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The Arab world facing a development challenge: Climatic changes

العالم العربي أمام تحديات التنمية: التغيرات المناخية

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Abstract

The Arab world, as in the rest of the world, faces the problem of climate change with unprecedented effect on economic development. Although the number of effects is very large, the Arab world cannot identify them because of the difficulties of adaptation and non-climatic factors. We will see declines in agricultural crops, short vegetable seasons, disturbances in rainfall, access to groundwater will become difficult, and many unwanted aspects of health such as infectious and chronic diseases and an increase in the number of deaths. The desert sands continue to crawl into the agricultural lands and cities everywhere in the Arab world. It is our duty to think in terms of equality and justice, according to these phenomena and their effects, to our survival and that of our children (future generations), in order to reduce these effects and adapting. For this reason, each country has been given the responsibility to set its long-term Greenhouse gas emission control goals and to choose the most appropriate way. In light of the successive crises experienced by the Arab countries, especially with regard to the climate change situation and its implications for all aspects of life; human, animal and plants, it is necessary to think about the present generations and the future generations. We give them

what we have seen for ourselves, in response to the principle justice and equality between them and us.

Keywords: Arab World, Challenge, Effects, Climate, Equality, Justice, Generations, Water, Adaptation, Participation.

ملخص

يواجه العالم العربي، كما هو الحال في بقية العالم، مشكلة تغير المناخ بتأثير غير مسبوق على التنمية الاقتصادية. بالنظر إلى أن عدد الآثار كبير جداً، ما جعل الدول العربية غير قادرة على تحديدها بسبب صعوبات التكيف والعوامل غير المناخية. سنشهد انخفاضاً للمحاصيل الزراعية وقصراً لمواسم الخضروات واضطرابات في هطول الأمطار وسيصبح الوصول إلى المياه الجوفية صعباً، وانتشار العديد من المظاهر الصحية السلبية مثل الأمراض المعدية والمزمنة والزيادة في عدد الوفيات. سنشهد زحفاً كبيراً للرمال على الأراضي الزراعية والمدن في كل مكان من العالم العربي. يصبح من واجبنا أن نفكر بناءً على مبدأ المساواة والعدالة، ووفقاً لهذه الظواهر وآثارها المضرّة، في بقائنا وبقاء أطفالنا وأحفادنا (الأجيال القادمة) بهدف الحد من هذه الآثار والتكيف معها. ولهذا السبب، تم منح كل بلد مسؤولية تحديد أهدافها لطويلة المدى لمراقبة انبعاث غازات الاحتباس الحراري واختيار الطريق الأنسب لذلك. وعلى ضوء الأزمات المتتالية التي تعيشها الدول العربية، خاصة فيما يتعلق بحالة تغير المناخ وآثاره على الحياة كلها، الإنسان والحيوان والنبات، فمن الضروري التفكير في الأجيال الحاضرة وما يأتي بعدها من أجيال في المستقبل. نحن نعطيهم ما ارتأيناه لأنفسنا، استجابة لمبدأ العدالة والمساواة بينهم وبيننا.

الكلمات المفتاحية: العالم العربي، التحدي، الآثار، المناخ، المساواة، العدالة، الأجيال، المياه، التكيف، المشاركة.

Introduction

The Arab world is increasingly facing problems such as climate change. The climate is changing and the development of human activities by the production of greenhouse gases is accelerating this change. Despite its complexity, it has consequences for all economic spheres (poverty, development, population growth, resource management), political and societal in terms of equality within the current generation and that of future generations. In spite of the fact that the Arab world exports large quantities of oil to the industrialized countries which represent so many precious energy resources which will be deprived of the future generations.

As countries are rich in natural potential, how can their policies challenge this climate problem, which has effects on development, including intergenerational equality? The answer to this complex question opens up a field of research including political and ethical approaches and issues of justice and equality between present and future generations. In our methodology we will illustrate the different challenges we face and the mechanisms we will exercise to get by. Our field of research is that of the Arab countries, which suffer from the consequences of this phenomenon, starting from the Indian Ocean to the east and the Atlantic Ocean to the south. So my study will be on the theoretical side and on the other hand of the experimental one. Besides, we use graphs that answer the problem with a language of numbers, and maps to position phenomena in its place.

Development

The answer to this problem requires ample analysis of the various challenges hindering the development of the Arab countries and the action of their policies to get by. To do this, we will use a set of elements that allow us to better answer the questioning.

The challenges to overcome

The Arab countries, with their economic policies, in particular on the social education and political level, have almost all the successful impression of getting their country out of underdevelopment. We know that this world remains with problems requiring solutions like that of global warming. This phenomenon of global warming is known throughout the globe in general.

