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Land Degradation: Building Climate Resilience and Adaptive Capacity in Agricultural Sector of Niger

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A b s t r a c t

Land degradation and global climate change create monumental risks to international food security. In most countries, wherever agricultural productivity is already low and the means of handling adverse events square measure restricted, global climate change is anticipated to cut back productivity to even lower levels and create additional erratic production. Widespread impoverishment, arid climate, and a for the most part agricultural economy leave Niger particularly prone to global climate change. Given these challenges, this paper can examine policies addressing land degradation and the economic edges of investment in property land management within the region. Research shows that the agricultural sector suffers from ever-changing downfall patterns, and additional frequent droughts have considerably reduced crop yields. And this has negatively compacted food production within the country. Confronting these challenges is important. This study aims to contribute to the few existing literature in the continent and ascertain what response choices will be derived from the study to assist mitigate the economic effects of global climate change on agriculture and food security in Niger. Key findings emerged from the literature review of existing reports like previous studies about the topic, table review administrated by program evaluations. Printed and unpublished materials, newspapers, journals were conjointly used. The result findings conjointly highlight many factors of food crisis within the country and show that the various interventions that were known within the method became a key element in Niger's economic and social development arrange. This study shows a powerful association between the policy changes and improved human welfare, demonstrating that even poor countries may deliver the goods property development. Enhancing government effectiveness by giving communities a mandate to manage natural resources and by giving incentives to land users to profit from their investment is a key role in making improvements in land management and human welfare in Niger.

Keywords: Climate Change, Food Security, Land Degradation, Poverty and Sustainable.

Introduction

Land degradation has received widespread discussion at the world level. A minimum of 2 distinct colleges have emerged. "One college believes that it's a significant world threat sitting a significant challenge to humans in terms of its adverse impact on bio-mas productivity and environmental quality. The second college, comprising primarily economists, believes that if land degradation may be a severe issue, why has the economic process hasn't taken care of it. Supporters argue that land managers (farmers) have unconditional interest in their land and cannot let it degrade to the purpose that it's damaging to their profits".

A large share of Niger's population struggles in degraded natural surroundings and exists at the brink of food insecurity, presenting a novel set of development challenges. For a substantial portion of the people, the struggle for survival Overshadows concern for the Conservation of the natural surroundings. Because of restricted data of and capability to adopt improved practices, the population has light resources to speculate in improved techniques for property natural resources management. Several countries have adopted policies in varied phases for agriculture with the expectation that the event of agriculture would cause the development of their nation and facilitate the demolition of poorness. It's been later realized that the increasing efforts to boost agricultural growth have resulted in kinds of land and water degradation. Large-scale ecological losses were reportable in cropland, grassland, and forest lands, like wearing away, soil pH, and salinity, waterlogging, and quick depletion and contamination of groundwater (Eswaran et al., 2001).

Rural populations and native communities, notably husbandman farmers and pastoralists, WHO board the arid and semi-arid

regions, square measure the most users of the land across. They are also the foremost severely full of land degradation and geologic process and, as such, smallholders and pastoralists square measure the most actors and beneficiaries. Finding an efficient thanks to addressing this downside at intervals economic, political, and social constraints, like poor economic process and therefore the structure of state establishments may be a challenge to be long-faced by the Niger government. The government of Niger began to connect larger importance to property development and environmental protection. Therefore, it created efforts to require various measures designed to boost production potential and shield the surroundings, which was enshrined in sequential five-year plans, and launched the 'Re-greening the Sahel' initiative. This aimed to market environmental rehabilitation and agricultural development by introducing integrated comes. Varied initiatives were meted out as a part of the fight against the geologic process. The government of Niger Drew up a Rural Development Strategy (RDS) that became a driver of the economic process in Niger and served because the sole frame of reference for economic and policy within the rural sector. The government of Niger conjointly set a particular rural development strategy that is named the strategy for food security and agricultural property development, conjointly called the Nigeriens Nourish Nigeriens Initiative. Seeable of the on top of, an endeavor has been created during this chapter to review the offered literature and document major findings of various studies in Niger and abroad. During this section, we tend to develop a theoretical framework that guides our analysis of the study. This part of the study attempts to clarify the importance of land degradation in Niger. Therefore, the study can discuss the background for the soil degradation in Niger and how soil degradation threatens food security, the surroundings, and agricultural property. Then the study attempts to clarify the complexness of the matter. Among the foremost impoverished countries within the world, Niger has suffered from continual droughts and famines over the past century. There's a major danger of irreversible consequences. To reverse this trend, it'll be necessary to check the character and causes of this degradation. Most of the regions share environmental issues. Cultivatable land may be a scarce resource in several elements of the regions and is below intense development and population pressures. Land of low capability is being overused or overgrazed.

