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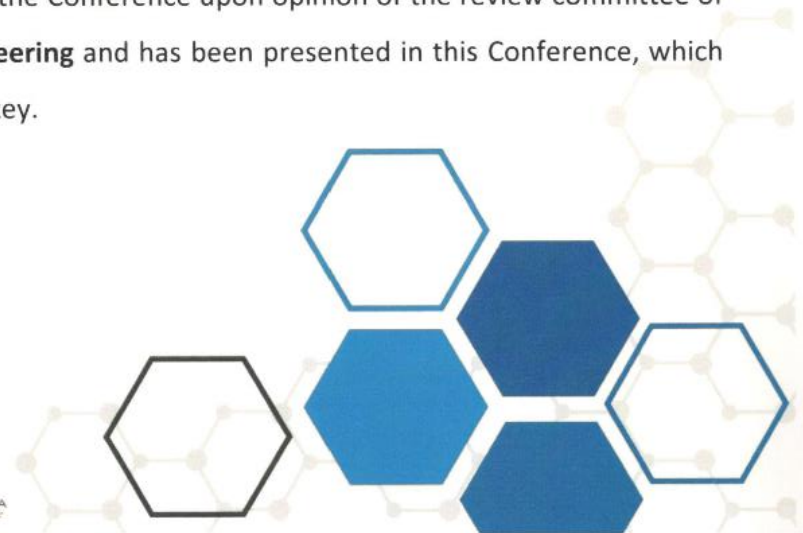## OF PAPER ADMISSION, PUBLICATION & PRESENTATION

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Use of socio-economic indicators to control desertification

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Dr. Angela W.Benson
head of scientific committee

Use of socio-economic indicators to control desertification

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Abstract

Desertification refers to the degradation of land in arid, semi-arid, semi-humid dry areas due to the various effects of humans and their function. In fact, the threat of life in the desert is more serious than other vital ecosystems of the Earth, and this violent figure is due to climate poverty or geological location. In other words, the birth of deserts during the history of the earth is a natural activity that Difficult geographic conditions have given birth to several hundred million years ago. What is recognized by scientific and international assemblies as desertification is a seemingly intangible but much more dangerous phenomenon than the desert Land and reducing production capacity of land or land degradation is largely the result of human performance. Therefore, to describe such a complex phenomenon, we must use criteria and indicators that are a means of defining, monitoring and evaluating desertification. Each criterion has several quantitative and qualitative indicators for measuring and monitoring that are measured continuously and continuously, in order to identify the effects of desert management. Most desertification plans and projects also need such indicators to determine if they have functioned properly. Therefore, this research is a first step in the continuous evaluation of desertification-related parameters and anti-desertification activities. Determining the indicators and criteria is the first step in which the aim is to examine the possibility of achieving a set of simple criteria and indicators. And it is logical to be able to get the closest possible assessment of reality from desertification and desertification.

Key words: desertification, desert control indicators, land degradation, desert management.

Introduction

One of the most important environmental issues in the last two decades is the issue of desertification. The phenomenon of desertification, in the sense of land degradation, is the degradation of natural ecosystems, which reduces soil fertility and biological production capacity in dry, semiarid and dry areas of the wetland. Desertification is often caused by environmental and socioeconomic factors on local, national and global scales (Rubio and Boucht, 2006, and Rubio and Ricatta, 2007). According to available statistics, about 70 percent of these areas have been subjected to some degree of destruction, resulting in a wide range of environmental, cultural, economic, social and political impacts on local, national and global scales (UNEP[1], 1997). However, there is no good indication of the extent and severity of desertification. Due to the extent of land affected by desertification, this trend is neither well-measured nor poorly documented, hence the need for national, regional and local effort and planning as an important priority (Lantieri, 2003). In general, therefore, it can be noted that natural resource management, especially desert areas, is in line with the unified and sustainable development approach (Long et al., 2015, Berks, 2012), which have many advantages in management and control Continuously, such as species conservation, livelihoods, employment, cultural values, justice, awareness and education (Hicks, 2016, Charles, 2014).

