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Desertification phenomena in Algeria

Bachelor Thesis

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Declaration

I declair that the Bachelor Thesis Desertification phenomena in Algeria is my own work and all the sources I cited in it are listed in Bibliography.

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Summary

For several decades the natural resources of the algerian steppe (soil, water, vegetation ect...) have been decreasing and degrading under various combined effects that are caused by humans, animals, and natural impacts.

These degradation is a fast process which causes land's transformation into a desert in arid and semi-arid areas, due a weak and traditional management of the territories, administration, socio-economic, political changes, and the absence of a durable and suitable measurement of the degrade area, also the lack of technical experts who could fix the issue and bring up modern techniques and get rid of the old management which is completely useless, in order to manage pastoralist activities and control the ecological biodiversity. New rules and new thinking must be brought up to ensure the safeguarde and durable developement of the natural resources. Also pretending to ensure food secrurity in order to reduce poverty in steppe regions.

Moreover, algerian politics made a considerable effort in the pastoral and agro - pastoral zones, however they were failed to limit land degradation and the situation remains alarming.

This destruction lead to more negative effects on the environment and population, because the inhabitants of steppe regions will have to deal with food security which became alarming as well and increases of poverty that affect more the families who used to live from agro - pastoral lands or small quantity of livestock. This poverty will bring fears and dubts from dying hungry, so this last will create another negative effect which is the mobilization and the movement of the population in steppe toward coastal regions and especially the capital. In fact big population concentration and density will appear in the coastline regions which will lead to several social and economical problems and issues in various domains.

Key words : Algeria, desertification, soil degradation, environmental risks

Content

1. Introduction

According to the UNCCD (1994) desertification represents a very considered phenomenon, which is defined as the degradation of land in arid or semiarid regions caused by climatic changes, human influence, or both. Climatic factors include periods of temporary but severe drought and long - term climatic changes toward dryness. Human factors include artificial climatic alteration, as through the removal of vegetation which can lead to unnaturally high erosion, also an excessive cultuvation and the exhaustion of water supplies.

At the United Nation Conference on desertification (UNCOD) in Nairobi (1977), definition of desertification was agreed upon that it could be the reduction of biological potential of land which can lead to transformation into a desert like a forever condition of that region or country.

UNCCD (1992), confirmed that land degradation in an arid and semi - arid area is resulting from various factors including climatic variation and human activities. There is a correlation between human activities and climate of long - term changes.In addition of that previous factors, both of livestock quantity and density of population lead to accelerate degradation movement and progression.

According to the UNCOD (1996) desertification occupies 3,6 milliards of hectars on the universal parameters, which is about 25 % from the total earth's surface. 110 countries risk the degradation of their soil. In some countries as Benin, the lost of the agricultural lands because of the desertification achieves 12 millions hectars every year.

Glantz and Orlovsky (1983) found that desertification has a different impact on the environment and land's degradation. Reining (1981) said that it could be deterioration of ecosystem. Le Houerou (1975) had mentioned this impact as a various vegetation degradation. UNCOD (1978) determined the effects as a biological potential destruction. Hare (1977) found that the impact is an alternation in biomass.

Desertification in Algeria is a big problem which mostly concerns steppe region of arid and semi - arid areas. In fact recently, our national news papers are alarming from desert progression toward coastal regions and the capital, as "El Watan" on Friday 15th june, 2012 published an article about how Algiers,the capital is also in danger because desertification process. However, Houerou (1985) focused mostly on steppe region and that agricultural lands productivity is affected by dryness and authropic pressure developement. For more than thirty years, Algeria had been suffering from desertification process, even when our politics had been trying to find out the solutio, so in 1974 they brought up « Green Dam » project. Aidoud (1996) found that desertification in Algeria is caused by natural (dryness, rainfall, erosion..ect) and human (overgrazing, deforestation, Urban constructions on agricultural lands...ect) facts.

2. Objective of work

Desertification isn't only a national problem, its a global issue that affect several countries all over the world. This studies will show the statistics which had been made by the United Nation about desertification phenomena and why its realy important to fight against it where ever it is.

Precisely the situation in Algeria, especially in the steppe region where we can focus and give a good exemple to study about this phenomena, so we could find the real causes of desertification in Algeria, also it impacts on population and the efforts which had been lunched by our governemnt to struggle against this phenomena.

It will also show how among time the natural resources in algerian steppe (soil, water, vegetation) had been reduced. It will also bring up other solutions from other different countries that have been facing the same climatic conditions, in order to compare it with the algerian government´s efforts that had been released to fight against desertification, and to find out if our government did make a bad monitoring of the situation. So we could expect some other solutions for the future of our country.

3. Literature overview

3.1. Importance of agricultural lands

Productive agricultural lands provides food security and self-sufficiency, also its a mother material for industry. Agricultural lands has a different productivity and this is due to long-term physical limitation for agricultural use, and the natural conditions. MAFF; Agricultural land classification of England and Wales (1988) had revised guideline for grading the quality of agricultural lands and they specify the affecting factors as the following :

- Climate: temperature and rainfall aspect and frost risk.
- Site: gradiant, micro-relief and flood risk.
- Soil texture: texture, structure, depth and stoniness, chemical properties which cannot be corrected.

When climates and soil factors are combined, it determines soil wetness and droughtiness that will infleuence the choice of crops to grow and yield consistency level.

3.2. Drought

FAO (2007) defined drought as slow-moving disaster, destroys food crops, kills human beings and animals and has long - term effects on the environment. Drought will lead the land to lose the protection of vegetation and becomes vulnerable to erosion by wind and when the rains finally return to erosion by water.

3.3. Land or soil degradation

According UNCCD (1992), land degradation is a reduction in land production and biodiversity, which can be observed as many degradation types:

- Wind Erosion
- Water Erosion
- Overgrazing
- Dryland Salinity
- Soil Acidification
- Irrigation Salinity and Waterlogging
- The Replacement of Natural Vegetation with Pasture
- Soil Structure Decline
- Clearing of Natural Vegetation

3.4. Erosion

According to the online dictionary Babylon.com; erosion is coming from word Erode that mean to eat away, wear out or to destroy the surface. From Green (2011) posted that soil erosion is a natural process, but it can be as a result from the destruction of natural ecosystems (especially forest), particularly on steep hills and mountains, as well as in the plains. Deforestation is a huge environmental issue, every day thousands of trees is cut down, all for the aim of industrial needs**..** Erosion causes the loss of soil fertility, which reduces future crop yields.

3.5. Soil pollution

Green (2011) mentioned that soil pollution means changing the physical, chemical and biological properties of soil, leading to a reduction in its fertility and ability to conduct normal process of decomposition.

