

Combatting the Expanding Desert: National Green Belt in Iraq

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Executive Summary:

In addition to the many challenges facing Iraq now, desertification is yet another formidable challenge that needs immediate attention. The seemingly unstoppable desert expansion is creeping up and taking over the fertile lands in Iraq in unprecedented speed!

It is manifested in a dramatic shrinking of green cover and the losses of millions of trees and tens of thousands of hectares of cultivable land and diminishing agricultural production.

The historically abundant water resources are declining as a direct result of over control and the use of water resources by upstream countries.

The country's recent history of wars, economic sanctions, occupation, terrorist attacks and the fragile security and political stability stipulated specific set of priorities to which Iraq's financial and human resources have been allocated and utilized.

Unfortunately combating desertification was never a top priority in this country and as a result Iraq lacks the capacity to stop the encroachment of the desert to its fertile lands and cities.

The current government is taking serious steps towards economic and environmental recovery. However, it needs the support of the international community in issues of regional or global dimensions such as combating desertification.

The proposed project of establishing National Green Belt (NGB) on the edge of the desert in Iraq western areas is a major enterprise to stop the expansion of the deadly desert.

More than 200 million trees are required to be planted on an area of at least 3000 sq.km, irrigated by ground water through closed irrigation systems operated by solar power.

The project is not purely environmental undertaking but it is in fact a development project where employment generation is a significant

outcome in addition to the utilization of renewable energy and the establishment of human settlements in uninhabited areas.

At least 10 or more townships are proposed to be constructed to accommodate operators, workers and researchers. A network of roads and other necessary infrastructures are required to be established to implement and maintain the NGB after completion.

The most important step in the realization of the project is the feasibility study that would prove the viability and practicality of the project. The study will pave the way for the government final approval of the project and thereafter to allocate the resources necessary to start implementing it.

The estimated initial cost of the feasibility study is about \$5million and the expected time frame is 18 months.

The project enjoys the support of many distinguished Iraqi personalities including politicians, scientists and professionals.

I. Introduction

The green cover in Iraq is shrinking rapidly in the face of desert expansion, and dust storms are increasing in intensity and recurrence in an unprecedented manner. This is causing huge environmental, economic and health-related damage in Iraq. It is destroying the biodiversity in the environment, threatening the general health of residents and leading to the spread of poverty, disease and migration from rural areas. Soil fertility and agricultural production are declining. The ability of the Iraqi government to impact the spread of the desertification phenomenon is shrinking with time, unless it resorts immediately to taking decisive measures to stop and combat this phenomenon by way of an ambitious long-term program aimed at preserving soil fertility, expanding the green cover and utilizing modern technologies in managing water and soil resources.

During the last quarter of the twentieth century, Iraq's inflow of water shrunk by more than one third. Rainfall averages have decreased as a result of the rise in average temperature of the earth's surface, and Iraq's need for water has become more acute than at any time in the past. The decrease in river water and rainfall in Iraq coincided with the neighboring countries taking control of water resources through the construction of major dams which greatly harmed Iraq's water resources. With that, Iraq lost the benefits of spring floods which restore soil fertility and revive the green cover in the plains and valleys, thus making them prone to erosion and desertification.

Consequently, in the event that it is established, the National Green Belt will represent Iraq's first line of defense in resisting the encroachment of desertification and stopping it at the western edge of the Iraqi *jazira* land, west of the Euphrates, known for its fertility across history. It is a proposed project that stretches from the north of Mosul to the south of Basra.

The Belt comprises palm trees, trees, plants, herbage and grasses that are resistant to the severe desert-like conditions which are prevalent in Iraq, including drought and elevated temperatures; and it covers various areas ranging in width from one to five kilometers, subject to local conditions.

II. Project Stages

This giant project is considered to be one of the largest ambitious national initiatives that aim to rescue Iraq from falling into the trap of desertification, drought and poverty that could extend for many years. It is expected to stimulate

the Iraqi national spirit and reinforce the unity of the people in all Iraqi provinces, putting them in the position of forging the future of the country in confronting the desert's challenge and achieving sustainable growth.