Definition

Global warming today is the phenomenon of temperature increase that has been occurring on Earth for more than a century, at the beginning of the Industrial Revolution (activities of human societies). Many scientists grouped within the IPCC (International Panel on Climate change), regularly study and publish where we are in terms of global warming and its evolution. They proved that the average temperatures on earth have indeed increased more or less regularly. In 2016, the average temperature

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on the planet earth was about 1 to 1.5 degrees above the average temperatures of the pre-industrial era (before 1850).

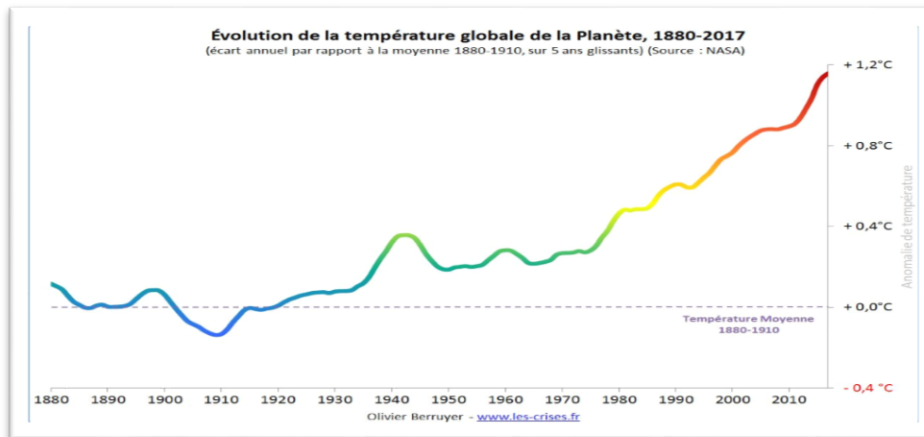


Figure (1): Evolution of global temperature of the planet 1880-2017.
(Annual deviation from the 1880-1990 average over five rolling years)
(Source NASA) Olivier Berruyer. www.les-crises.fr

For a long time, the Arab world has experienced extreme heat waves and their effects (droughts, floods, cyclones and typhoons), the loss of biodiversity and rainfall changes, so the complete disruption of the ecosystems, which could lead to destruction resources of existence (habitats, fields and herds). The chart below shows the phenomena that threaten ecosystem resources and hinder development, such as drought, floods and cyclones. We can see these phenomena, which, among others, hinder the development in the Arab world, through the graphic representation below:



Figure (2): Average Number of victims per year (calculated in period of 1980-2004).

Source: OFDA/CRED Disaster Database (EM-DAT), Catholic University of Leuven.

So the climate change experienced in recent years in Africa especially the Arab world has a direct influence on water and indirectly on health (chronic diseases, epidemics and decreased life expectancy) this subject alone represents a complicated study.

Water is a natural source of life and an important commodity for most of the economic activities of humanity. But this wealth is in the midst of concerns about the future of our future generations and our planet.

Statistics give us figures that are really discouraging; we only have 3% of the water that is fresh water, mainly in the form of ice. But each of us needs 20 to 50 liters of water per day to drink, cook and clean.

Other statistics show us that "per capita consumption will go from 150L/ day in the 80's to 200L / day in the year 2000 and 250L/ day in the year 2015" (Kamel & Nizar.1992). Admittedly, these quantities will

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appear very modest compared to those of the developed countries, which can reach 500L /day and sometimes 700L /day, for each individual in the big American cities. This means that Arab countries must compensate for this deficit in drinking water and that of agriculture. We can see below the table showing the population of Arab countries and domestic consumption of water.

Table (1): Population of Arab countries and domestic consumption of water for the years 85 and following, and forecasts for the years 2010-2015.