3.6. Global status of desertification around the world

Table 1 : Statue of global desertification

Types of degradation	Area(millions of hectars)	Relative importance (%)
1.Irrigated areas	43	0,8
2.Rainfed agricultural areas	216	4,1
3.rangeland areas	757	14,6
4.Total drylands degrade by human factors	1.016	19,5
5.Rangeland with vegetation deterioration without soil deterioration	2.576	50,0
6.Total degrade drylands(4)+(5)	3.592	69,5
7.Non-degrade drylands	1.580	30,5
8.Total dryland area (6)+(7)	5.172	100

Source: UNEP Desertification status report,1996.

From table 1, UNEP (1996) estimated that 3,6 billion hectars are affected by desertification, where all 70% representing dryland and about one-sixth of the world's population. The 0,8 irrigated areas of all dryland are affected as well from degradation processes, mainly salinization and alkalinization. According to some scientists,the whole world is losing about 1,5 million ha of irrigated areas every year.about 216 million ha rainfed lands (4,1%) of all dryland are affected by desertification processes where soil loses its physical abilities and

become so sensitive to soil erosion, also less fertile because of the reduction of nutrients. It is estimated that the world is losing about 7-8 million ha of rainfed crop land each year. Rangeland are affected in degradation of their vegetation by soil erosion mainly.

3.7. Universal problems and global indicators related to process of desertification

Causes of land degradation can´t be generalized across all desertification cases. It depends on range-land, rainfall and irrigated areas. According to UNEP (1996) main causes of desertification in range-land are: human activities (overgrazing, farming of average land, destruction of plants in dry regions and incorrect irrigation), also climate changes and crises. In fact the main desertification problem in irrigated agriculture is "salinization" .

3.7.1. Human activities

Humain activities are basically direct factor of desertification. The demographic developement will demand higher needs of food, in fact the developement of agricultural products can be depended only on the environmental space and its natural ressources. So the higher food demand from a less productive area will create a pressure on the ressources and negative activities as Overgrazing, clearing and deforestation. This activities will directly affect the vegetation and causes degradation. The present pressure will not satisfy the needs of population, in fact it will only cause unexpected climate, demographic and economic crises which will lead to poverty and desertifcation .

3.7.2. Overgrazing

Overgrazing can be defined as the practice of grazing from big quantity of livestock over a long period on land which is unable to recover it vegetation, also it can be also result from climate´s change. Allowing to a large number of animals to graze may include other indirect causes that could response to the fact of overgrazing as : selecting inappropriate times for

grazing, often too early after the beginning of rainfall, traditional land-use and grazing rights. The main indicator of overgrazing is the « disapearance of range-land » because animals prefer to eat some plants more than other ,which is called « platable-plants »

3.7.3. Farming of average land

Farming of average land is causing desertification worldwide. Farmers are clearing average land, and using it which takes away the richness in the soil. People should let the average land replenish itself beforefarming.

3.7.4. Destruction of plants in dry regions

Destruction of plants in dry regions is causing desertification . People are cutting down trees to use them as a source of fuel. Once all these trees are cut down there is nothing to protect the soil. Therefore, it turns to dust and it is blown away by the wind.

3.7.5. Salinization

Incorrect irrigation is commonly used in poorer areas, which basically causes salinization that involves a number of interrelated processes occuring in the soil, for example waterlogging, increasing salt content, ect. Some farmers are using canal irrigation and other poor techniques because the lack of water. The lack of advanced techniques increases the amount of salt in the soil.

3.7.6. Climate crises

Climate factors have also important impact on desertification and on the population life style. Dryness, especially in the steppe which is between the most affected zone by desertification. The little rainfall lead to degrade the natural ressources, it becomes more hard for the ecologic systems to resist . However dryness impact has less affection where is less population and animals. For some authors dryness alone isnt the direct reason of desertification in the affected zones, however its considered as one of the important factors that leads to desertification.

3.8. Desertification in Algeria

3.8.1. General view about Algeria

Algeria is situated in the north of Africa with the bigest surface today, it covers approximately about 2 831 741 Km2. Capital is Algiers,it is located in the middle coastline of the algerian territory. Algeria is bound by: Tunisia and Libya from east, Maroco, Moritania and oxidental Sahara from the west, Mali, Niger and Tchad from the south and Mediterranian sea from the north. The nationl territory is devided into 48 big cities.

Algeria has two mountain range; first is Till Atlas in the north and second is Sahara Atlas in the south , this two mountain range are deviding the country into three different land's zone according to their morphology and their own ecological biodiversity. From north toward the south its distinguished by Till Atlas, high plains in steppe and Sahara.

Population is composed mostely from arabs (80 %), the rest are berbers. The official language is Arabic.

3.8.2. Historical and geografical view of Algeria

The territory of today's Algeria was the home of many old various cultures and civilizations as Aterian and Capsian cultures in adition of Berbers , Numidians , Romans , Vandals and later Ottman (turkish) . Algeria had been occupying by french colony for more than 100 year (1830 – 1962) .

Algeria could never find it political stability since independence up to 2000 ; two from our president were killed one in 1978 and second in 1992 , also the black 10 years of terrorism (1990 – 2000); which influenced negatively people life, economic of the country also agriculture and industry .

Algeria is situated in the north of Africa , its southen part include an intersting portion of Sahara . The area from the coastline to the tell Atlas is fertile and the one from tell Atlas untill Sahara tell is a steppe .The farther south is Sahara desert. There are also mountain among the tell Atlas and the tell Sahara as Jorjora in the north , El Awress mountain in the stepped zone and El Hogar mountain in the Sahara .

Basically around 80% from algerian surface is a desert and sahara this why the 20 % rest of algeria is in big danger from desertification phenomena movement, if government wont find out how to recover algerian steppe and stop this degradation movement.

3.8.3. Algerian climate and hydrology

Nedjraoui (2001) confirmed that algerian climate is one of the most evil factors that affect desertification process in the country. The amount of precipitation was never stable, rainfall amount is different from one reagion to another, also the magnitude of the sirocco ; hot wind that comes seasonally from the Sahara. Rainfall refers to the principal elements on which agriculture and many other activities depend.

Climate´s specifics in the coastline according to Seltzer (1946) who had published that in the north of Algeria is a typical mediterranean climate, with warm, dry summers and wet winters. For exemple : Algiers, had 30° at day and 23° at night during Augest and 600 mm of precipitation falls between October and March. July and August are usually dry.