According to the United Nations Environment Program (2004), global damage caused by land degradation and desertification is estimated at $ 42 billion a year (Nunez et al, 2009). Desertification is the impoverishment of the ecosystems of arid, semi-arid and semi-arid regions by human activity (UNCED[2], 1992). Land degradation and desertification are a serious threat to fertile land around the world. The consequences of this threat include reducing food production, reducing access to clean water, increasing vulnerability to damaged areas, food insecurity and increasing poverty (Nkonya et al, 2011). The fact that most of the poorest and most vulnerable groups in the rural community in developing countries are affected by the devastating effects of some natural hazards and land degradation is due to the fact that their livelihoods are dependent on natural resources. . Considering the role of people in sustainable development and the extent of the natural resources of the country and its importance in sustainable development, the need for people's co-operation in managing natural resources is evident. Most of the natural hazards management projects that are designed and implemented for sustainable development are introduced as development engineering projects. A development engineering project, in addition

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[1] United Nations environment programme

[2] United Nations Conference on Environment Development

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to technical aspects, has economic, social and environmental aspects, and in this context, what ensures the success and effectiveness of development projects and programs, simultaneous examination and coordination of all these aspects and accurate recognition Interactions are between them. Therefore, recognition of the socioeconomic structure of rural society is considered as a work achievement. The situation of rural communities in dealing with the phenomenon of desertification has its own specific features in socio-economic fields (Akbari et al., 2013). Regarding the socioeconomic conditions governing rural communities, the low efficiency of factors of production in different sectors of the rural economy, the inability to use existing facilities and misuse of them are one of the most prominent economic variables that reduces the efficiency of natural resources (Bakhtiyar , 1376). In fact, by appropriately managing the desert, the behavior and attitudes of humans from the economic and social point of view towards the environment and nature are right or corrected, which ultimately seek to attain sustainable development of environmental resources, such as water and soil. (Sharama et al., 1995). Therefore, the use of these indicators can play an important role in determining whether or not desert control plans have been successful in the area in question.

1- Desertification and the factors affecting it

There are many definitions of desertification and land degradation. For example, some of these definitions can be cited. Desertification reduces biological potential and exacerbates soil in arid areas ecosystems, the dominant role of human activities in the process of desertification (Babayev, 1985), the development of desert conditions, and the reduction of biological power of ecosystems (Kherin, 1991). Desertification is the impoverishment of ecosystems in arid, semi-arid and semi-arid regions by human activities (UNCED, 1992). Land degradation and desertification are a serious threat to fertile land around the world. The consequences of this threat include reducing food production, reducing access to clean water, increasing vulnerability to damaged areas, food insecurity and increasing poverty. Nkonya et al., 2011). In the definition of desertification by FAO and UNEP (1984), desertification is the collapse of soil balance, vegetation, air and water in dry climatic zones. However, the onset of desertification is directly affected by climatic factors, but the severity of its effect in many areas is intertwined with human interactions, so that some elements of the climate, such as drought, as well as human performance play an important role in accelerating it (Akbari et al., 2008). The difference in definitions depends on the difference in the research conditions of individuals in that region; factors such as different climate conditions, human activities, soil, land cover and socio-economic factors are among the most important factors influencing the definitions. In addition, different expert views, such as climate, geomorphology, botany, geology, and views based on the prevailing ecology requirements in different regions, have

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contributed to a variety of existing definitions. In Iran, due to the large part of it in arid and semi-arid regions, agricultural practices such as irregular irrigation and mismanagement can cause salinity and soil degradation (Jaffari and Tavili, 2010). Human intervention in this phenomenon involves land conversion, uncoordinated farming in agricultural lands, deforestation, removal of vegetation cover for use as fuel and heat generation, etc., which jeopardize the health of the world's natural resources. So far, as a result of these interventions, 13% of the world's forests and rangelands have become desert, and 30% of these resources are at risk of desertification (Schelesinger et al., 1990) and (Atamuradov and Fet, 1994). Desertification is the destruction of lands caused by Human activities such as livestock grazing, road construction, population growth and mining, and believe that if such activities are combined with protective measures, the desertification process may stop and even improve (Giordano et al., 2002) . Desertification is considered to be the impoverishment of ecosystems in arid, semi-arid and semi-humid areas by human activities. He believes that this process of change ultimately reduces plant biomass, reduces plant and animal species diversity, and exacerbates soil degradation and increases the risks to human societies. Desertification occurs by a combination of social, political, economic, and natural factors that vary from region to region. Policies that can lead to unsustainable use of resources and lack of infrastructure lead to land degradation. Agriculture can play a positive or negative role, and depending on how its management of aggressive agricultural decision-making decisions over the nomadic system in more appropriate areas, why it can contribute to desertification. According to UNEP reports (2005), four types of human activities can have very immediate and immediate consequences for the creation and intensification of desertification; excessive livestock breeding, which causes poverty and poor soil protection against erosion, excessive exploitation of Soil is due to agricultural activities, felling of trees and deforestation that will cause dirty soil from atmospheric factors, as well as irrigation and drainage which leads to soil salinity.