	Number of inhabitants (in millions) by census year	Annual domestic consumption (million m ³) consumption / inhabitant 150L / day	Annual growth rate (in thousands) for the period 1985-2015*	Population forecasts in the year 2000 in millions of inhabitants	Forecast annual consumption in 2000 (million m ³) consumption / inhabitant 200L / day	Demographic forecasts in 2015 (in millions inhabitants)	Forecast annual consumption in 2015 (million m ³) consumption / inhabitant 250 L / day
Jordan	85/2.694	147.497	37	4.647	339.231	8.016	731.460
UAE Emirates	85/1.622	88.804	17.8	2.113	154.249	2.753	251.212
Bahrain	87/0.416	22.776	22	0.552	40.296	0.765	69.806
Tunisia	87/7.362	403.070	25	10.148	740.804	14.667	1.341.101
Algeria	87/22.972	1.257.717	28.8	33.227	2.425.571	50.870	4.641.888
Djibouti	87/0.456	24.966	27.5	0.667	48.691	1.002	91.432
Saudi Arabia	86/12.006	657.329	32.7	18.916	1.380.858	30.714	2.802.652
Sudan	86/22.932	1.255.527	28.2	33.847	2.470.839	51.366	4.587.148
Syria	86/10.612	581.007	36.1	17.744	1.295.312	30.205	2.756.206
Somalia	86/4.760	260.610	26.6	6.874	501.802	10.192	930.020
Cisj / Gaza	86.1.381	75.610	37	2.296	167.608	3.961	361.441
Iraq	86/16.230	888.583	31.2	25.326	848.798	40.153	3.663.961
Oman	86/1.381	72.873	30.3	1.973	144.029	3.106	283.422
Qatar	86/0.305	16.699	27.9	0.494	36.062	0.800	73.000
Kuwait	85/1.697	92.911	27.8	2.560	186.880	3.863	352.499
Lebanon	85/3.019	164.385	26	4.436	323.828	6.519	594.859
Libya	86/3.955	21.536	34	6.315	460.995	10.428	951.555
Egypt	86/49.609	2.716.093	30.8	66.180	4.831	90.122	8.223.633
Morocco	82./20.419	1.117.940	26	32.409	2.365.857	47.629	4.346.146
Mauritania	86/1.900	104.025	29	2.835	206.955	4.354	397.302
South Yemen	85/2.294	125.596	30.8	3.615	263.895	5.698	519.943
Yemen North	86/9.274	507.752	31.9	14.391	1050.543	23.045	2.102.856
-							
Total	197.246	10.799.218		291.565	2.1284.245	440.258	40.173.542

* The annual growth rate appears in the World mark encyclopaedia the forecasts of the United Nations from 1985 to the year 2000, assuming that this rate is maintained until 2015. For Lebanon, the rate has been estimated according to the averages of growth before and after the civil war. (World mark encyclopaedia of the nations– 1988 – World mark Press – LTD; - John Wiley and Sons – 7^e ed- NEW-WORK. Volume 2 and 4).

But, unfortunately the Arab world is experiencing a definite decline in its environmental resources and water among the key areas that are under threat. In most countries in the Middle East and North Africa (MENA⁽¹⁾) region, water sources are diverted, misused or polluted by releases of hazardous products (sewage, agricultural effluents and other chemicals such as factory waste).

According to the World Bank, climate change will cause a scenario that will severely penalize this region of MENA, which is expected to experience droughts and heat waves even more pronounced than before.

The World Bank said (*With global warming and, in particular, changing rainfall patterns, most MENA countries will see their water supplies dwindle throughout the 21st century, with experts expecting losses above 15% for an additional 2°C in average temperatures, but which could reach 45% if the temperature increases by 4° C*). The Arab world, especially the MENA are experiencing the phenomenon of irregular rainfall. It has two aspects:

- Internal rainfall, which is quite specific to the region. It can happen from one year to another, the total rainfall can vary in very large proportions from single to double and sometimes more. There is therefore a need to store water from one year to the next. We quote Algeria as an example, the winter of 2018 did not experience any rain until April and every next year we will have late or early rains.
- Intra-annual (within the agricultural year). Between a hot and dry season and a cooler wet season.

This double irregularity of rainfall has serious consequences on the distribution of seasons, forecasts of temperature, agriculture and life in general. This will cause us to be unfair to our future generations as a result of tremendous pressure on scarce water resources as demand rises faster than population growth; (*the Arab world has undergone remarkable*

(1) Mena: English acronym (Middle East and North Africa) means a large region, from Morocco in North-West Africa to Iran in South-West Asia, which generally includes all countries Middle East and North Africa.

demographic changes. Over the past 60 years its population has increased by around 37,8% at a rate of 2.1% per year. At this rate, the population of about 359 million is expected to double in about 35 years)⁽¹⁾ (UNDESA, 2011).

The supply will experience a drop due to changes in precipitation and the intrusion of seawater into underground drinking water supplies. These phenomena result from climate change and the excessive use of groundwater, which can reach 51% by 2050. This situation may put Arab countries below the level of absolute water poverty, which is the scale of 500 m³ per person. We can cite the example of Tunisia in overexploitation of water from groundwater and deep aquifers.

Table (2): Level of exploitation of groundwater resources by natural region and by type of groundwater in% (year 2005 DGRE).