The project relies on selecting suitable location and course for the National Green Belt, from the north to the south of Iraq, for planting many types of desert trees and improved drought and heat resistant trees which can survive in severe conditions. Also determined are the locations and paths of Secondary Belts, which are connected to the main belt and surround Iraqi cities.

In addition to implementing wind barriers that aim to stop the movement of sand dunes, the Belt includes planting fruit trees and other trees in parallel lines and at predefined distances, interspersed with areas planted with desert grasses and special plants selected by specialized scientists and irrigated by ground water from closed irrigation systems that provide continuous and secure irrigation.

The project also necessitates the establishment of villages and towns for the workmen, operators, supervisors and investors in different areas of Iraq, and is anticipated to be implemented in several stages, namely:

1. Feasibility study to determine the locations, paths and dimensions of the National Belt and the Secondary Belts around adjacent Iraqi cities, as well as sources of electrical power, water resources, etc.
2. Project design stage and the completion of all other technical requirements (determination of location and quality of ground water and oases and their usable quantities of water, design of irrigation networks, selection of suitable trees and plants, locations of villages and residential complexes, etc.)
3. Actual implementation stage at several locations simultaneously, in accordance with topographical, hydrological and financial conditions at hand, all proceeding toward full integration with each other until the entire Belt is completed from the north of Iraq to its south, where it adheres to the marshes of southern Iraq.
4. Maintenance, sustainability, utilization and production stage. This stage is not defined by time but by the ability to sustain and benefit from the project and reinforce the country's capability to combat desertification.
5. Expansion stage of the National Green Belt Project toward the Iraqi interior until the western banks of the Euphrates River.
6. Stage of undertaking the planting of trees in towns, roads, schools, universities, hospitals, factories, residential neighborhoods, stadiums, army

and police encampments; reviving “Tree Day” and supporting civil, individual and collective initiatives that aim at planting trees in homes and streets in accordance with regulations and laws aimed at improving the environment.

III. Required Implementation Time

The period required for completing the project ranges between five and ten years, depending on the size of available financial and human resources, working conditions in unpopulated areas of Iraq and the levels of response of local authorities in different Iraqi governorates. However, what is of greater importance in this Project is the post-completion stage, or the period of sustainment, maintenance and production, which is what distinguishes this from other construction and development projects.

IV. Project Benefits

1. Actual contribution to halt the encroachment of desertification and prevent it from reaching the Iraqi interior; protect the fertility of the Mesopotamian valley and agricultural production; stop the deterioration in the environment and protect the biodiversity which is threatened because of climatic changes and the rise in temperature of the earth’s surface.
2. Create job opportunities for thousands of Iraqi citizens from all governorates, stimulate the Iraqi economy and learn to practice other professions and economic activities.
3. Create a general state of collaboration and a sense of common destiny, national responsibility and solidarity in order to accomplish a public benefit project.
4. Bolster scientific research prospects, develop capabilities in the domains of renewable energy, the environment and engineering, and contribute to taking Iraq to the stage of active adaptation to climatic changes.
5. Open up investment opportunities in Iraq and benefit from successful international experiments in the domains of operation, combating desertification, marketing, management, coordination, export and others.
6. Achieve prevention from diseases caused to people by dust storms and dust, reduce the burden on national hospitals and clinics, lower treatment costs and provide relief to citizens who are victims of dust storms.

7. Iraq's undertaking of its required role in the field of combating desertification and accommodation to severe climatic changes in the region, in accord with Iraq's commitments within the United Nations Convention to Combat Desertification.
8. Consolidate Iraq's experience in working with international agencies that are concerned with improving the environment and building up the green economy.