Additionally, farmers cultivate low precipitation areas while not adequate following or fertilization. This pressure ashore is felt in a region where the land surface is most fragile and subject to high levels of natural erosion, exacerbated by severe storms and periodic drought. The proof of land degradation is widespread as the results of giant areas have gone out of cultivation. Worse still, the severe poorness of the agricultural individuals limits their investment in soil fertility management and different property land management techniques. We would like to fret that, land degradation and drought square measure challenges of a worldwide dimension and still causes serious challenges to the property development of all countries, especially developing countries. In this regard, there's a powerful concern for the devastating consequences of circular drought and famine in Africa and concern imperative action measures in the slightest degree levels to reverse land degradation.

Literature Review

The purpose of this literature review is to use obtainable data to characterize the character and extent of land degradation in Niger, assess the causes of land degradation, establish information gaps and develop some testable hypotheses concerning the attainable pathways for overcoming land degradation issues and rising agricultural productivity within the region. Government support for regionally-based going to devise and implement solutions is important. However, most analysis within the past has been directed towards the physical processes of land degradation. Solely recently have some international analysis teams wanted to expressly incorporate scientific discipline strategies in researching the human aspects of this major international downside?

Concepts and Definitions

Land degradation has negative connotations that imply the loss of one thing of import among the national environmental economy (Gretton, P. and U. Salma (1997)). "The lost price is also associated with the productivity of the land for agriculture, the surroundings as a bunch to present species of Flora and Fauna or to the surroundings as an area for different human activities like mining, secondary industries, human habitation, and waste assimilation". In keeping with some authors, the term land degradation involves each soil and vegetation degradation. Soil degradation refers to negative changes within the physical, chemical, and biological properties of the soil. Hence, land degradation is typically delineated in terms of the loss in natural resources (soil, water, fauna, and flora) or within the biophysical method by that it functions (Ime O. Utuk, Ekong E. Daniel, 2015). Land degradation additionally has impacts on the socio-economic vulnerability of agro-ecological systems. Changes to the number and quality of scheme services as a consequence of global climate change can affect livelihoods across associated industries. These changes ultimately feedback to affect land management and land degradation. Land degradation happens everywhere on the planet however could be a specific downside in components of the continent and Niger. Its consequences are often devastating for folks and life. It's usually closely connected with different environmental and social issues like global climate change and poorness, and its remedy is busy with them. Land degradation, either natural or iatrogenic by humans, could be a continuous method. "It has become, however, a very important concern poignant food security and therefore the wealth of countries, and affects the resource of virtually everybody on this earth". Land degradation is often triggered by varied processes that lower potential productivity, resulting in long, typically irreversible, deterioration of land.

However, global climate change has been delineated because of the most important environmental threat of the twenty-first century. Agriculture is especially at risk of global climate change. The impact of global climate change is Brobdingnagian. Food production is adversely affected. Heating ends up in lowland rise with its attendant consequences and includes fiercer weather, exaggerated frequency and intensity of storms, floods, hurricanes, droughts, excessive frequency of fires, poverty, deficiency disease, and a series of health and socio-economic consequences (von Braun et al., 2008). It's an accumulative impact on natural resources and food production. Projections to 2050 recommend each a rise in international mean temperatures and exaggerated weather variability, with implications for the kind and distribution of agricultural production worldwide.

The Effect of Land Degradation in Sub-Saharan Africa

Agricultural productivity and food security in Sub-Saharan Africa are seriously vulnerable to the decline in soil fertility. Declining soil fertility jeopardizes the property of farming systems in the SSA particularly in the arid and semi-arid areas that are ecologically fragile (Ime et al., 2015). The fate of the agricultural sector directly affects the economic process, economic condition alleviation, and financial aid. Therefore, the consequence of land degradation is that the decline in crop production in several countries, which has given rise to food insecurity within the region. "Barbier (1998) studied the land degradation and rural economic condition and located that over twenty percent of vegetated land in the continent was degraded. Overgrazing accounted for ½ of the human-induced erosion, whereas agricultural activities accounted for one-quarter of that semiconductor diode to the loss of permanent pasture. He found overgrazing and agricultural activities like over-cultivation as

major causes of land degradation, which might result in a loss in farmers' current and future financial gain and enlarged risk, significantly for poor households. He conjointly found that there was little land offered with those who resulted in in-depth rural economic condition and high land degradation issues, thereby indicating that the matter of land degradation was a significant concern in Africa".