The main causes of desertification and land degradation (Reynolds et al, 2011) include:

• Infrastructure development (dam construction, residential and urban land development, mining, gas, oil, etc.)

• Agricultural activities (gross grazing, mass production, etc.)

• Extraction of wood and related activities (harvesting as fuel, medicinal plants, etc.)

• Increased drought and climate change (indirect effects: climate change, temperature rise and rainfall reduction, direct effects: continuous droughts and increased fires, etc.)

• Population factor (migration, population density, declining land fertility due to increased planting for food production ....)

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• Economic factor (commercialization and development of business and its citizens increase planting and production)

• Technology Factor (development of new industrial innovations for harvesting, mining, etc.)

• Strategic factor and governance (increasing inappropriate strategies, subsidies, loans, land ownership, regime change, etc.)

• Cultural factor (attitudes about land use, lack of attention to water loss, land use mentality, individual and demographic behaviors in land use, etc.)

   2- Criteria and Indicators Effecting Desertification

1-2- Determination of Indicators Effecting Desertification

 Desertification is a phenomenon that threatens different regions of the world, especially the arid regions. To prove this, in many parts of the world, studies have been conducted to determine the rate of land degradation and the state of degradation. Case studies that have been carried out in Nairobi in order to prepare for the convening of the United Nations Desertification Conference (1977) on the phenomenon of desertification are among the most important studies in this regard. Researchers in the field of controlling desertification work that the assessment and management of desertification is only possible to measure and reliable indicators of this phenomenon are defined, but so far to determine the criteria and indicators that can be in the various international, regional, national and local use, possible yet and these indicators to determine the public have not been so determined indices and their validity for assessing desertification for the rest of the still questioning raise.

2-2- **Criteria and indicators**

 Criteria and indicators are a tool for the definition, monitoring and evaluation of desertification. Each criterion has several quantitative and qualitative indicators for measuring and monitoring that are measured continuously and continuously, in order to identify the effects of desert management. According to the definition of the European Environmental Agency, a criterion, such as a parameter or value derived from parameters that gives us information about an event (OECD[3], 1993) and (EEA[4], 1998), should not be confused with the raw information obtained from them. .

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[3] Organisation for economic co-operation and development

[4] European Environment Agency

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Criteria are qualitative information that simplifies how information describes things that change over time and place (EEA, 1998) and complicated events quantitatively and genuinely based on relevant information (UK Environmental Organization, 1998 and 1998 EEA). To describe a complex phenomenon is not enough, but several criteria that are carefully selected and managed (EEA, 2001). Indicators usually measure or examine quantitative aspects or qualitative state of the criteria. Indicators are variables that are important for assessing desertification, and, on the other hand, measuring them is easy and low cost. Indicator changes are measured, monitored and evaluated over time, indicating trends and trends in desertification. In other words, indicators indicate the amount of deviation or proximity to the ideal state or desertification. In general, indicators should have characteristics such as transparency, flexibility, scientific feasibility, enforceability, national constraints, compatibility and flexibility with the socio-economic, political and ecological conditions of each country.

3-2- **Characteristics of indicators and indicators of desertification**

Desertification assessment is a very difficult task, and benchmarks and indicators are used to measure the destruction of a key tool. A benchmark must be measurable and monitor the changes of a complex system and simplify the complex environmental, economic, and social relationships. The criteria can be divided into two groups of biophysics and socioeconomics. The introduction of desertification criteria should be based on scientific indicators and the relationship between the criterion and its role. The appropriate benchmark is to provide the best information on the desertification trend, using available knowledge and information at low cost. Therefore, the selection of the indicator should be such that even non-specialists (farmers and land users) can easily and quickly use them to assess their land degradation. Therefore, the following features can be suggested for the introduction and evaluation of desertification criteria and indicators (Dahle and Biller, 2001):

• You can make them a little.