Year	2005		2010	
Region	Phreatic Aquifers	Deep Aquifers	Phreatic Aquifers	Deep Aquifers
Northern Tunisia	106	44	104	59
Central Tunisia	119	75	139	102
Southern Tunisia	94	97	95	98
Total	108	81	114	91

Source: Calculations from various data sources: including FAO, 2008.

The exploitation has circumstances on the aquifers themselves: the water quality of the aquifer by the intrusion of poor quality water (marine for some coastal aquifers and sebkhas (salt water) for those of the interior). Subsequently these degradations have repercussions on the good functioning of the farm, which results in the lowering of the level of the agricultural yields, and pushes the agricultures to abandon some cultures.

(1) UNDESA Department of Economic and Social Affairs. *World population prospects: the 2010 revision*. New York, NY: United Nations, Department of Economic and Social Affairs; 2011.

In countries like Tunisia, after a very difficult summer 2016, this country has experienced a drop of 30% in the rainfall rate, the water is very limited and it shows in the water cuts, the thirsty vegetation and empty dams. This lack of water affects different areas such as agriculture, which accounts for 82% of water demands and does not meet the need for drinking water, for domestic, industrial or tourist use, which amounts to 17%.

In Syria, severe droughts in the east of the country have destroyed the livelihoods of 800,000 people and have decimated 85% of livestock, 160 villages were abandoned before 2011⁽¹⁾(El-Zein et al., 2014, p 458-476), a decline in household income of about 7% in Syria and 24% in Yemen, even tourism will suffer losing 50 billion dollars when tourists will lend countries with a more moderate climate. Prolonged periods of drought will cause loss of agricultural and pasture land and rural livelihoods. I refer to the example of Lebanon, where snowfall in areas hosting ski resorts, as well as the coral reefs of the Red Sea, and several monuments in this region will be threatened by climate change. These effects, assigned different levels of confidence by the IPCC, are expected to have significant impacts on water and food security, as well as the health and spread of disease.

Variability and climate change affect birds and animals in different ways, birds lay eggs earlier in the year than usual, plants flower earlier and mammals come out of hibernation rather than decades preceding. We estimate that about 23% of birds are considered threatened by IUCN⁽²⁾ (IUCN. 1948), *(its program includes three areas:*

- *Valuing and conserving nature, highlighting both the tangible and intangible values of nature.*

(1) El-Zein, A., Jabbour, S., Tekce, B., Nuwayhid, I., Khawaja, M., Al-Mooji, Y., (2014). *Health and ecological sustainability in the Arab world: a matter of survival*. The Lancet, volume 383, Outcome 9915, 1-7 february, p 458- 476.
See:<http://medwet.org/wp-content/uploads/2016/11/Climate-change-victims-in-North-Africa>.

(2) IUCN (International Union for the Conservation of Nature). A global non-governmental organization founded on 5 October 1948.

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- *Effective and equitable governance of the use of nature.*
- *Nature-based solutions to global climate, food and development challenges to broaden IUCN's work on the contribution of nature to addressing sustainable development issues, including perspective of climate change, food security and economic and social development*⁽¹⁾(IUCN. 2012) (International Union for the Conservation of Nature).

What is clear is that the rise in temperature is putting intense pressure on crops and already scarce water resources, phenomena that can increase death, illegal immigration to Europe and the risk of internal conflict. And the question then is how to ensure an adequate supply of food and water in the short and long term, despite declining reserves, threats from climate change, dwindling arable Growing demands of the population and pollution, or what are the adoptable mechanisms, the policy to get to end these problems. The answers to these questions will be clarified in the following paragraphs.

Mechanisms

The daily transformation of the landscape of the Arab world along the whole of Africa and the Middle East, which changes from one year to another, the way of life; that is to say, poor nutrition, diseases, the crisis in drinking water. And, to get by, everyone is concerned to find mechanisms to challenge all these problems.

Participation

Participation is one of the principles deriving from the ethics of responsibility which (*refers to the procedures, steps or attempts made to give individuals a role in making decisions affecting the community or organization to which they belong*)⁽²⁾(MELIN & CHOAY, 2000, p575). In the case of climate change that knows no borders, everyone is concerned

(1) IUCN, 2013-2016. September 2012. Jeju, Korea.

See http://cmsdata.iucn.org/downloads/uicn_programme_2013_2016_fre.

(2) MELIN P., CHOAY F., (2000), *Dictionnaire de l'urbanisme et de l'aménagement*, Press Universitaires de France, Paris p. 575.

and must participate. At the Rio Earth Summit in 1992, Tenth Principle clearly calls for participation in any environmental issues *"The best way to deal with environmental issues is to ensure the participation of all concerned citizens. At the appropriate level (...) States should facilitate and encourage public awareness and participation by making information available to the public"*⁽¹⁾ (United, 1993). And, the fight against global warming represents a tremendous opportunity, a source of development and societal and economic innovations.