Djelouli (1990) estimated total annual of precipitation, how it increases along the coastline zone from west to east but it diminishes rapidly from the coast southward into the interior. The greatest amount of precipitation occurs in the mountainous regions of the eastern littoral, which are directly exposed to the humid winds that blow inland from the Mediterranean. From a point about 50 miles (80 km) west of Algiers to the Tunisian borders, annual precipitation exceeds 24 inches (600 mm), and in certain places for example, in the Great Kabylia, Little Kabylia (Petite Kabylie), and Edough regions it reaches about 40 inches (1,000 mm). West of this location a considerable part of the Chelif Plain and the plains of the littoral and the region immediately to the south of it in the vicinity of Oran are insufficiently watered, receiving less than 23 inches (580 mm). Precipitation also diminishes after crossing the Atlas ranges to the south, except in the Aurès and in a section of the Amour Mountains, which still receive about 16 inches (400 mm).

This east-west boundary roughly separates the two principal agricultural zones of the country. Dry farming is generally possible and commercially profitable in the eastern zone, where fine forests and abundant vegetation also exist. In the western zone cereal crops can be cultivated only with irrigation; pastoral activities dominate, and the forests disappear.

Climate in the north of steppe, Seltzer (1946) had mentioned that steppe regions are situated in parallel to the coastline which are sepparated because of the mountains that limit the penetration of the mediterranean climate toward the south . It contains plains and hills ,it is characterized by a much drier atmospher than previous one ,varied and higher temperature and sufficient precipitation . The southen steppe in the other hand is known by hot summers and cold winters, and insufficient precipitation.

Chaumont and Paquin (1971) estimated that summer temperatures are typically above 100 °F (38 °C) in the afternoon and drop to about 50 °F (10 °C) at night, while in winter they range from about 60 °F (16 °C) during the day to about 28 °F (−2 °C) at night. Annual precipitation varies from 4 to 16 inches (100 to 400 mm).

Climate in the Sahara according to Dubief (1963) begins on the southen border of Saharian Atlas , its characterezied by a very dry and warm weather ,where the annual precipitation is very low and irrigular ,due the statistics the annual precipitation is aournd 100 mm per year . The more we go toward the south the less precipitation we marke and the less vegetation as well . Summer temperature can attend 55 ° or even more, however in winter the minimun temperature average can be 8°. The universal meterologic organization (September.2012) has found that the temperature in the region of In Salah which is situated in the center of the algerian Sahara didnt go below 48°during the whole month of june and half of July.

3.8.4. Algerian soil characteresics

Djebaili (1982); Halitim (1988); Hanifi (1998) had mentioned that the variation in algerian soil is due the various climate conditions. So in the north of the country along coastline regions, soil is brown and very fertile, rich of inorganic and organic matter as Metidja plain, Annaba plain and Oran plain. Always in the northen part but on the mountains ; soil is red and very poor of organic matter which is more threatened by soil erosion.

In steppe and on the hills ,soil is less fertile, poor of organic matter but its still good enough for cereal's agriculture . In the other hand , there is also another type of soil on the southen part of steppe which is salted soil and useless for agriculture .

In the Sahara its almost sandy soil which is very poor of organic matter , accept in the Oasis where is fertile soil and agricultural activities there are not bad .

Due last given information from algerian ministry of agriculture (2008), 40 millions hectar are estimated to be used in agriculure activities, this number represent only 17% from the total algerian territory which is 2 381 741 Km2. In addition of that 31 millions hectar are used as an etinerary for nomadic pastoralists activities. Ministry of algerian agriculture had estimated that 80% from algerian territory as a non-productive lands.

3.9. Situation of desertification in Algeria

Nedjraoui (2001) published that Algeria is considerated between one of the most affected countries by desertification and land degradation. The most affected regions are Steppe, however scientist today are warning from desertification process on the algerian Sahel and the capital. Our national news papper El Watan recently published an article about desertification process and warning the capital from it. Youness (2012) one jornalist in El Watan news paper who had warned from the algerian Sahel and capital transforming into a desert.

3.9.1. Algerian Sahel

Houerou (2006) warned the Algerian Sahel from desertification. During 1950's, people settled into the Sahel region, in areas where they could find water ressources. This is resulted from overgrazing, which is one of the greatest causes of desertification. Eventually, the perennial shrubs were destroyed because of grazing, and they were replaced by annuals. Then, the annuals were grazed out which left bare soil. A lot of the topsoil was washed away, and all that was left were rocks. Silt turned hard when it was hit by rain. Therefore, plants were not able to grow because there roots could not penetrate this hard layer. Now this region has turned to desert and it continues to expand. Records show that rainfall in Sahel has decreased and sands have shifted about sixty miles south into the area. Sahel is expanding due to lack of vegetation in the area. Another reason desertification is occurring in the Sahel region is because people are using the slashing and burning method to clear land. This degrades the quality of soil just like overgrazing.

3.9.2. Algerian Steppe

Nedjraoui (2001) published that desertification in Algeria is basically refers to the steppe in arid and semi-arid regions, which are known as an important landscape diversity in relation with huge variability of ecological factors. This steppe zone occupies around 80 % From the national territory which absorb around 18 millions of sheeps and 4 millions inhabitants. 32 millions hectars are estimated as a fundamental factor for the algerian agro- economic, which is completely menaced by dryness, anthropic pressure, grazing, deforestation, sand movement toward the north of the country and the Sahel; where will be the reduction of ecological potential also socio-economical disequilibrium.

Seltzer (1946) said that steppe is the closest part to the algerian desert and Sahara, it is located between Atlas tell mountains from north and Sahara atlas mountains from south. It coveres around 20 millions hectars from total algerian surface. Steppe has limited agriculture because of the soil and climate conditions that allow only cereals to be grown. In fact the southen part of steppe which is in border with the north of Sahara has less vegetation and useless land for agricultural activities. The steppe hired the most from pastoral activities and animals husbandery.

According to Hanifi (1998), steppe is charecterized by the presence of calcareous soil which is relatively alkaline with high PH value, poor of organic matter and so senssible for erosion and degradation. Hydraulic ressources are very low, not much renewable and badly managed.

Aidoud and Nedjraoui (1992) found out that there are for types of vegetation that can be grow across the algerian steppe: *Stipa tenacissima* (20-40 %), *Lygeum spartum* (15-50 %), *Artemisia herba alba and Hamada scoparia* (15-30 %).

Steppe has the second bigest demographic number after the capital the coastline regions. The population growth rate is very fast. In 2012 the algerian national office of statistics (ONS), estimated the annual growth of population by 2 % more than previous year. However population's concentration is not fairely distributed across the algerian territory, ONS (2012) estimated that 95 % from the population are living in the northen steppe towrad the coastal regions, means that in the Saharian Atlas direction to the south live the rest 5% from population, which is realy obvious because through all 80% from the total algerian area live only 2 millions habitant and the rest 38 millions are concentrate on the 20% from the total area.

