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Perceptions on climate change- associated disasters, adaptations and apportunities at gashua geographical area

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ABSTRACT

The paper focused on assessment of perception on climate change associated disasters, adaptations and resources for future opportunities based on human perceptions. Stratified random sampling was used for selecting respondents between north and southern Gashua. Fifty (50) respondents from the south and thirty eight (38) from the North were selected. The data was collected via field observation and structured interviews at the onset of the rainy season of 2011. The result revealed that, drought, wind storm, heat wave, hamattan dust, tree biodiversity reduction, flood and out-break of some heat related meningitis are among the major disasters aggravating the social well-beings of the populace. Among the reasons perceived for the disasters were massive deforestation, overgrazing due to communal resource feeling, nearness to desert, poverty, and societal immorality .Field observation revealed that, the inhabitants have adapted to the environmental challenges by practicing irrigation, fishing, rearing livestock, seasonal regional and local migration to southern Nigeria, reverting to traditional architectures, planting exotic tree species, civil service and intensive prayers for Devine intervention in their various religious gatherings. The study recommends among others, Agro- forestry intensification practice using draught- resistant tree species and massive participatory rural- integrated projects towards improvement of social amenities, economic diversifications through collaboration of NGOS, CBOS and local authorities, for the ample dry land resources-based opportunities witnessed in the study area.

Introduction

Earths planet is a mega environmental system made up of various interlocking components. The major components are: atmosphere, hydrosphere, biosphere (including man as a special and superior-intellectual creature with fore sight brain, hand and legs) and of course the lithosphere which suffers much anthropogenic interventions. The systematic integral components work simultaneously to keep the planet survives. Without which the planet may had collapsed. The relationship was best explained by system theory. Of all the spheres, lithosphere worst hit by human deleterious activities in the quest for food (agriculture), energy, industrialization, and so many urbanization processes. The man catastrophic attempts on the lithosphere has severely degraded the land potential well beings and extended the menaces to the three major spheres so much that the earth biogeochemical cycles and natural composition of the atmosphere have altered beyond the natural status. The major affected cycles are: Hydrological cycle, climatologically system, Nutrient cycles and Atmospheric compositions.

Climate Change and Its Disasters

According to UNFCC (2007) climate change isprently attributed directly or indirectly to anthropogenic activities that alter the composition of the global atmosphere, which is in addition to natural climate variability observed over comparable time periods. Climate change is one of the contemporary environmental issues that have been known to be caused by natural internal processes or external forcing or persistent anthropogenic activities. It leads so many distortions in weather pattern which have serious socio-economic repercussions, upsetting seasonal cycles, harming ecosystem, water supply systems. Increase in climate disaster has reach an alarming rate, it lacks boundary but more prone to semi-arid and arid lands of Africa where environmental degradations reached their climax.

Factsheet (2004), has reported that, climate change has been notorious for numerous extreme climate events: high wind, heavy rainfall, heat wave which result to wide range scenarios like wind storm, floods, erosion, droughts, epidemics spread , proliferation of pest and diseases, ecological imbalances. These catastrophes induce populations to be displaced, which may in turn lead to conflict and civil unrest as witness nowadays in sub-sahara region of West Africa.

Conducting research at and around Gashua at this material time is very vital for its proximity to the sahelianregion where aridity due to nearness to sub-tropical high and environmental degradations had reach climax point. Adaptation will be necessary to address impacts resulting from warming which is already unavoidable due to past emission brought about by human developmental activities, IPCC,(2007), Saleemul(2006). Above all the UNFCC (2007) has indicated that developing countries in Africa are among the world most vulnerable communities to climate change extreme events, for their fewer resources to adapt: socially, financially and technologically. The events like flood and drought can occur in the same area, time of the year and lead to famine, epidemics and disruption of socio economic wellbeing. Climate change has remained a bottle neck that crippled the dream of developing nations to attain a sustainable development and their ability to meet the MDGS missions comes 2015. Thus the questions of what climatic disasters are most peculiar to Gashuans? Where, when and whoare most vulnerable? What strategic measures of adaptations are in practice? What economic potentials has arid land in Gashua? Are some of the questions expected to answer at the

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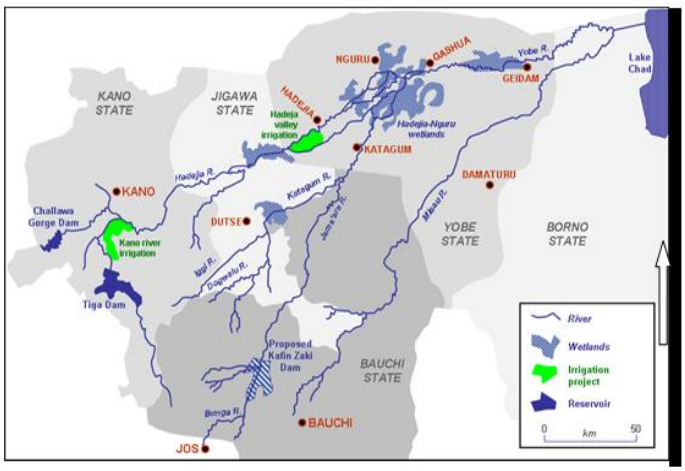
end of this research? The main propose of thispaper is to examine the perception status climate change relateddisasters, their factors, vulnerability and adaptations based on the human perceptions in the area of study.