The creation of the Intergovernmental Panel on Climate Change IPCC's mission is to publish reliable information on the global climate. This international scientific body has demonstrated that there is an urgent need to understand and act at the regional or even sub-regional level, such as sub-Saharan Africa or the Sahel, which is also considered to be the most vulnerable region to manifestations of change climate. This information provides important benchmarks on the level of each country's contribution to pollution and GHG emissions, i.e. a carbon budget. Hence, these countries commit themselves to carry out concrete actions against the adverse effects of climate change by means of financing mechanisms intended for this purpose, i.e. a collective work to be done to get by *«If it is not properly managed, climate change could endanger not only the environment but economic prosperity ... and, more broadly, peace, stability and international security"*⁽²⁾(IPCC, 2014).

We must raise awareness of this climate phenomenon and create a lasting call for action in the Arab world. And for this, governments in the MENA region are urged to put in place green solutions to reduce their CO₂ emissions and sustainably protect livelihoods and their natural resources,

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- (1) United Nations, (1993). Department of Public Information, Rio. Declaration on Environment and Development. Principle of Forest Management, 1993, May.
See: <http://www.un.org/english/events/rio92>.
 - (2) IPCC, (2014): *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R. K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

especially drinking water, in the face of climate change, and adapt territories to the effects of climate change.

And as climate change is already there, and is producing real effects everywhere in the world, it is necessary to adapt. This involves the maintenance and preservation of the natural heritage (forests, dikes) and the development of the urban space (fountains, refreshment areas, green spaces, trees planting...), the protection of property and people (fight against energy poverty.)

Adaptation to climate change requires initiatives and measures to reduce the vulnerability of natural and human systems to the effects of climate change in the present and future. This adaptation is individual by modifying its behaviours and those of the collective, involving communities and businesses by limiting emissions of greenhouse gases and restore or protect the carbon sinks of ecosystems or agro-ecosystems. And take serious initiations in favour of challenging these climate changes. However, this step forms the basis of participatory democracy *"we then witness a phase of cultural learning of a difficult work in common between actors belonging to very different social worlds"*⁽¹⁾ (WUHL, 2008).

Principle of responsibility

According to Paul Ricoeur, someone is responsible only for past acts, but Hans Jonas has developed an idea about the responsibility towards the human being of the present generation and that of the distant future. By basing this reflection on the responsibility, the author intends to approach in an original way the ethical question in the contemporary technological civilization. Humanity, for Jonas, is a legacy to be preserved, so must continue in the future and we must make it possible, and to transmit. For this reason, Jonas proposes a heuristic of fear in order to increase the "radius of action" of the responsibility and to answer the new ethical requirements of our technological civilization so that the man will not infringe the rights of existence others of the same generation or of future

(1) WUHL, S., (2008), "participatory democracy in France: historical references", Research Institute and debate on governance.
Online <http://www.institut-gouvernance.org>. Viewed on 2018, June 3.

generations (some things are entrusted to us which is essentially fragile), and will perish "*the city is perishable one day, and its survival depends on us*" ⁽¹⁾ (BINDE, 1998, p21). Each institutional system does not survive "*without being supported by a desire to live together ... When this desire collapses, the whole organization gets rid of, very quickly*"⁽²⁾ (BINDE, 1998, p 21).

The case of the Arab countries is very complicated; their policies are facing the problems of desertification "the biggest environmental challenge of our time" of their land, the exponential rise of greenhouse gases and global warming, more and more they are called to react by developing sustainable management programs green dams to curb the movement of sands to arable land and forests (carbon sinks) because they are important carbon stocks and to develop seawater desalination technology and to verify compliance to sanitary standards. The construction of the dams meets multiple objectives, among them the supply of drinking water after their treatments. They form sustainable stocks, instead of excessively exploiting well water until depletion of that wealth.

While GHG emissions have mainly been caused by so-called "developed" countries, these changes are likely to occur in so-called "developing" countries, as well as in less developed countries. If the north is responsible for GHG's, it is the south of the planet that suffers and will suffer most of the consequences. We are facing a situation of notorious injustice. This raises obvious issues of distributive and restorative (restorative) justice between nations, not only ecological justice but also economic justice.

Financing

Africa's contribution, in general, to overall greenhouse gas emissions is minimal. Yet the combination of certain geographic and economic

(1) BINDE, J., (1998) *Pour une éthique du futur*, Les cahiers du MURS n°35, p 21.