Niger experiences low and variable rainfalls, land degradation, deforestation, and geological process. The overwhelming majority of Nigeriens rely on agriculture for their livelihoods, and frequent droughts within the region typically injury crop yields, resulting in food shortages within the country. Chronic food insecurity and a high prevalence of infectious diseases have semiconductor diode Niger to record a number of the world's best deficiency disease and mortality rates. According to the world organization that estimates, nearly 3.4 million Nigeriens are food insecure. Quite four-hundredth of kids but five years older suffer from chronic malnutrition, and acute deficiency disease rates often exceed the globe Health Organization's threshold of significant concern of 100 percent. The climate of Niger is additionally characterized by high evaporation, starting from 579 to 902 millimeters within the time of year, and 744.5 to 1327.5 millimeters within the season (CNEDD, 2000) (https://www.usaid.gov/niger/newsroom/fact-sheet/agriculture-food-security). This harsh physical context will increase the liability of the country to land degradation, further impairing the success of the many restoration techniques.

A literature review reveals that 40-50% of the lands of Niger were deforested over an amount of fewer than thirty years (between 1958 and 1997) with current rates of degradation calculable at 80,000 to 120,000 hectares annually. Whereas the geological process is usually incorrectly attributed alone to droughts, the fact may be a deadly combination of continuing land abuse during times of deficient downfall that end in the degradation processes of vegetation cowl loss, wind and water erosion, and ultimately geological process (UNESCO 2003, Bado et al., 2017.).

This loss of scheme operates includes soil biological, chemical, and physical fertility, water storage, and nutrient sport requires an additional holistic and participative approach involving stakeholders, native communities, and farmers for property management of soil fertility and ecological restoration of degraded lands.

Land Degradation and Food Security

"Food security is access by all folks in the least times to the food needed for a healthy life". A significant drawback endeavor several countries these days is that the inadequacy of food offered within the face of a quickly growing population. In several countries, the task of manufacturing enough food for the abundant population has received extensive policy attention. Withal, the expansion rate of food production remains so much below the increment rate. This can be caused by land degradation (Ime et al., 2015). it had been accomplished that food insecurity, like deficiency disease, breeds at the best rate in South Asia and geographical region (SSA), therefore indicating that hunger would possibly stay a significant challenge endeavor the globe (Ime et al., 2015).

Land shortage and productivity decrease, resulting in non-sustainable land management practices, that causes degradation. Land degradation then ends up in reduced productivity. This results from skyrocketing land shortage, therefore resulting in additional food insecurity. Most of the countries are experiencing speedy increment. Hence, they need to cultivate increasing areas of obtainable land, starting from cultivatable land to all or any alternative styles of soil. In this doing, natural vegetation is destroyed and replaced by cultivated fields. Consequently, there's a loss in productivity that has resulted in food insecurity in several elements of the globe.

Challenges of food security and agricultural productivity

Climate change worsens the living conditions for several people who are already vulnerable, notably in developing countries, due to the shortage of assets and the adequate sum of money. Temperature change impacts key dimensions of food security (availability, stability, and utilization). Accessibility of agricultural merchandise is suffering from temperature change directly through its impacts on crop yields, crop pests and diseases, and soil fertility and water-holding properties. Additionally, the soundness of crop yields and food provides is negatively suffering from variable climate. Temperature changes pose threats to food utilization through effects on human health and also disperse of diseases in geographical areas that were antecedently not affected. By 2080, agricultural output in developing countries could decline by two hundredth thanks to temperature change, whereas output in industrial countries is predicted to decrease by 6 June 1944. Also, thanks to temperature change, yields in developing countries might additionally decrease by 15 August 1945 on the average by 2080 (FAO, 2008). The threats of temperature change are additional severe in developing countries, part thanks to earth science. Several low-income countries are situated in tropical and semitropical regions that are notably susceptible to rising temperatures and in geographic area zones, which are vulnerable by decreasing water accessibility. Taking under consideration the results of temperature change, the number of underfed folks in the geographical region could triple between 1990 and 2080. Temperature change shocks conjointly erode the long opportunities for human development and will exacerbate inequalities inside countries (UNDP, 2007). The temperature change can worsen the living conditions of farmers, fishers, and forest-dependent people that are already vulnerable and food insecure. In general, poor folks are going to be in danger of food insecurity thanks to the loss of assets and lack of adequate sums of money.