V. Estimated Project Cost*

1. Trees and bushes

Assuming that the total length of the National Green Belt will be around 1,000 km long with an average width of 3 km, and on the basis of 20 square meters per tree; and assuming a survival rate of 70% in planted trees (30% plant death rate), the Project would require 220 M trees of various types of fruit trees and non-fruit bearing trees. If we assume that the cost of one seedling will range from one to five dollars, the cost of the trees would be between \$220 M and \$1.1 B.

2. Irrigation Systems

Assuming that closed irrigation systems, especially drip irrigation or sub-surface irrigation, will be used to irrigate the cultivated areas, and because irrigation system prices vary, ranging from \$2,000 to \$5,000 per hectare, the cost of covering the entire area would range from \$600 M to \$1.5 B.

3. Solar Energy Production

The Project requires the construction of around ten residential complexes (villages or towns) for the workmen, operators, beneficiaries and researchers of around 1,000 residential units per residential complex (village or town.) In order to provide lighting and power for operating the irrigation systems, the requirement of each residential complex will be around 1.5 MW. The cost of one MW is estimated at \$1.5 M, bringing the total cost of electrical power to \$22.5 M.

4. Other Costs

It is premature to provide estimated costs for the construction of road networks and villages, land appropriation compensations, water desalination, canal construction, well drilling and so on.

VI. Energy and water sources

It is anticipated that solar energy will be extensively used to cover the project's large requirements for energy. This will have obvious economic feasibility considering that solar power is a renewable source of energy in a region where surface temperatures reach their peak for many hours of the day. As for irrigation water, this will come from ground water in the western plateau and the Iraqi desert, with the probability of utilizing salt waters from closed lakes (Lake Razzaza and Lake Sawa) and those of the main drains in Iraq.

VII. Anticipated challenges and means of responding to them

1. Water resources

This is the principal challenge to the Project's survival during and following implementation. Although ground waters in the proposed region are deemed abundant, there is a necessity for continuous exploration and search to ensure sustainability of irrigation water sources and develop modern technologies for their efficient utilization.

Response: It is necessary to consider linking the Project to drainage waters and salt-water lakes such as Lake Razzaza in the Governorate of Karbala and Lake Sawa in the Governorate of Al-Muthanna for the purpose of utilizing them in irrigation after partial or full desalination, depending on the type of trees and other plants and their tolerance to salt, by utilizing available desalination technologies or those that are discovered while the work is in progress.

2. Project sustainability

The success of the National Green Belt Project following its completion depends on providing sustainability requirements in both administrative and financial aspects.

Response: The largest portion of the response depends on the following:

- Long-term commitment by the government to provide the required financial, human and logistical resources, provide a suitable legal and legislative climate for joint action with international organizations and agencies and facilitate the involvement of foreign investment in the Project work and its supporting activities.
- Provide the requirements for scientific research in fields related to the Project, including the establishment of new research centers and reinforcing the capabilities of existing ones for the purpose of completing hydrological and biological surveys, maintaining and improving the genetic resources of seeds, plants and local trees; inspection of imported trees and seedlings and the selection of the ones that are suited to local conditions, and so on.
- Provide rewarding working conditions for Iraqi workmen such as the researchers, operators and administrators in order to encourage them to work in difficult geographic and climatic conditions, and create the conditions for a decent living in the proposed residential complexes that will be established as part of the Project.
- It is anticipated that the Project will be capable of paying the cost of its operation and maintenance and will be profitable for the investors in some of its facilities such as the production of olives, dates, solar power and others.

3. Project Size

The size of the Project and its need for large human and financial resources raises the level of risk under unsuitable security, geographic and climatic situations.

Response: The response is to adopt a flexible approach comprising the following:

- Engage one of the recognized international consulting firms, selected by way of a competition, to undertake a detailed feasibility study for the Project aimed at determining the locations and paths of the Belt, recommending follow-on measures and estimating the risk or success/failure factors and so on.