(2) Ibid.

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factors as well as dependence on natural resources, make Africa the most vulnerable continent to the adverse effects of climate change.

The areas of intervention suggested by Africa to be supported are:

- Preparing African countries for access to climate finance.
- Integration of climate change and green growth into programs and projects;
- Capacity building and institutions⁽¹⁾(ACCF, 2014).

It will be useless to tackle a project of this size in the Arab world (fight against climate change, transition to green growth) without recourse to financing from a global or local bank. For this reason, the international community has institutional and scientific climate policy governance, and several financing mechanisms such as the adaptation fund and the carbon fund.

In Africa, the African Development Bank (ADB) mobilized in 2011, for Regional Member Countries (RMCs) \$596 million for adaptation projects and \$925 million for mitigation projects, and in 2012 figures were increased to \$523 million for adaptation and \$1708 million for mitigation⁽²⁾ (The A, D, B, 2017).

The principle of sobriety

Sobriety is a formidable criterion for managing our economic and social environmental crises *"It is absolutely certain that sobriety, if it were to spread, would be a formidable antidote to destructive excesses. Changing paradigm means, according to our aspirations, putting the*

(1) Africa Climate Change Fund (AFCCF) (2014), Supporting African countries to access international climate finance.

See, <https://www.Afadb.Org/fr/topics-and-sectors/initiatives-partnerships/africa-climate-change-fund>.

(2) The African Development Bank, Germany 2017. See <http://www.afdb.org/fr>.

human and nature at the heart of our concerns and all our means at their service”(1) (Pierre, 2013, p114).

Sobriety is an art and an ethics of life, a source of satisfaction and a deep well-being that calls into question the gigantic waste of energy consumption. It is a conscious choice inspired by the reason that faces the "always more" indefinite that destroys the planet for the benefit of a minority. It indicates a political stance and an action of resistance in favour of the land, sharing and equity. The American economist Thorstein Veblen (1857-1929), his thought of "ostentatious consumption" teaches us that the desire of the middle class to imitate the modes of the most fortunate can lead to a cultural epidemic of environmental degradation.

Promote sobriety and energy efficiency; develop alternative sources of energy, sustainable and renewable, adapted to the needs of the populations of North Globe and its South. And to better understand the problem of global warming, the use of renewable energy will become a solution for everyone.

Mobilization of renewable

World demand, particularly Arab energy, is growing at 2% per annum on average. While it tends to slow down in some countries despite industrialized, Arab population, despite their low industrial level, household energy consumption continues to increase. This situation cannot be sustainable. It is time to develop an energy model based on the competitiveness of renewable energies, which forms a real opportunity and a challenge. Going towards renewable energy or decarbonization is possible only through the means of sobriety and efficiency in all consumption and production sectors, and thanks to ambitious and realistic development with renewable sectors.

The Arab world is favored with significant renewable energy resources in the world (solar, wind, hydroelectric, biomass) that can be exploited and transform this Arab world to an economic power on a global

(1) Pierre Rabhi, *Vers la sobriété heureuse*, éditions Actes Sud, 2^e édition, Arles, 2013, p114

scale. In addition to its wealth of solar radiation throughout the year, experts agree that this world has a huge pool of solar energy.

We find in the Arab world countries that are convinced that the use of renewable energies is a necessity for sustainable development. We cite the example of Algeria, Morocco, Jordan and Egypt. Algeria with its natural potentials; the sun in particular, has invested in its Sahara, with the aim of bringing electricity to remote and isolated regions. This has been a great advantage for farmers who have placed photovoltaic cells to start their irrigation systems and overcome the problem of diesel that were used before. Algeria has issued a series of recommendations, including making investments for production ranging from 500 MW to 1G by the end of 2018, and aims to produce 27% of its energy mix by 2040.

The Arab world is in full development, so the needs are growing but their energy production remains limited. However, scientists around the world are trying to promote national energy independence. In Egypt, in 2007, President Mubarak decided that his country would go ahead with nuclear energy. It will have to deal with its future electricity needs because of the short life of its oil and gas resources, as well as the limitations of its hydroelectric power in Nile water.

After enacting laws regulating the safety and security of nuclear power, Egypt has signed an agreement with Russia for the construction of the first Egyptian nuclear power plant in the El-Dabaa area in the northeast of the country (the Mediterranean Sea coast). The project, led by the Russian public Rosatom group, includes the construction of the plant, the delivery of nuclear fuel, the training of workers and the maintenance and repair of production units.