More frequent and additional intense, extreme weather can have adverse immediate impacts on food production, food distribution infrastructure, support assets, and opportunities in each rural and concrete area.

Food availability and food accessibility

In this case study, the two major styles of agricultural production are cultivatable and pastoral farming. As a result of the restricted quantity and uneven distribution of precipitation in time and geographic scope, precipitation represents the foremost limiting issue for agricultural and ethereal mammal production. Its consequences are renowned to native populations: the drying out of water sources; insufficiency of grazing land; shortage of dairy farm product and loss of untamed plants for gathering, migration of grazers, unhealthy harvests, and ethereal mammal losses, among others. As an example, it's been calculable by the globe Bank that around 100% of the population of the geographical region is primarily addicted to their animals, whereas another fifty-eight depends on variable degrees of their ethereal mammal (Arnell et al., 2002; Devereux and Edwards, 2004). Increasing population pressures interacting with declining precipitation and reduced pasture have begun to negatively impact the ethereal mammal sector. Production of food and alternative agricultural commodities might keep up with mixture demand, however, there are doubtless to be important changes in native cropping patterns and farming practices.

Food accessibility refers to a scenario whereby food is allotted through markets and non-market distribution mechanisms. Factors that verify whether or not folks can have access to sufficient food through markets are thought to incorporate income-generating capability, the quantity of remuneration received for product and product sold, or labor and services rendered. For rural people that manufacture a considerable part of their food, temperature change impacts on food production might scale back handiness to the

purpose that allocation decisions ought to be created among the family.

Food system stability

Many crops have annual cycles, and yields fluctuate with climate variability, notably precipitation and temperature. Maintaining the continuity of food offers once production is seasonal is so difficult. Droughts and floods are a specific threat to food stability and will motivate chronic and short-lived food insecurity. Each is expected to become a lot of frequent, a lot of intense, and less predictable as a consequence of temperature change. In rural areas that rely on precipitation for agricultural production, changes within the quantity and temporal order of precipitation during the season and a rise in weather variability are doubtless to irritate the dangerousness of native food systems.

Policies and Measures to manage Land Degradation

Experts within the fields of social science, and agricultural development, in addition to environmental management, should draw the eye of policymakers to soil degradation considerations and work with them to line priorities for public investment in land degradation issues. "Scherr and Hazell (1994) know numerous incentive structures like information, the economic importance of resources, disposition to long-run investment, and economic incentives because the factors influencing the pace and scale of land transformation. They mentioned numerous problems with additional analysis like community and regional level, the low external input agriculture, the role of institutional agencies in areas of natural resources management. They found that there was a good ought to understand a lot of regarding inter-sectorial, interregional and macro-level effects on processes of development of fragile and marginal lands".

At the National Level and Regional Level

Strong native establishments with a capability for land management are doubtless to enact bylaws and alternative rules that would enhance property land management practices (Ime et al., 2015). National-level policies like decentralization and also the presence of establishments to create the capability of native establishments onto land management play key roles. In general, top-down policies are found to steer to alienation and land degradation. The foremost necessary step is for the government to spot factors that may be modified to reverse the processes that result in land degradation. Therefore, if governments perceive why land is being degraded, it's going to be the potential to introduce gradual and cheap changes which will encourage farmers to require up a lot of productive and property styles of land use.

Measures from Farmers

"Without any rights to the land that they're exploitation, they need no incentive to vary or improve the fertility of the land". Special attention ought to tend at the native level to those and alternative landless farmers if land conservation programs are to be effective. What is more, a sustained effort is required to enhance the safety of tenure of these World Health Organization don't have land. Farmers World Health Organization hasn't guaranteed that they'll continue the land that they farm seldom take actions that contribute to long-run stability and productivity. Whereas the responsibility for sensational land degradation lies with governments, higher results on land conservation will be achieved over giant areas and at an affordable value solely through the land users' activities. Land conservation programs should aim at making the conditions that can encourage land users at the extent of the farm to adopt land-use systems and management practices that will result in conservation. Consequently, it's necessary to develop agricultural practices which can at the same time increase yields and manage land degradation.