According to Nedjraoui (2001), the socio-biological equilibrium is totaly affected from this demographic distribution and developement, so government will not be able to cover all population's needs, cant find solution for jobless and other more problems untill they will find raisonable management for the natural ressources and natural phenomenas.

Nedjraoui (2001) montiened about some different studies that were done through the algerian steppe, in fact the evaluation and monitoring were completely irregular ,non coordonated on the most of steppe regions accept south of Oran (west of Algeria) they took it seriousely; they measured the vegetation 's quantity, quality and charecterestic of the place. They also analysed different socio-economical parameters which affect system's dynamics.

ROSELT (1970) studied how the functional of an ecosystem determines effeciency of production. Functional of socio-economic system determines management impact of these practices on that ressources. This studies had began in 1970 which are still followed today (programme ROSELT/OSS/Algérie, 2001-2005). Through this program they could install stations in different regions of steppe (figure 1). This research allowed to determine and identify the factors that are causing degradation in steppe.

Figure 1. The choosen station for the projet of observation in steppe.

Stations of observation of steppe. (programme ROSELT/OSS/Algérie, 2001-2005).

3.10. Causes of desertification in Algeria

Algeria belongs to arid and semi-arid regions, according to the UNESCO those regions are defined as an areas with higher potential of evaporation than precipitation. In point of view of the UNESCO the most common features of arid and semi-arid lands in general are :

- Unpredicted rainfall with great seasonal fluctuation.
- Average annual evaporation is much higher than average annual precipitation.
- Water-constrained agricultural production.
- High temperature and less rainfall.

Those causes are only the natural one, in Algeria are more facts that lead to degrade the vegetation and cause desertification.

Bedrani (1997) confirmed that the first and the most responsable factor of desertification in Algeria is the natural one which is dryness. On the other hand there are also anthropics facts as (Population, overgrazing, deforestation...). However he didnt blame at all the politics and the government and their bad monitoring and their careless upon the situation. In fact according to Nedjraoui (1999) it should be the government who must control and manage the natural ressources and try to find out the solution that could be the most efficient, there for bad management of the government and politics toward the natural ressources is also cause of desertification. Its obvious how distribution of population isn´t equal across the whole national territory; 95% habitant are in the northen part of Algeria (North of stepped area toward coastal regions) and in the Sahara is almost no one, government should take a biger responsibility and do something about it, they should find out why poeple are letting their lands and houses to move toward the north and the capital. Basically the entire problem in this regions is work; most ofthe inhabitants are jobless, they are thinking that the mobilization toward the north could solve their problems, in fact their hypothesis is completely wrong and they are only creating more crisis in the north of Algeria and the whole territory.

Aidoud (1996) put a big blame because this population movement toward the north on the government. Basically in steppe region there are so many villages which are completely isolated, inhabitants there dont have the least from there rights as human being and as algerian citizenship, they cant obtain the most important daily needs as: Health care, transport, limitted gaz, limitted electrecity and lack of water. So how this isolated inhabitant wouldn't be so desperite and leave to try make better life for their children and them selfs. So this could be big reason that population concentration is created in northen zones, and the agricultural activities in steppe are almost neglected. Government should motivate the isolated population by constructing health centers, schools, put more buses there, also they have to awake them and warn them about the situation in Algeria. Its important if this inhabitant of the south or steppe region to know about how dangerous is neglecting agricultural activities by there movement toward the north, which will reduce national crop production and lead to disequilibrium in their food-security. This last will lead to quick and fast desertification through all the national territory. Actually our politics had already began to try limit the population mobilization toward the north, because since 2002 our president:"Abd El Aziz

Bouteflika" had been creating options and insisting to solve isolated inhabitants problems in first place.

From our national news paper « El Watan » on Saturday 16th march 2013, president of human rights in Algeria; Mr Farouk Constantinois has said:" we must create an emergency management program to upgrade the socio-economic situation of isolated poeple, mostly who are living in the south of steppe and Sahara, also in one week i will give to president Abd El Aziz Bouteflika final protocol which resume algerian human rights especially those who are isolated".

3.10.1. Dryness

Dryness is first remarkable characterestic of the algerian steppe, because of the variability in precipitation. Wiley (1994) had measured the effects of annual variation in climate and experimentally augmented rainfall on patterns of distribution and above-ground productivity in annual plant communities at Carpinteria Salt Marsh in central California. In the driest year, Hutchinsia procumbens was codominant throughout much of the upper marsh; however, Hutchinsia was very rare or not present in the wetter years. Conversely, Juncus bufonius was common in the wettest year and absent in the driest year. Elevational distributions of other annual species also differed among years with different total precipitation. In 1989-1990, an exceptionally dry season, supplemental water decreased soil salinity, increased above-ground productivity of annuals, and caused significant changes in spatial patterns and relative density. In the lowest zone, Hutchinsia occurred only in watered plots and supplemental water increased the density of Spergularia marina. At intermediate elevations Lasthenia glabrata occurred only in watered plots and supplemental water increased the density of Spergularia, Hutchinsia, and Parapholis incurva. At upper elevations, Juncus occurred only in watered plots, and Lasthenia was the only species that increased significantly in density with watering. Unlike natural shifts in species abundance, no species declined significantly in cover in any zone in the watered treatment. Although climatic variation has complex affects on annual plant communities, our experiments isolated important affects of total annual rainfall on the structure of annual plant communities that were similar to those that occurred with natural

variation in rainfall. We conclude that variation in total annual precipitation promotes dynamic community composition and spatial distributions among years, and thus increases overall species diversity in the salt marsh.

(CRU); University of east Anglia had estimated that during last 10 years, Algeria had scored reduction in annual rainfall with realy high degree of dryness.They had been measuring and scoring monthly temperature and rainfall during the time period (1999-2009). On January, february, march and appril rainfall annual was between the range of (2,5-10)mm and temperature range of (15-27)°. During May, June, July, August and September the annual rainfall was between (2,5-5)mm and temperature between (26-32)°. On October, November and December average rainfall was (6-13)mm and temperature between (10-25). This results confirmed that Algeria had realy a seriouse dry period during 1999 to 2009.

3.10.2. Overgrazing

Nedjraoui (2003) discribed overgrazing as a fact when plants are fed upon by animals for a long period of time without any pause, that could allow plants to regrow up again. The plants will not be able to grow, therefore species of plant in that area will be eliminated. According to Ziad (2006) that steppe zone are typical for pastoral activities, which is basicly sheep farming in Algeria, because it represent about 80% from livestock. Sheep farming had been developing in Algeria since our independance. It represent 70% from steppe livestock. Steppe is realy the most affected zone from overgrazing in Algeria, where the situation was warned by older farmer 12 years ago. In 2000 the livestock production was multiplied even 10 times more than what land could support.