Now the Arabs are questioning the use of nuclear energy and opting for other energy policies such as renewable energies. The Gulf countries are developing numerous research projects on renewable energies and consider themselves to be essential partners in their production, for example the exploitation of which decides to reach the 25 % by 2020. Another example is Qatar, which decides to limit the import of foodstuffs

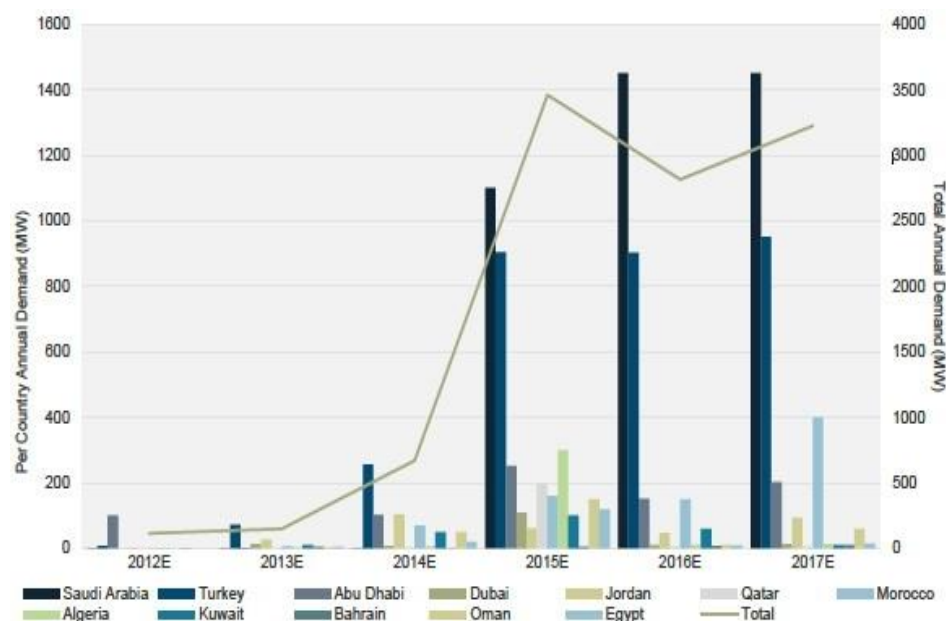


Figure (3): Inside MENA Countries' Solar Energy Plans.

Base case MENA demand forecast, in megawatts (MW)

(Source: Green tech Media)

By using solar energy to desalt water for irrigation, all the Maghreb countries, Tunisia which decides to set up the installation of 40 solar projects in the years to come. Morocco, Algeria, two countries that carryout very large projects in the South where the heat is very high and lasts almost the complete year. The North is for wind turbines that operate under the force of strong winds and throughout the year.

We can quote the example of Algeria in this program in renewable energies by referring to the following image.

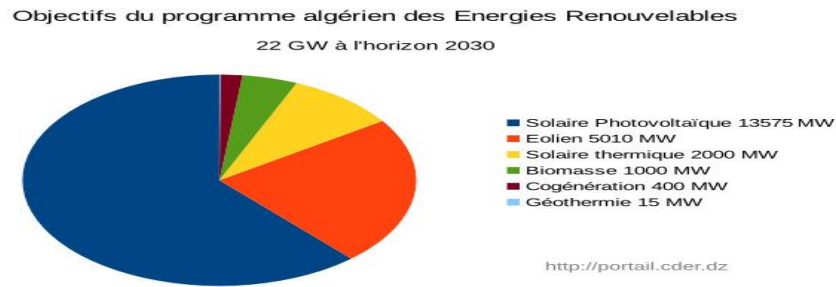


Figure (4): Objectives of the Algerian Renewable Energies Program 22 GW by 2030.

This picture shows us that Algeria has invested in all types of renewable energy; photovoltaic, wind energy, thermal, cogeneration and geothermal. Solar energy reaches the rate of more than two quarters, followed by the wind of a quarter then the rest of the other energies

We also quote the example of Morocco in its renewable energy program, which has made considerable progress at the African and Arab level.