Measures from Non-Governmental Organizations (NGOs)

NGOs are taking part in Associate in nursing more and more necessary role in land conservation altogether elements of the globe. Several are economical at the grassroots level and might typically involve village organizations in a very approach that's not possible for presidency organizations. Their effectiveness in small-scale comes is changing into widely known, and a few major donors are currently channelling Associate in Nursing increasing quantity of their funds through NGOs.

Conceptual Framework and Methodology

The abstract framework of this study relates the factors that move to influence agents and establishments call to undertake and improve property land management. Hence, we tend to conjointly discuss the influence of such selections on outcomes, socio-economic factors that verify land management practices.

Conventionally, some models are wide to assess the economic impacts of temperature change on agriculture; these are; the production function Approach, the Agronomic-Economic Models (AEM), Agro-Ecological Zone Models (AEZM), and therefore the Ricardian Cross-Sectional Model (RM). The production function is specified and the yields of different species of crops are examined under different climatic conditions (Reinsborough, 2003). The AEM employs a mixture of controlled experiments on specific crops full-grown within the field, science modelling, and economic modelling, to predict climate impacts (Adams and McCarl, 2001). One major advantage of the AEM is that it directly predicts the manner temperature change affects crop yields since it needs fastidiously tag-controlled experiments. However, disadvantages that limit its pertinence to the developing countries embracing science estimates don't adapt to dynamic climates and, therefore, the lack of comfortable controlled experiments to work out science responses in many developing countries (Seo et al., 2005). The AEZM on the contrary, assigns crops to agro-ecological zones as inherent the name and their crop yields foreseen. The best strength of this model is that it will simply be applied to developing countries as a result of the geographical distribution of zones during this region is accessible. The RM straightforward examines however climate in several places affects worldwide revenue or worth of land. The RM has been extensively applied in developed and developing countries with outstanding success.

This chapter conjointly discusses the methodology we'll adopt for the study. The fortification informing this paper was conducted in Niger. The chapter clarifies the analysis styles and information assortment instruments utilized in the analysis. During this analysis, the case study approach is going to be chosen and therefore the reasons behind that's its technique is qualitative and holistic (it's a lot of or less a comprehensive examination of a phenomenon); information gathering techniques are going to be realistic (a real-life context of farmers). In qualitative technique, the analysis inquiry falls into beta, descriptive and instructive mode. This study aims to explore the difficulty of trying to find a solution to its main consequences in the future. The study must examine land-related issues. It suggests that searching for the causes and consequences of land degradation.

Study area and Design

There are several varieties of land degradation in Niger, like erosion and geological process. This poses vital challenges for the country. The Sahelian country of Niger has a neighborhood of 1, 267,000 km² and is located with the Saharan desert to the north and geographical region to the south. Regarding seventy-fifth of the country is roofed by desert. The country borders Algeria; Chad Burkina Faso. The country encompasses a long time of year and a shorter season. The rain is characterized by high variability at intervals the year, however conjointly from year to year; rain is additionally extremely variable at a spatial scale.

Agriculture is the primary driver of the economic process, with eightieth of the population looking forward to it as a financial gain. The main economic activities are rain-fed agriculture, as well as wheat and sorghum, and placental breeding. The adverse impacts of temperature change within the region's area result in water deficiency, drought, soil degradation, decreases in fodder production, death of placental, and reduced agricultural yield. This case has caused several households to become vulnerable, and production doesn't permit the population to satisfy their organic process daily desires. Tormented by high levels of impoverishment and structural food insecurity, the realm suffers from unsustainable agro-pastoral practices and increasing risks of conflicts over natural resources. Temperature change consultants expect Niger to expertise progressively variable rain patterns and better temperatures over the approaching decades. Frequent droughts area unit already a retardant, as rain levels have steadily declined since the late 1960s, leading to an extended time of year that currently lasts for nine months. The degradation of the system has forced some residents into unsustainable and damaging practices, like cutting fuel purchasable, that exacerbate issues more.

