam Reservoir in rank. The annual evaporation loss from the High Dam Lake was estimated to be about 10 milliards m^3 , Abul Ataa (1978). In general, the High Dam is unique amongst the dams of the world in that it provides a variety of benefits to the national economy, not only for Egypt but for Sudan too, in agriculture, industry, power generation, fisheries, tourism and flood control.

For Egypt, it provides water required for agricultural expansion in new areas exceeding 2.5 millions feddans and facilitates the cultivation of 2 or 3 crops annually instead of one. It puts an end to irrigation complaints by providing water for the various crops all year round and secures the arrival of adequate quantities to the various crops at the

right time. It allows for flexibility of agricultural planning without fearing of low river yield or its insufficiency. It improves the drainage of all agricultural lands thereby increases productivity by approximately 20% for some crops, and by 50% for others, as well as simplifying drainage projects and reducing their cost. It allows the cultivation of one million feddans of rice annually, no matter what the river yield might be. It protects the country against high flood attacks which means saving millions of pounds which were previously spent on maintaining and strengthening the river bank in addition disasters that used to result from such floods. Electric energy with a capacity of 10 milliard K.W/hours years could be generated, which makes the project the main support of the country's industrial development and about 2 millions tons of oil annually could be served.

As social benefits, the High Dam assure stable tenure in agricultural lands for millions of inhabitant, who will become owners of new reclaimed lands. It allows modernizing the Egyptian Village by introducing electricity. This will close the civilization

gap" between the village and the city in Egypt.

For these reasons, dams should not be evaluated by evaporation loss but by the benefits they realize for irrigation, power generation and other purposes too, especially the writer stated that there is no simple or safe way to lessen evaporation loss from surface reservoirs.

- 2: In Reviewing the possibility of adding more resources of water, he mentioned that the exploitation of artificial precipitation is the cheapest method instead of searching for new water resources or retreating used water. He aproved that the usage of artificial clouds are controlled by many factors such as social, legal, environmental, scientific and economical situations through societies.

The experiment he has done was probably controlled by special suitable climate and environment that may not be available under clear uncloudly weather and moderate temperature.

- 3: The auther pointed out that the efficiency of surface irrigation may be reached to 80% of the total quantity of water used in irrigation with

no replacement of surface irrigation with other power sources or other irrigation system.

This is an excellent and encouraging result that should be discussed in detail. Loss factors through distribution system, costs, and economical feasible studies must be undertaken.

- 4: On the other hand the paper has not taken in consideration soil as a dynamic system. The author didn't look after the important role which the soil conditioners can play in raising the soil water holding capacity. This technique is more practical and more economic than the method using antitransparent or reflecting heat from soils. It is evident that wind activity is more effective than temperature on the rate of evaporation, El-Sweedy (1983).

In a study carried by Semika (1983), spraying either a sandy or clay soils by curasol (AH), bitumen emulsion and betrosset (SB) showed a reduction in the evaporation from soil surface. Increasing the concentration of these materials decreased the evaporation in both soil types under study. About anti-transpirants, foliar spraying for sunflower and corn,

with abscisic acid (ABA), phenyl mercuric acetate (PMA) and alar, he stated that all the vegetative features and fresh and dry weights were reduced. The reduction varied according to the variety of plant, number and concentration of the sprays. Eventhough they were very costly and unsaftely chemicals.

- 5: Dealing with the reuse of sewage water in agriculture, since it is water of limited quality, we have locally a leading plan to get use of the large amounts of water produced from big population cities like Cairo (11 millions) and Alexandria (3 millions). Regarding the nature of the area and hot weather, it was recommended to be used in afforestation wood trees in desert regions which have good permeable soil. It seems to be the best possible solution since an appropriate return could be achieved in addition avoiding any prolonged microbial and mineral pollution and its serious dangers on human and animal health. At the same time we can save large sums of money which were expected to be spent in treating these waters.

6: Regarding the use of brakish water, from our long experience, it was found that using different water qualities depends on type of soil, plant, specific effect of ions as like as total salinity. Leaching requirements should be also taken in consideration.

Irrigation and leaching requirements, quality of water used and efficiency of the drainage system are very complicated formula which reseachers, all over the world, are trying to tackle and solve. So, water may be suitable under certain convironmental conditions of soil and plant in a certain area but it may be not under similar circumstances but in other area where a more complicated problem has been arised, like failure of drainage circuit or its deterioration.

7: Cultivation on strips for the different contour lines has been known to Ancient Egyptians thousands of years ago. It is still followed in some regions of Fayoum Governorate (100 km. South West Cairo), where contour lines are ranging from + 40 to -30 m. It is well known that cultivation of low contour

lines is more complicated than that on high ones. Therefore, it needs more experience and special qualifications which farmers have accepted through long performance for ages, it is not an aspect of modern technology, Heggi (1983).

8: As far as the inhabitation of bedwines, in the coastal section of Sinaa (Egyptian territories), is concerned, we would like to draw attention that the program of their settlement has been started from a long time. The local authoroties and societies like the Desert Rehabilitation Organization (DRO) had developed agriculture, in these areas and in the north western coastal region of the contry, and all other possible resources. Wind energy has been used in pumping the under ground water and power generating. Wind breaks have been performed for soil and water resources conservation.

The implementation has not been lasted for a longtime. It was disturbed by periods of military activity and unsettled security, there is no need to be discussed any more.

The refreshment of any society is mainly due to the rate of settlement and the political and security circumstances which the author has not undertaken. The success of any new community should be evaluated by the new settlement rates, and the social, political and security regimes applied in it.

Referring to the condensed agriculture system, it may succeed in some places which have moderate climate and is relatively near to coasts or ports. It will be uneconomic if it is applied inside the country or used on a large scale as the products will meet difficulties when we need to export the surplus amounts.

REFERENCES

Abul-Atta (1978)

Egypt and the Nile after the construction of
High Aswan Dam.

Ministry of Irrigation and Land Reclamation, Cairo.

El-Sweedy, A. (1983)

A meorological study in Cache Valley.

Agr. Res. Rev., 61: 4, Cairo (In press).

Hegi, S.S. (1983)

Effect of water table on soil properties and
plant growth in Fayoum Governorate.

Ph. D. Dessertation, Fac. Agr., Ain Shams University,
Cairo.

Semika, M. (1983)

Effect of some chemicals on evaporation and trans-
piration.

Ph.D. Dessertation, Fac., Agr.; Ain Shams University,
Cairo.