The study area

Gashua is located in semi- arid environment typically termed as arid land or manga grassland maigari(2000).It is made up of collection of sand dunes of different complexity. Some are active while others are dormant in nature. The area lies between latitudes 13^0 to 15^0 N and longitude 11^0 to 15^0E. It is inhibited by the sedentary Mangawa farmers, Fulbe and Nomadic stock owners. Some of the important towns are: Gashua, Geidam, Dagona, Yusufari, Yunusari, Jajimaji and their environs villages attached. The climate is typified by semi arid which characterized by low rainfall of about 400-600mm/anum depending on the rainy year and geographical location. The rainy days last for about 90 days in southern parts (Gashua) and to less than that in part of the extreme north as in Yusufari and Yunusari. This may be due to the prevalence of drought. The moisture is highly critical that it determines farming activities as well as growth of vegetation species. The condition of the atmosphere is hot and dry for most of the year owing to the Continentality and proximity to Sahara desert where originate tropical continental air mass. For most of the time the mean temperature is about 37^0c while in April it exceeds to above 42^0c and in December to about 30^0c.thus both temperature and especially rainfall exhibit temporal and aerial variations in the region. This area represent part of the world the typified by dramatic diurnal range of temperature due to less vegetative cover, cloudless atmosphere and proximity to the desert. The range varies from 30^0c in august, 39^0c in April and 12^0 in December. The area is noticed with high speed wind storm at especially at the onset and cessations of the rainy season. It has less vegetation cover due to the subjection of the area to environmental degradation through over grazing, deforestation for fuel, farming and shelter construction. the area is drained by river Kamandugu and it tributaries in the south while the north is limited with disappearing streams and clue of dry wadis and oasis along the dunes depressions.

Figure 1: Map of North Eastern Showing Gashuawa Location



The methods and procedures

The data used for the study was collected through field observation of areas of man-environment interactions and structured interviews with respondents and some local community leaders for in-depth investigation. Thus the main data collected was qualitative type. The data was in line with: type of major climate-disasters, vulnerability, adaptation responses, and local mitigations in practice. Five communities selected by stratified random sampling were involved in the study. These are Gashua, Dagona, Geidam, Yusufari, Yunusari, Machina. The fact that settlement developments and disasters ; adaptation responses may differ with geographical positions, the communities were segregated into two classes based on geographical location:

1. Gashua, Geidam and Dagona in the southern latitude and(semi-urban settlements)
2. Yusufari and Yunusari in the drier northern axis(as rural set-up)

Fifty respondents were interviewed along with tree community leaders in the southern zone while only 38 respondents and two community leaders were able to be interviewed due to some unavoidable environmental constrains in the northern axis. The data were than subjected to descriptive statistics for coming up with results that would answer the questions raised before. Pictures relevant to the work were also snapped for practical evidences of environmental realities.

Results and discussions

This section comprises the enumerated climate disasters, it impacting factors, human responses and adaptations and local mitigations as pertain to the area of the study..

Southern Latitude Zone

The area geographically comprises Gahsua, Geidan as the semi urban settlement with agglomeration of population and urban socio-economic facilities. According to the field result of inhabitant's perceptions, the area faced serious climate disasters as has been revealed in table 1(below).

Table 1: major climate-related disasters perceptions

S/NO	Disaster	Perception	Percentage (%)
1	Wind storm destructions waves	19	31
2	Thunderstorm extremes	3	5
3	Flood	12	20
4	Drought related	10	16
5	Extreme heat waves	8	14
6	Active dunes approach menace	2	4
7	Epidemics (cbm, cholera, livestocketc)	4	6
8	Others	2	4
9	Total	60	100

Field: work 2011

The table has indicated an array of climate related disasters based on the perception of the inhabitants and some physical observations around the area of the study. The dominant disasters perceived include: wind storm related destructions, flood, drought and extreme heat wave. While the least perceived are epidemics, dunes encroachment and thunder storm bombs. Some respondents revealed that occurrences of the events are in connections to the evils committers in the society who spiritually distance themselves from good deeds. In contrast to the above idea, the physical scientists were of the view that, proximity to sahara desert means exposure to sub-tropical High pressure that characterized by calm and cloudless atmosphere, man induced massive deforestation and overgrazing indicated serious environmental degradation and earth surface exposure to ultraviolet rays, and urbanization due to built up settlements, roofing sheet materials and are the major reason for conserving heat that stimulates severity of the disasters and subsequent atmospheric disturbance. Other predicaments contributing towards environmental degradation in the study area are poverty and communal resources utilization (i.e no man's resources).