Ziad (2006) confirmed that this multiplication is due demographic developement, which demands more meat production in order to cover population need of meat consumption. Maintenance of livestock multiplication where is almost no plant and completely overgrazing area became more and more difficult, it lead to create an economic disequilibrium in Algeria,

because instead of feeding sheeps from the natural plants which disapeared through time, the farmer is feeding them from cereals which is so much more expensive to give it as food to sheeps. So this created Two big problems; in one hand the meat will be sold more expensive and in the other hand, cereals will not be sufficient to feed all algerian inhabitants plus animals from the livestock. this will create big need of cereals and infortunately algerian's cereals can not be enough, so government will have to export cereals from other countries.

According to (Le Houerou,1985 ; Aioud,1996 ; Bedrani,1999) overgrazing, deforestation had been degrading for more than 40 years in Algeria. This degradation and desertification of land is due biological reduction and non equilibrium between ecology and socio-economic.

Table 2. Livestock quantity in Stepped region (Thousand heads)

Years	1968	1978	1988	2000
Sheeps	5 600	8 500	12 000	16 000
Goats	560	1 000	1 400	300
Cattles	120	120	200	280
Camels	100	175	100	135
Equine	250	450	530	750
Total	6 370	9 805	13 830	18 885

Sources: Agricultural statistics, ONS,2000

Table 3. Demographic developement in Stepped regions (Thousand inhabitants)

Years	1954	1968	1978	1988
Total population	925,70	1 255,48	1 700,00	2 500,00
population of steppe	595,42	545,25	500,00	625,00
Average of population in steppe	52	43	29	25

Sources: Agricultural statistic,1974;ONS,1993

From table 2 we observe that livestock production in Algeria is based on sheep's production which represents around 80% from it. In the other hand, demographic development from table3 is going higher and higher which will demand more consumption of meat. In 1954 in stepped regions populations was estimated about 595,42, but today its about 8 million inhabitants (Kacimi 2012). In fact total algerian population today is around 40 millions habitants (ONS,2012).

Couderc (1999*)* confirmed that migration of inhabitants toward coastline and northen regions had created another problems and phenomenas. So instead to deal with desertification and degradation, first we have to solve populations need and their socioeconomic situation to stop that population movement toward the north and create more possibilities to care about agricultural lands in steppe, motivate young farmer in order to take care about agricultural activities, as fertalization of soil because those activity were almost gone in this regions; inhabitants there are mostly nomadic pastoralist, its the life style of this arid and semi-arid area, that could allowed to maintain equilibrium and survive ecological crises as: Dryness .

We conclude as main factors of overgraizing in Algeria by two important points:

- Lack of job and job's creation (agricultural and non-agricaltural) push poor poeple to leave their lands and houses, by going toward northen zones or capital. This will completely cause deforestaion and reduce farmers number which will surely

reduce cereals production, however nomadic pastoralist will develop the number of their sheeps and goats to minimise their daily needs.

- Pastorals lands are completely free of charge, this will motivate pastoralist to develop the number of their sheeps and take them through other etinirary in order to own new lands and cause more deforestaion and more overgrazing in order to own those new lands.

Kaci (2006) did some reaserch in one steepd region "Naama", he found there dramatic degradation of original biomass which was done due demographic and livestock quantity developement, also changes in management of patoral zones. He estimated the density average of forage plants which was about 190 in 1980 and 20 in 2005.

Aidoud (2000) said that some species as *Arthrophytum scoparium* and *Thymelaea microphylla* which are typical plants for poor environment conditions, they could be founded in steppe region.

Regardless dryness and overgraizing, there are more factors that cause desertification in the algerian steppe:

3.10.3. Insufficient strategy and bad management adopted by administration of steppe

Floret and Pontanier (1992) mentioned that in 1971 it was made first important decision for steppe region which consisted on forbidding tillage in agricultural activities, because it´s negative impact; dries the soil before seeding, the soil loses a lot of its nutrients like carbon and nitrogen and its ability to store water, soil's erosion, higher rate of fertilizer and chemical runoff, decreases the water infiltration rate of soil, reduces organic matter in the soil and destroys soil aggregates. However this low wasnt ideal for all farmers, only owners who had big herd could release it, because they had enough money and materials as the uses of trucks to transport thier herd. In the other hand limited disposal owners were completely disapointed from that law because their traditional management was included tillage and by being forbidden from using it according to that new low, their productivity became very low which

pushed them to sell their little herd´s quantity and join rich owners as another pastoralist member. In 1981 it was created another commission for the developement of steppe, which aimed to coordinate the actions in steppe regions. Agricultural and forestal services couldn´t be adopted to that law. They could be limited at some actions as creation of water supply points, plantation in the most degrade zones. This comission was completely failed due the insufficient budget, absence of research from universities. This results had faced big criticism from other scientist.

Local administrations, technique services (hydraulic, urbanism, agriculture) have absolutely lack in trained poeple and experts, it´s limiting their ability to intervence. Forest services are directly concerned because their bad management in steppe region which needs better skills and more facilities to improve their efficiency.

3.10.4. Pastoralist careless to develope the national program and strategy

Acoording to Bensouiah (2003), social strengh that came from this owners of big herd and agricultural lands should have benefit from government action :help and support during dry periods, regular veterinary control and vaccination of their herd. Pastoralists can cause proportional influence toward administration and their herd. Also big problem in Algeria is that etinirary for herd to walk through,it is completely free of charge. In fact those rich pastoralists are those who consume and use public lands without pay no tax, however this category of pastoralists are making a huge fortune by taking profits from government mesuremnt for free, without participating in national effort at least. Bensouiah (in 2003) had mentioned that public lands and spaces are still used in an inappropriate way by pastoralists, who dispose politics and financial support. Lack of the government authority and its disability to find social low which can be combined with ecological durability.

In order to create an ideal management of steppe, concerning the natural identity, Boudjadja (2004) allowed to create union between algerian big cities for managing pastoral etinirary. This mouvement of social union was like a strengh for associations that protect the envrinement. Experience had been released in one of steppe region "M'sila" which

encouraged the corporation by regrowing the local forage plants which was removed by pastoralism activities. Kaabeche (2004) had confirmed the succession of this management in this region "M'sila" which was recovered by local vegetation again. However this management had been interrupted by the financial lack, because they found out that was impossible to recover the land using only local plants across some other steppe regions.

Strategy's creation of a local program that lead to struggle against desertification also for the rehabilitation of degrade's zone, will consist a durable step to care about steppe. Also some low should be added to the legislation regarding steppe's protection.