- Selection of three or more locations for pilot projects in a number of governorates for the purpose of testing the levels of success in cultivating the Green Belt and utilizing the required technologies, then applying the successes to additional locations such that expansion would be gradual and based on successful experiments.
- It is appropriate and practical for the area of the pilot projects to be not less 10% of the total area of the Project, making the area of each pilot project around 10 square kilometers. This will increase the confidence in the outputs of experiments in pilot locations, enabling their expansion and spread.
- Provide the conditions and requirements for the involvement of competent international agencies in supporting the Project and rendering it successful; facilitate the movement and activity of international scientists and experts in order to gain maximum benefit from their participation in a vital project that, if successful, can be considered a model to be followed.

VIII. Stakeholders

1. National “commission” (or ministry) for the National Green Belt Project (established by the Government to design, execute and maintain the National Green Belt.)
2. Governmental ministries and institutions, including:
 - Ministry of Water Resources, Ministry of Agriculture, Ministry of the Environment, Ministry of Municipalities and Public Works, National Investment Commission, Commission on Combating Desertification in Iraq (Ministry of Agriculture), Directorate General for Surveying (Water Resources) and Directorate General for Geological Surveying (Ministry of Industry), Ministry of Science and Technology, universities, and the various research centers.
 - Local authorities and administrations in the capital, Baghdad, and the western governorates (Mosul, Anbar, Karbala, Najaf, Samawa, Nasiriya and Basra.)

3. Foreign investors, companies, experts and workers.
4. Relevant international agencies, namely:
 - International Food and Agriculture Organization (FAO)
 - World Bank
 - International Fund for Agricultural Development (IFAD)
 - United Nations Education, Science and Culture Organization (UNESCO)
 - International Center for Biosaline Agriculture (ICBA) in Dubai
 - International Center for Agricultural Research in Dry Areas (ICARDA)
 - United Nations Development Program (UNDP)
 - Secretariat of the United Nations Convention to Combat Desertification (UNCCD)
 - Arab Center for the Study of Arid Zones and Dry Lands (ACSAD)
 - Others.

IX. What is required?

1. The Iraqi government to adopt this proposal and order the establishment of a specialized “commission” (or ministry) to undertake the execution of the will of the Iraqi government, and to authorize it to prepare suitable conditions for rendering this Project successful, including the launch of special programs and policies required for its completion, supervise all its work stages and contact and contract with the various international agencies and other countries that have succeeded in implementing similar works.
2. Obligate related Iraqi governorates to work seriously and responsibly with the proposed Commission (Ministry) and to allocate portions of their budgets, to be agreed upon at the time, for implementing and sustaining the National Green Belt and Secondary Belts surrounding the cities in accordance with the plan laid down by the Commission (Ministry).
3. Create a supportive climate for the Project in the government and among the public, direct all government institutions to participate in the afforestation of

Iraq, prevent developmental expansion into agricultural lands, prohibit trees cutting; and enable civil society to exercise its role and support it in promoting educational and cultural initiatives that aim at respecting the environment and its diversity, and preventing the wastage and pollution of water.

4. Act promptly at the regional level with neighboring countries and similarly with international organizations concerned with combating desertification, coordinate programs and plans to prevent the spread of desert and deal with that as a national and cross-border regional disaster causing poverty and migration, and derailing economic and social development.
5. Call for the convening of international conferences on the phenomena of airborne and ground dust, desert encroachment and the rise in temperatures to unprecedented levels in Iraq and the region, and study their impact on public health, transportation, communications and agricultural production, and ultimately on social and economic stability in the region.

X. Desired Project Results

The success of the Project is represented by preventing desert encroachment toward the green, historically fertile lands of the Mesopotamian Valley, which would allow restoring soil fertility and protecting its biodiversity, and create the conditions for sustainable growth that would transfer Iraq from the position of victim of severe climatic changes manifested by more poverty and dust storm intensity to an effective and active society mustering its vital strengths and capabilities to achieve an economic revival and improve its living conditions.

**The estimated cost presented below is far from accurate. It represents an initial and rough estimate with potentially large margin of error if properly scrutinized. However, it is presented as is until the proposed feasibility study makes more information available*

XI. Proposed location.