Niger's path to development is facing several substantial challenges. First, the country perpetually battles drought and solely regarding twelve-tone music of all its land is tillable, largely placed on the stream Niger. High population growth acts as a retardant upon progress. At the present rate, the population is predicted to double by 2035 and reach fifty-four million by 2050. With current demographic trends, seventieth of the population can still sleep in rural areas by 2035. Thus, a giant share of the population can keep looking forward to agriculture for his or her living, and therefore the economy can stay captivated with the world as a supply of growth. It's calculable that a pair of 5 million folks in the Niger area are inveterately food-insecure and unable to satisfy their basic food needs even throughout years of average agricultural production. During times of unnatural access to food, millions a lot of will quickly be short-lived food insecurity. Production is more unnatural by the predominance of ancient management systems, with restricted use and potential for irrigation, poor access to improved seeds, fertilizer, and mechanization, and lack of knowledge.

Data Analysis

Findings were reviewed with relevant Government and partner organizations to verify that they were correct and delineated the simplest obtainable information. Information consists of a literature review of existing reports and works, like previous studies concerning the topic, at the community and regional level in different African countries that thoroughly justify the result of land degradation. Revealed and unpublished materials, books, newspapers, and journals square measure used. The government is that the most vital supply of information within the country papers, followed by international organization organizations. The United Nations agency is mentioned expressly in exactly some documents. Reports collected were used to collaborate between totally different partners and organizations.

Discussion

The country is characterized by harsh physical and climate. The economy depends on exploiting natural resources, with agriculture and placental farming because of the main economic activities. The high pressures on natural resources irritate land degradation and end in the accentuation of impoverishment. The weak economy of the country doesn't permit comfortable investing in property land management. However, the prevailing political and institutional context acknowledges the importance of local people's involvement in natural resources management and restoration. However, this recognition has not been translated into effective implementation in several cases.

Climate change and challenges of food security and agricultural productivity

Niger experiences low and variable rainfalls, land degradation, deforestation, and geologic process. The overwhelming majority of Nigeriens depend upon agriculture for his or her livelihoods, and frequent droughts within the region typically injury crop yields, resulting in food shortages within the country. Chronic food insecurity and a high prevalence of infectious diseases have light-emitting diode Niger to record a number of the best deficiency disease and mortality rates within the world. Poor and food-insecure folks have typically did not receive the advantages of current temperature change science. The power of the poor to require advantage of temperature change mitigation and adaptation technologies is additionally coupled to their education, cultural practices, skills, and access to money assets, furthermore on the existence of supporting establishments and therefore the relevancy of technologies to their explicit wants. It's necessary to maximize farmers' knowledge that is usually marginalized by large-scale efforts to push agricultural production. Small farmers are often at a disadvantage due to economies of scale.

Climate change adaptation strategies

The National Action Program for Adaptation to climate change development aim is to assist mitigates the harmful effects of climate change on the foremost vulnerable folks, with a read to property development and action against impoverishment in Niger.

The Project's primary objective is to strengthen the capability of the agricultural and water sectors to adapt to temperature change, by implementing adaptation measures that will increase agricultural productivity, food security, and therefore the installation at district and village levels. The Project "Priority Action beneath PANA to strengthen the resilience and adaptableness of the agricultural sector in response to climate change" is a solution to the considerations of individuals within the most vulnerable areas, known once PANA was necessitated. PANA is integral to most policy and strategy documents adopted within the cupboard by the government of Niger and glided by the National Assembly. Besides, all activities planned within the implementation of the PANA Resilience Program area unit are compatible with the 5 lines of approach of the 3N initiative for food safety and agricultural development and therefore the Government of Niger Emergency Program.

In recent years, Niger has advanced disaster risk management (DRM) efforts. The government has centered on property development, building resilience to natural hazards, food shortages, and temperature change, and establishing connected establishments for implementation. In 2011, the govt. of Niger launched the 3N Initiative "Nigeriens Nourish Nigeriens." it's the most framework for food and nutrition security interventions. The initiative aims to strengthen national capacities in food production and provide and resilience to food crises and disasters. To more advance its DRM agenda, Niger is prioritizing change in temperature change impacts to strengthen property development; establishing DRM funding mechanisms and strengthening institutional capability, and rising knowledge management.