3.10.5. Deforestation and expansion of cereal crop

According to Houerou (1998), during 70's cereal crops expansion was charecterised by uses of tractors with disc for the soil's tillage with a fragile texture. Tillage on this soil was done by a simple scratching of the upper surface. This techniques has also negative impacts as soil erosion, damaging and sterilizing the horizontal soil's surface.

This system damages perennial plants which will be replaced by another species that are inable to maintain soil and avoid erosion. Houerou (1998) estimated that the degradation of vegetation in steppe had been reduced about 25% in average. This changes of vegetation cover and biodiversity erosion, decline the evolution in steppe areas. Some plants can be indicators of degradation as *Atractilys serratuloides, Peganum harmala.* Disadvantages of vegetation changes can be seen on the density of plants also their pastoral value.
Houerou (1998) mentioned that in 1978, a strong dust came over during dryness period, which tooke up the sand level in steppe region. Depth of degradation had acheived a scary and dubtfull level. However in addition to that dust, there were other factors that could lead to this degradation as the anthropic factors. Maintenence of high herd's quantity all over grazing area and around water supply points, will provocate the removal of horizontal upper soil surface and will develope risks of soil erosion.

There is also another factor which cause deforestation; it is the daily use of wood as cooking, heating ect.. Habitant of steppe uproots wooded plants even if it has a small size. Houerou (1985) estimated the consumption of wood which is used for fire about 1,5 kg dry matter per one person per day.

Table 4. Evolution and changes of vegetative cover in steppe.

Original steppe(1978)	Actual steppe (2009)
Stipa tenacissima (Alfa)	• Atractylis serratuloides,Salsola vermiculata and Thymelaea microphylla. • Thymelea microphylla and Atractylis serratuloides. • Thymelea microphylla and Stipa parviflora.
Lygeum spartum	• Atractylis serratuloides and Peganum harmala • Atractylis serratuloides and Salsola vermiculata • Atractylis serratuloids
Artemisia herba-alba	Salsola vermiculata and Atractylis serratuloides

(Roselt/Algerie, 2005)

Table 5. **Vegetative Production in steppe**.

Plants	Plant production (UF/ha) 1978	Plant production (UF/ha) 2003
Alfa	70-140	18-074
Artemisia herba-alba	70-190	22-120

Lygeum spartum	80-200	25-082

(Roselt/Algerie, 2005)

From table 4-5 we see the abvious reduction in native vegetation of steppe. Nedjraoui (1990) said that Alfa species is a native mediteranian plant which has the ability to grow in dry condition, its one of the dominated vegetation in the algerian steppe where it occupied about 5 million hectars in 1873. National technical center in 1990, measured total of the surface that was occupied by alfa, they estimated it about 2,025 million hectars, this means that 50% from Alfa plants across steppe were disapeared during the period of 100 years. This result and numbers confirm the terrible degradation which is attacking vegetation of steppe in Algeria.

3.11. Impact of desertification on algerian population

Adem (1986) confiremed how the herds of steppe have been considered as the most importatnt ressources of meat production for the whole national territory. It's bringing to pastoralists so much big incomes and huge richness. However the rest of the population in steppe who doesn't have any herd are really poor. basically pastoralists are taking there richness from this poor inhabitanst; because herds are being taken across public spaces and through different etinirary in steppe lands. Infortunately this will cause overgrazing and damages the soil, which became more sensitive to erosion, desertification and useless for agricultural activities accept cereal crops which can be grown on this lands. There for due this lack and reduction in agricultural lands, the rest of inhabitants are becoming poor, jobless and totally inable to cover their food-sufficiency.

Bedrani (2006) and Bessoud (2006), both confirmed that degradation in steppe is basically sign poverty and social erosion. Both of them had demostrated how the traditional management in this land had been transformed under pressure of market demande.

According to Nedjraoui (2001), demographic developement influences the equilibrium between inhabitants needs and their natural ressources. Pastoralists had modified there activities by adapting cereals crops production in order to satisfy their herds feeding, in fact it made the situation more horrible especially soil degradation and reduction of perinnial vegetation .

From Houerou (1985), the algerian macro-economic in 80's already made prognosis for the future about the envirnmental sitution in steppe in correlation with demographic developement, also high estimation was given to the national currency value which leaded to an underestimation of an important products that had been sold very cheap in comparaison to their real value. However it was allowed to own so many tractors and agricultural materials by one farmer, which was an evil impact for deforestation, because farmer were selfish and wanted to own maximun of lands because it was given from government for free, in fact to proove their adoption to the land, they had to deforest it and automatically it add it to their personal properties. This practice of deforesting lands caused higher level in soil's salinity.

Aidoud (1992) showed how in some regions the degradation had been increasing during this last years. Native inhabitants who actually don't have big herds quantity, in general are small pastoralists and agro-pastoralists, this groupe of inhabitants were so disappointed because they just leaved there houses going toward northen regions or capital, to upgrade their socio-economic level and creating a new conditions for a better life of their children. In fact this situation is due a complete absence of politics care and their job's creation in steppe zone.

3.12. History of the algerian policies to struggle against desertification

40 years ago , algerian scientists had been finding an efficient solution for this problems which are affecting mostly steppe areas in Algeria . In one hand some authors had been studying about the ecological characteristic, pastorals activities as : Djebaili (1978) , Houreou

(1985) , Djelouli (1990) , Boughani (1995) and Kadi Hanifi (1998). In the other hand other researchers had been fixing the socio-economic evolution of different systems as : Kaldoun (1995) , Bedrani (1996, 1997, 2001 and 2006).

During 1960 , the algerian association of economical and social developpement had been creating a socio-economic studies about steppe and pastoral population in one of the algerian reagion which is El Bayadh.

From 1962 untill 1969, government had been making an orders to plant trees. 99 000 ha lands were reforested in order to reduce soil erosion.

Since 1962 the governement had been trying to struggle against that scary phenomena . Some actions were done and fixed through a studied strategy to fight against desertification in Algeria. They brough up the idea of trees plantation on the zone that separate the steppe regions from the Sahara, they called it : « The Green Dam » .