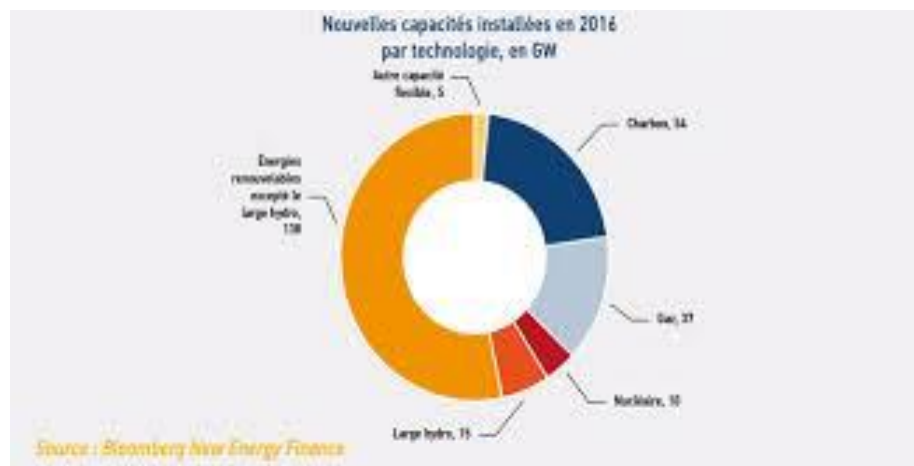


Figure (5): New capacities installed in 2016 by technology, in GW (Morocco).

Source: Bloomberg New Energy Finance

We note that the new renewable capacities have set a new record with, for the year 2016 alone, 138 GW.

Certainly, the location of this technology requires enormous efforts to face the various challenges, the costs of the necessary equipment, the skills in the field of renewable energies, then a firm political will to develop renewable energies, of which the Arab countries are not at the same level of competitiveness and human and material potential, but that does not prevent to work in collaboration to carry out this project.

Climate governance

With regard to known concerns about global environmental change, collaboration has become necessary to address emerging issues such as global warming, which has given rise to the notion of global climate governance officially recognized in 1992 in the world. The United Nations Framework Convention on Climate Change (UNFCCC) was one of the outcomes of the first Conference on Planet Earth ⁽¹⁾.

Everyone is aware that Africa is the continent most affected by climate change and its disastrous effects. Since the Rio Conference, many issues have been raised that illustrate the difficulties of reaching binding agreements on many issues such as *"financing, adaptation, mitigation of climate change, technology transfer and climate change"* ⁽²⁾, increasing the instability of the Conference of the Parties to the Convention. Thus, global climate governance will address Africa's needs and must be analysed with precision, and the implications for the future of African economies and development programs in Africa need to be addressed by policy makers at all levels.

The year 2015 was particularly important for global climate governance by launching the Sustainable Development Goals. The global agreement on this goal is the formulation of the imperatives of sustainable

(1) The Rio de Janeiro Earth Summit was held in Rio, Brazil, from 5 to 30 June 1992, *bringing together 11 Heads of State and Government*.

(2) United Nations Economic Commission for Africa.

See, https://www.uneca.org/climate_governance_and_climate_policy_in_Africa.

development in the twenty-first century on a global scale. It will be useful for Africa by providing concrete opportunities to improve the integration of Africa's interests in global climate governance.

Recommendations

It is essential to provide recommendations that serve as public awareness and policy tools for taking steps to reduce the impact of warming on the development of Arab countries.

Among the various recommendations for climate change, measures must be taken to help men and women understand and adapt to these changes at the household level. Because of their central role in society, women can influence the attitudes and behaviours that these new livelihoods and new forms of social organization require, and among these measures have been presented above, for example sobriety.

Since water is scarce and used for a variety of competing purposes, the region needs a strategy that goes beyond simple technical solutions to review the rights regime, the regulatory framework and public partnerships-private in the field of water.

The countries of the Arab world and households need to diversify their production and sources of income; the issue of adaptation needs to be mainstreamed into all policy decisions and initiatives. These countries must demonstrate a constant commitment to combat the various social, economic and ecological consequences of climate change.

The states of the Arab world are in a position where it is in their interest to adapt to the circumstances of their economic, political and geographical position in the world. To meet its challenge to crises and multiple problems that surrounds it including that of global warming which are becoming increasingly, nationally and internationally, a great burden and a perilous thing that threatens humans and other species.

I think that by drawing inspiration from their heritage, rich in experience for centuries and acting in a concerted manner, the Arab countries will once again be able to meet the challenge and succeed fully in their adaptation to climate change.

Conclusion

The Arab world is going through a very delicate period characterized by a severe climate change that influences the environment in general, the increase of the heat, the precipitation, the exhaustion of drinking water under the influence of the drought, the population increase and the aspects of the standard of living of the Arab individual who are improving urbanization example.

And, to get out of this situation, it considers the mechanisms illustrated above, such as participation, the principle of responsibility, financing, the principle of sobriety and the mobilization of renewable energies, without neglecting the governance of the climate international scale. All these tools allow us to lead our development and think in terms of justice and equality between current and future generations.

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