• Measuring them objectively and practically.

• Be sensitive to minor variations.

• Can be measured on a national scale.

• Assess the current conditions.

• Measure and collect information and calculate them simple and low cost.

• Ability to identify trends.

• Ability to differentiate the effects of environmental and human factors.

• Fits into ecological phenomena and influences.

• Their number is limited.

Therefore, according to the above points, the indicators are selected based on the desired goals, and the descriptors can be characterized as follows:

1. Desertification indicators should be dynamic so that:

(A) Changes in the vegetation cover of the region over a period of time can be a sign of danger to resource degradation.

(B) Reducing agricultural production is an indicator of land degradation, demolition of agricultural land has led to an increase in unemployment and forced people living in rural areas to migrate to cities, which today is one of the major social challenges of big cities.

(C) Determining the factor of ownership is a factor in the degradation of agricultural pastures, so that farmers plow, leave or rent land for the purpose of maintaining their ownership, and the landlord will, to a minimum, use it to the maximum. Provides resources.

2. **Indices may be quantitative or qualitative.**

(A) Quantitative indicators for measuring and collecting information are simple.

 To study changes in the status of a phenomenon, qualitative indicators such as pastures or agricultural land levels in a given period, for example, 3 years or some social indicators that can not be provided quantitatively, can be identified as Qualitative presentation such as cultural, political or other indicators.

3. Indirect or Indirect Indicators: Some indicators clearly indicate degradation of land, such as the types of erosion or the presence of sand dunes. But others indirectly refer to the destruction of the earth. For example, the decline in the price of charcoal, which is indicative of the abundance of this, suggests an increase in the degradation of pastures and shrubs.

4. Indicators are at a variety of levels, as stated above, some of the indicators are global, as well as other indicators at the national, local and regional levels.

5. Indicators are presented in a variety of areas. Indicators may be socioeconomic or biological, climate, soil, vegetation, institutional and political. Therefore, the indicators should be properly categorized and the fields of each one should be specified. In general, we divide them into two groups:

1. Descriptive indicators: These indicators determine the status and changes in a specific environment. Descriptive indicators are generally used to measure and evaluate desertification processes.

2. Performance Indicators: These indicators are important for the implementation of projects, programs, in particular national projects for combating desertification, and used to evaluate and measure the success rate or failure of the projects. . Increasing expertise in a variety of fields, creating workshops, and enhancing NGOs can be of great help in specialized fields.

3- Introduction of the most important indicators of desertification control

1-3- Social indicators

1-1-3-Education Index

 Population literacy and education indicators can be used to indicate the rate or extent of population literacy. Enrollment and continuing education of the population of all sexes and ages in the schools and universities of the country are called to study. People who are studying from pre-school to high school in the education system under the supervision of the Ministry of Education are called 'students', and those who are studying at higher education institutes and universities under the supervision of the Ministry of Culture and Education, the Ministry of Health and Medical treatment and education, and other institutions of higher education, are called 'students'. In demographic, social and educational studies, students and students are also referred to as 'students'. The relationship below shows how to calculate the education index. (UNDP[5], 2016)

Relation (1) $EI = (\alpha)\frac{2}{3} + (\beta)\frac{1}{3}$

α= Basic Literacy Index   **β**= Basic registration rate at school

EI= Education Index

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[5] United Nations Development programme

2-1-3- **Age of education**

 The age of education is determined in each society according to its rules and regulations. In Iran, the first age for the first grade of primary education is six years, and for the other bases, this year, at least and with the social years of academic failure, is considered to be the maximum.

3-1-3- **Education Rate**

 The employment rate is calculated in both general and special cases. The relation between employment rate and the ratio of the rate of employment to special education is shown in relation2.

Relation (2) $Ep = 100 \times \frac{\gamma}{T}$

γ= Population 6 years and older   T= The population is studying

Ep= Employment rate of general education

Relation (3) $Es = 100 \times \frac{\delta}{A}$

δ= Population 6 years and above group   A= Special education population

Es= Special Education Rates

2-3- **Immigration Index**

 Today, population growth, on the one hand, and resource constraints on the other hand, have created problems that have increased the migration to large cities in most regions, especially rural areas, with different age groups, especially young people. Large-scale migration from village to city can lead to economic problems such as high unemployment and poverty (Sabouhi and Moghaddam, 2007). What can be considered in the migration process is the reasons, causes and motives of the migration of the villagers towards the city centers. Because, depending on the natural features, socio-economic conditions, as well as ethnic and cultural differences of the villages of the origin of immigration, the villagers refer to the cities in terms of their high living standards in terms of livelihood and welfare (Shamsuddini and Gorgian, 2010).) Lack of facilities, lack of suitable jobs for people and the elimination of major rural jobs, including agricultural occupation due to land burial in the process of moving wind sands and invading agricultural land,

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which today is one of the most important research debates in The field of natural resources is one of the reasons for the immigration of people from villages to the city (kashte, 2004).