Belaaz (2003) mentioned that the big project has been made in order to fight against land's degradation. Basically this project was launched in 1974, it was programed to be planted trees on the connection zone between oriental and oxidental border. Length of this Dam is 1500 Km, width average is 20 Km and it surface is approximetly 3 millions hectar of this trees plantation . This green belt has been created to protect the north of Algeria or the Sahel against desert movement toward the north and reduction in overgrazing of steppe regions. Vegetation of this green belt is based on Pastoral plants (Alfa), forest trees (*holm oak* and *aleppo pine).* Soil is calcareous, depth 60-100 cm, poor of organic matter and PH is >= 7,5. Climate is very dry with 2-40 ° celsious. It has been planted by the national military forces and forest’s services. It is aimed to stop the sand movement toward the north also to develope of fodder crops (*atriplex* , *opuntia* and *acacia*), reforestation, rangeland management in this arid area including the fixation of sand dunes and developpement of tree fruit production. However this green belt project faced a big issue that could be one from the reasons which could lead to Green Dam's failure. In one hand lack of water, which is the bigest problem of steppe areas. Algeria live on stressed hydric zone with only 600 m3 per inhabitant per year, it means that algerian poeple are really suffering from lack of water . So many rivers , lakes are

polluted; this will cause reduction in biodiversity of water ressources. In second hand, it's abvious how water plays an important rule in agriculture, about 70% of all this usage is oriented to irrigate agricultural crops. Big budget was given for Green Dam succession, in fact this project was a huge technical mistake; because it's hard to grow trees in areas where soil is completely neglected and without the least of irrigation. Choice of trees species wasn't an ideal one; *pine* trees are so resistant to fires but they are so sensitive to Pine Processionary Caterpillar *Thaumetopoea pityocampa* which is considered an emerging pine pest in Mediterranean countries.

Vega (1999) found from his experiments that this insect has high medical relevance. In recent years, adverse reactions reports in humans following contact with T. pityocampa have been increasingly reported. Dogs living in pinewood areas are also frequently exposed to the caterpillar.

Houerou (1985) offered that there could be other actions to fix and to support The Green Belt and fight against desertification as: the creation of quantitative and qualitative expert who are specialized in fauna and flora and the various socio-economic impacts which could influence the dynamics of ecological system; development of agro-pastoral activities and allow private investigations; make people more awakening about underground hydrous resources.

During same period when Green Dam has been released, politics lunched the agrarian revolution by updating new agricultural and pastoral lows, which aimed to limit the herds quantity for those who had the bigest herds number, created a pastoral corporation with pastoralists that have small herds quantity a giving them a good strategy to protect steppe from degradation, tillage and removal of wooded plants were forbbiden in pastorals areas. However some conflicts was appeared because of the interest between properties's owners who totally neglected that law.

According to Ziad (2006), in 1983 high commission (HCDS) was created to take seriousely steppe's case and its developement, its a public institution under control and guidance of the ministry of agriculture, it's aimed to create a politics of an integrated developement in steppe by taking in consideration the socio-economic conditions. The functions were limited because all what could be done was rehabilitation of deforested areas, so they only planted some plants as *Atriplex* species, it was depend on water supply points multiplication. Ziad (2006) confirmed that forests were conserved and about 300 000 hectars areas were planted. In fact HCDS didnt create a durable management in steppe zone. Its also what can explain the actual desertification statut in algerian steppe.

Nedjraoui (2001) found from this historical review of this political actions that tried to limit and brake desertification movement toward the north and coastline parts. No action was done in favor of the agricultural activities developement and variation in agricultural production beside the sereals crops production which can cover the inhabitants food-sufficiency and upgrade their social situation also upgrade and support the economic of the country. They could give some budget to the serious farmer to make soil more fertile and reduce its salinity, creation more water supply ressources which can help soil and corps irrigation. This agricultural activities can be good way to struggle against desertification also ensure life of the inhabitants and creates more job's possibilities. This last will also play an important rule to reduce the population concentration in coastal zones.

Houerou (1985) said that the scientific researchs were not done in algerian steppe regions accept in 1974, when algerian ministry of agriculture had been describing the physical, agricultural, ecological and individuals situation. This was the only study that could be done about this phenomena in Algeria. There is a big lack in scientists who are capable to find out the solution for this land degradation, to analyse causes and consequences of desertification process.

3.13. Universal and global strategies that fight against desertification

So many scientists and researchers had been studying the land degradation for several years. UNCCD (1977) adopted a plan of actions to fight against this phenomena and they could devided this actions on four categories which contains different strategies :

- **The correctif methodes** (rehabiliation): which aim to stop this phenomena and repairs the degradations (conservation of water and soils, protection of vegetation,..) .

- **Adoption of techniques** that allow to control and estimate resources (agroecology,agroforestry,ect) .

- **The clarification of the models and integred systems of natural ressources management,** this means to make a global question that contains all the factors (evironmental,socio-economic) which badly affect the natural ressources .

- **Setting up** the institutional and political mechanisms (civil peace, prices stabilisation..ect).

All of this actions help to fix globaly and durably the developement of the environment and its issues, it will also maintain the diversity of the natural ressources of each affected territory. The aim is to upgrade the population's social life, also make a sure equilibrium between the natural ressources and the correct exploitation of it.

3.14. How other countries faced this phenomen

When we say desertification we are not talking only about where is desert and sand's advance, there are some europian countries like Italy, Spain, Portugal and Tuerky which are also menaced by this phenomena as UNESCO has confiremed. In addition of this european

countries. China is suffering from it as well and their government had already tried to struggle against it by broughing up a five year objective.

3.14.1. China' strategies

According to the United Nation to combat desertification UNCCD, so many countries were and are still fighting against desertification. China is one between the most affected countries by this phenomena. Deforestation is being a major problem facing China's environment. Lei Jaifu (vice head of the State Forestry Administration (2005) said that the ecological status of their country has come into a key stage, of which management and devastation are major conflicts. He also confirmed how China's forested area has been grown from 16,5 percent in 1999 to 18,2 percent in 2004, the increase was largely due to recent reforestation efforts, which meant trees were immature and the quality of forest cover low, he said.

Chineese government made a several monitoring options, they have carried out three times national desertification surveys; 1994, 1999 and 2004. In the last one China aimed to bring 13 millions hectar of desertified land under control. This control would be based on reforestation that would be depend on the different natural and climate characterestics of desertification. China banned to adopte several policies to limit desertification and control it.

Zhu Lieke (2005), deputy director of the State Forestry Administration separated strategies management according to natural and climate characterestic for desertificated zones: desert, semi-arid areas, desert in high altitude (Tibet), and semi-humid plains.

For desert margin and desertified oases, so much efforts with big budget would be put to grow windbreaks. Proper use of water will be used to protect vegetation in the existing natural deserts and oases.

For semi-arid desertified area, forestation and grass-planting, small-valley control and ecological migration, which aimed to protect vegetation; develope the natural ressources in desert properly.

For the deserts in high-altitude as Tibet plate, planting in closed areas will be the main way of protecting the natural ecological system; irrational development will be prohibited to promote the recovery of the vegetation.

For the semi-humid plains along the Yellow River, Huaihe River and Haihe River and the humid deserts in south China, desertification control and development of resources will be combined through planting shelterbelts along with fast-growing, high-yielding timber woods and economic forests.