The project aims to reinforce the capability of Niger's agricultural and pastoral sectors to deal with temperature change, by mainstreaming temperature change Adaptation (CCA) practices and techniques into in progress agricultural development policies and programs and facilitate stakeholders to adopt a field-based, pragmatic community learning method that ends up in Associate in Nursing exaggerated understanding, adaptation and ultimate wide-scale adoption of improved agro-pastoral practices for increasing production, rising livelihoods and enhancing food and nutrition security. Farmers in rural communities' area unit samples of however property livelihoods management systems will facilitate communities build resilience to climate shocks. The Community Action Project for Climate Resilience (CAPCR) provides resilient

seeds and teaches farmers adaptation innovations to higher manage installation for agriculture. As a result, farmers throughout Niger have recorded a rise of concerning eighty two.6% of crop yield and forty-fifths of forage yields within the areas of intervention, compared to different sites in similar agro-ecological zones. Niger isn't the sole country wherever its farmer's area unit makes the most of building resilient agriculture practices. However, the goal is to create the prevailing ancient canal system additional resilient and elastic to temperature change. With improved water management within the region, open land has improved its crop yields. Building resilience includes golf shot preventative measures in situ, to scale back the impact a future drought or flood could bring. As Niger makes the transition from drought to resilience, their success with improved water and land management area unit vivid examples which will facilitate different countries that area unit prone to temperature change become property. These activities have conjointly enabled the populations to get financial gain, enabling them to fulfill the wants of their households, make sure the fertility of the cultivated fields, and shield the setting.

Food security policy

Food production in Niger is very obsessed with climatic factors and additionally, unstable costs have contributed to associate unsure food security state of affairs over recent years. Thus, there's a desire for climate info products tailored for the agricultural and food security sectors at native, sub-national, and national levels to help adaptation designing and effective decision-making.

The main purpose of agriculture policy in Niger is to attain food independence despite climatic hazards (https://www.export.gov/article?id=Niger-Agricultural-Sector). Several soils became unfertilized, thereby jeopardizing the long-run prospects for agricultural productivity. To deal with these constraints, innovative management practices are required that increase soil organic matter contents and nutrient turnover, thereby rising water use potency and crop productivity. Within the earth of Niger, farmers are clutch associate innovative production system consisting of integration trees, crops, and stock. "Integrating trees into agricultural systems already has well-tried to be a good strategy to shield arid areas against land degradation and in raising the biomass used as energy sources". Reintroducing trees will permit farmers to extend the productivity of crops.

Building resilience for adaptation to climate change through sustainable forest management, RNA-FMNR

Resilience is "the property that permits a land system to soak up and utilize modification, as well as resistance to a shock. It refers to the flexibility of a system to come back to its pre-altered state following a modification. The natural resilience of associate atmosphere could also be increased by the range of land management practices adopted by land users".

"Advanced recognition of the resilience of a land system ought to influence land-use choices, thereby reducing the danger of permanent degradation to the system. Trees on farms progressively play a vital role in meeting completely different aspects of a farmer's well-being. In most components of the developing world, the management of woody vegetation within the agricultural landscape or in homesteads has been a living strategy for an extended time (Savadogo et al., 2015). significantly for farmers within the Sahel, trees not happiness to the class of forests however growing on agricultural land play a vital role: they are doing not solely forestall eating away however offer a large variety of system services such, food, feed, and biological process (Savadogo et al., 2015).

Proponents of this earth agroforestry technique named Farmer Managed Natural Regeneration (FMNR) claim that it reconciles the wants for sustained food production, conservation of soil, and global climate change mitigation by sequestering giant amounts of carbon in tree biomass and soil additionally to preserving variety. It should have contributed not solely to a motivating rise in vegetation greenness or "re-greening" on an oversized scale however additionally to enhancements in agricultural and environmental conditions. It's contributed to an increase in on-farm trees to a magnitude of two hundred million trees on a district of five million hectares of at one-time thin scrubland within the Nigerien regions. It's a promising climate-smart agricultural technique that represents a reasonable suggests that of enhancing rural livelihoods (Savadogo et al., 2015).

Conclusion

Here, we've given actions that will facilitate the integration of land degradation counter-measures into global climate change adaptation design. We argue that the combined effects of land degradation and global climate change should receive priority attention. Lessons learned concerning successful adaptation in regions with resilient agro-ecological systems should be applied to support regions with low adaptive capacity; at an equivalent time; we believe that a larger exchange of data between varied stakeholders can facilitate push methods. "The importance of land degradation among international problems is being increased due to its impact on world food security and also the quality of the atmosphere. The underlying causes of degradation are fairly often the fundamental socio-economic structure and institutional structures of assorted countries". Several countries have adopted policies in varied phases for agriculture with the expectation that the development of agriculture would be within the demolition of financial conditions. A policy framework to mitigate land degradation may be tackled at the national, regional, and international levels, and also by the land users (the farmers) themselves and by Non-Governmental Organizations (NGOs).

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