Relation 4 represents the migration index.

Relation (4) $I = \frac{\omega}{K} \times 100$

ω= Number of migrations out of the area   K= Total population

I= Immigration Index

4- Economic indicator

Per capita

Distribution of income is of paramount importance in one of the old issues of political economy. What is meant by how the revenue from production is divided between the factors of production or how much each economic sector contributes. The unequal distribution of factors of production will naturally result in inappropriate distribution of income. Expanding class distances, unbalanced distribution of income and wealth, increasing the population below the poverty line ... All but signs of harming social welfare. In economic discussions, the responsibilities of governments are focused on three areas of resource allocation, consolidation and distribution of income (Vaezi and Zare, 2011). Therefore, calculating how much income in a region is, in order to analyze and calculate the human development index of that area can be very useful. How to calculate the per capita income indicator as follows: (kashte, 2004)

The average income in the target year (Y^*) is considered, and each income below it is calculated by the following methods. Relations 1, 2, and 3 each, respectively, are how to calculate the amount of income and then compare it with the previous year:

Relation (1)   If   1. $<Y<Y^*$ $W(Y)=Y^*$

Relation (2)   If   2. $Y<Y<2Y^*$ ، $=Y^*+2[(Y-Y^*)1/2]$

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Relation (3)   If   3. Y*<Y<3Y*   ، =Y*+2(Y*)1/2 + 3[(Y-2Y*)1/3]

5- Discussion and Conclusion

Realizing management plans in a region, regardless of the effects (applications) of socioeconomic indicators, not only does not yield desirable results, but also its negative effects far more. Identifying these indicators is necessary to allocate funds and resources between these areas. The concept of sustainable development in the literature is related to the relationship between the environment, the economy and the community. However, considering the importance and role of the culture of the modern age, the cultural dimension is also considered an important dimension. The concept of sustainable development is not only related to the next generation, but also relates to the present generation, and only with the participation of citizens and stakeholders.

- Therefore, it is recommended to do the following to prevent immigration:

- Context for the transformation of the rural economy and restoring the prosperity to the rural economy

- Encouraging investment in employment plans, developing public services and providing incentives and facilities tailored to local needs in villages, and reducing the migration process to metropolitan and metropolitan cities.

- Comprehensive and integrated management of natural resources for optimal exploitation of basic resources (water, soil and vegetation).

- Development, conservation and restoration of forests and pastures by reducing livelihoods and creating alternative nature jobs

On the other hand, due to the low literacy rate in the village and the lack of schools with different educational backgrounds for children in the area, it is proposed to build and build schools for these villagers, which form a larger part of the population. Also, at the request of adult learners for education, it is proposed to set up literacy movements for these people and different classes for this group (especially rural women). In this regard, given the suggestions made in the future for a better society, the major goals of futures studies, better understanding of opportunities and the selection of the best solutions, create the highest value and increase the quality of life. Therefore, active and participatory modeling for the future, with priority being given to a development that has the greatest impact on technology, economy and society, requires behavioral change and social change to achieve sustainable development. In other words, the concept of sustainable

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development does not only relate to a specific scientific association, but must also be portrayed to the general public.

- Desertification, prevention of desertification and stabilization of the sand, and the control of the formation of hotbeds with the participation of development group members with the priority of critical areas and the economic benefit of the development of vegetation in the region.

- Signing desert control projects towards the most radical production hub, the Village, which unfortunately has become the focus of immigration scene today due to the serious damage it inflicted. The pattern of most of these projects is a collaborative resource management model that always emphasizes the active participation of local people in decision making and implementation. In addition, with a comprehensive view, the presence of all parts of the various natural resources and other effective implementing agencies in the development and settlement of the village is considered together.

6- Acknowledgment

7- Resources

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