3.14.2. The middle east strategies

The middle east is suffering from desertification as well, from Iraq in the north, to Egypt in the south and to Yemmen and Oman in shoutheast. Its representing about 6% from world's land area. The middle east is completely under desertification damages accept in few regions as UAE (Emarates Arab United) who have turned the desert into oasis, green gardens and vast lands have been allocating for establishement of an ambitious plan in order to fight against desertification, also the conservation of the environment under leadership of President Sheikh Khalifa bin Zayed Al Nahyan and Sheikh Mohammed bin Rashid Al Maktoum. Vice President, Prime Minister and Ruler of Dubai (1999) affirmed that the country’s leaders had spared no efforts to expand greenery, fight desertification and conserve the environment for the present and future generations.

Al Kindi (1999) explained how it is important for UAE to protect and develope their environment, there for they wanted to make some national settings in their environmental agenda at national and international levels. Protecting envirnoment from UAE had so much goals and aimes as:

- Maintain the biological diversity and envirnomental equilibrium.
- Fight against pollution and evoid such a long term harmfull effects that come from agriculture, constructions and industry to upgrade the life level of the population.
- Develope and maintain the natural ressources with an optimum use of the benefit for present and also future.
- Health's protection of human beings from any act which compromise a risk to environment.

UAE has shown a positive results and made from the inpossible possible, by remarkably reducing desertification on their lands. So what did UAE to struggle againt degradation processes was greenery solution, they aimed to plant a lot of green belts and establishement of the nature, which is under a durable management and control .

UAE staretegy is consederated as a good exemple in order to struggle against desertification especially in dry lands countries and who has a considered national budget and incomes.

In the rest of the middle east countries as: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Saudi arabia, Yemman, and Syria which are situated entirely in arid areas. Degradation in this countries varies from one to another, but according to the United Nation who control desertification and make a control program (UNDCPAC) anounced that the main desertification problems in this countries are soil degradation by water or wind erosion, salinization and waterlogging which surely affect land use (irrigated agriculture, rainfed cropland and rangeland areas).

In this areas they had to deal with water management, there for they have been using Water Harvesting techniques since past to provide good soil's aspects for agricultural activities.

3.15. Water Harvesting

Bamatraf (1994) defined "Water Harvesting" as the collection of runoff for a productive use. Runoff is collected in some pools dug into the ground to store surface water runoff for a later and productive use as: domestic use of water, crops irrigation in dry seasons...ect.

This techniques have been adopted long time ago, the first was in the middle east regions 9000 years ago in the Edom mountains in southen Jordan. There were discovered another water harvesting instalation in other countries as israel, Iraq, Yemman and Egypt.

Most of Middle east countries are using different kind of techniques to collect rains where ever it falls, to improve soil cover, increase soil moisture and increase organic activities in soil. This technic of water harvesting is considered as an important factor to survive and productive land of agriculture.

However up to now majority of countries in the middle east are using traditional techniques of water harvesting which need to be improved and developped to upgrade the efficiency of production and domestic water supply.

Countries in the Middle east accept UAE and Israel should focus more on this water harvesting efficiency, they should apply some new technologies depends on the country financial abilities, make more research in the hydrological management (design, planning of water havesting project), make long -term government policy.

4. Conclusion

According to the UNCCD, struggling against desertification is the durable way to get rid of poverty in first place. Transforming dry land into a fertile one reduce famine all over the world.

Situation of desertification in Algeria is being more complicated and difficult to handle. Abviously today all tasks and issues are across steppe regions, basically politics should focus more on this situation. Now it only depends on the good monitoring and best strategy that must be given by administration with different specialization, which could be applied on diversity of steppe regions by elaborating a precise data that allow to create a durable strategy in order to fight against this phenomena.

Algeria, actually didn't succeed to control desertification movement toward north, because since 2009 media and national news papers have been warning from desertification movement toward Sahel. Even when our politics had been trying to stop this phenomena, in one hand by forbidding the use of tillage in agricultural activities, in second hand the" Green Dam " realization which was criticized as a political and techniqual huge failure strategy. According to our ministry of agriculture report (1995), the choice of tree species wasn't ideal. This bad choice from using the *Aleppo pine* trees has resulted in a proliferation of the pine processionary caterpillar, which destroyed a large part of reforestation. The growth of trees that can survive is slowed and they are more exposed to other pests, such as spruce pine. This growth rate of the *Aleppo pine* trees was estimated about 100% in 1970-1981 and 50% in 1985. In addition of that, our government though that this plantation would be enough to stop degradation movement, there for since the date of Green Dam realization, no research or specialized studies were done in order to control the succession of the project. In comparaison with UAE and China trategies is showing a positive result. Algeria is completely neglecting this phenomena. In fact what did UAE and China was based on green plantation belts which must be well irrigated and protected from pastoral activities.

It would be more efficient if they Algerian government would aim to plant various native species of steppe and adding to the legislation some laws which can protect the planted areas from pastoralist activities and overgrazing.

Algeria should care more about water ressources by creating more water supply points and more storages for water harvesting (basins,dams..ect), which will help the irregation process in dry season. Actually some reasearch proved that traditional “water harvesting” techniques can achieve significant improvements both in agricultural production and environmental rehabilitation. These techniques have contributed to the rapid restoration of vegetational cover and helped to reverse erosion in degraded areas.

Also they should investigate more financial ressources in agricultural lands for more plantations as (Tree fruits, shrubs ect..) which must be protected by law from pastoralists activities. Soil of steppe is less fertile and poor in organic matter, there for ministery of agriculture should motivate financially farmers in order to feed and fertile the soil, because when we feed the soil, it will feed us. Basically when it will be more agricultural activities, it will reduce jobless in steppe and it will limit population movement toward coastline regions and capital. There for government should give them budget for farming and agricultural activities which must be highly controled to check if the investigation is spent on the project or elsewhere.

Moreover most people do not think about future generations, the highest percentage think only of themselves and they do not care what will happen tomorrow. It will destroy us if we do not raise awareness of ecology environmental and agricultural lands protection. So let us think green and do something good for the our precious Planet.

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6. List of abbreviations and symbols

FAO: Food and Agriculture Organization of the United Nations

ONS: National office of statistics

Roselt: (programme ROSELT/OSS/Algérie, 2001-2005) Network center for ecologic durable observation in steppe, and follow the process of desertification, thats been released by University of Science and Technology in Algeria (USTHB).

H.C.D.S: High comission of steppe developement in Algeria.

UNCCD: United Nations Convention to Combat Desertification.

UNCED: United Nations Conference on Environment and Development.

UNCOD: United Nations Conference on Desertification.

UNDCPAC: United Nations Desertification Control Program Activity Center.

UNDP: United Nations Development Program.

UNEP: United Nations Environment Program.

UNESCO: United Nations Educational, Scientific and Cultural Organization.