For flood, communities' having their farms or houses at the vicinity of flood plains or in areas with poor drainage is more vulnerable to its dangers especially during the months of august or early September when the rain is in excess. While, drought was reported surfacing either at the beginning or when the rain cessation begins. Thus fluctuation of ITCZ between north and south and shift of pressure belt towards the southern sahara are the two key factors determining the drought in sub Saharan region (Demmy 2006).

In Gashua and Geidam epidemic outbreaks like cerebral-spinal meningitis (CSM) has been reported not as high as in the case of the other disasters. This might be due to the availability of health facilities.

Main socio-economic adaptations

The respondents were asked about their major occupations sustaining their livelihood owing to the environmental calamities. However positive answers were revealed in the table 2 below:

Table 2: Major adaptations sustaining the in habitants

S/NO.	Main ocupation	Perception	Percentage (%)
1	Rain fed cultivation	24	40
2	Irrigation	3	5
3	Livestock herding	11	18
4	Fishing	3	5
5	Civil service	10	17
6	Seasonal migrations	2	3
7	Trading businesses	5	8
8	others	2	3
9	Total==========	60	99

Source: field work 2010

Majority of the respondents revealed that the major occupations sustaining the Gashuan populace was rain fed cultivations followed by livestock keepings and civil services at different tears of government. This is not surprising having observed the vast potential agricultural lands, available flood plains and reached grass-pasture. For the civil service the axis is a semi-urban environment where significant number of people attended formal and religious schools which empowered them to cope with reparable hazards. Other coping strategies reported by some eminent personalities were: planting short lived seed varieties of 2-3 months duration, seasonal migration to some urban areas in northern and southern Nigeria for lucrative jobs. Many of the inhabitants were observed reverting to the traditional building architectures, planting exotic tree species and when the local authority were asked about the essence of the practice they replied that the practice are for provision of domestic fuel, building materials and above all to safeguard the inhabitants from the, calamities of the wind storms and extreme heat waves in summer seasons.

In another perspective many of the in habitants are observed calling for intensified prayers in their places of worships and ceremonial gatherings for future protection against unprepared calamities.

Northern Communities(RuralSet-Up)

The zone constitutes Yusufari and Yunusari rural-oriented set up where by most of the populace are rural in their life style. The climatic disasters reported differ with those revealed by the southern counterparts in terms of magnitude and distribution. This is mainly due to geographical location and social status of the community as physically observed in the field. Table 3 below displays the findings:

Based on their literacy level and socio-economic status, majority of the community perceived: drought, dune encroachments and epidemics out break as their eye-sore bottle neck. While flood, wind storm destructions and thunderstorms cases were negligible. The environment seemed to be more degraded if compared with the southern zone.

Table 3: Major climate-related disasters perceptions

S/NO.	Disaster	Perceptions	Percentage (%)
1	Wind storm destructions waves	0	0
2	Thunderstorm extremes	0	0
3	Flood	0	0
4	Drought related	18	47
5	Extreme heat waves	4	10
6	Active dunes approach menace	10	26
7	Epidemics (cbm, cholera, livestocketc)	6	16
8	Others	0	0
9	Total	38	99

Field: work 2011

The main reasons are closer the proximity to the sahara than the other area and brief rainy days. In fact the area has reached a high scale of degradation due to overgrazing, desertification and recurrent drought. Most of the vegetations are scarce and limited with xerophytes species along the dry oasis depressions; dunes are conspicuous in longitudinal and traverse patterns. The dunes are observed active in nature and severely threatening the lives of the populace as was witnessed in Yunusari and Yusufari areas. The case of kaska is trouble as many settlements were reported buried with the dunes and some communities have to migrate to safer locations. Moisture scarcity has remained the critical factor of survival and economic activities. The community as observed are sustained by few deep boreholes and complicated traditional wells along the marginalized oasis depressions.

The mode of buildings are traditional made from grasses and mud obtained from the immediate locality, this technology made them feel less heat indoor as the materials are poor heat conductors as compared to the Gashua and Giedam, where the construction materials are heat retentive and experience more emission of green house gasses due urban agglomerations.

The area witnessed more epidemics outbreak like cerebral-spinal meningitis than the earlier zone. This is much more connected to the poor medical facilities, infrastructures constrains and remoteness from the mega towns in the state.

The local community leaders were asked about the causes of the climate related disasters. Most of them were agreed that 1973 drought and 1983 aridity are the genesis of the problems they faced. Others were of the view that human immorality and arrival of colonial masters to their locality as the prime factors of environmental degradations.

Main adaptations engaged by the northern axis

Table 4: Major Adaptations sustaining the in habitants

S/NO.	Main occupation	Perceptions	Percentage (%)
1	Rain fed cultivation	6	16
2	Irrigation	5	14
3	Livestock herding	20	52
4	Fishing	0	0
5	Civil service	0	0
6	Seasonal migrations(ci rani)	5	14
7	Trading businesses	0	0
8	others	2	5
9	Total==========	38	101

Source: field work 2010

Majority of the respondents revealed that the major occupations sustaining them is pastoral farming followed by rain fed cultivation, marginalized irrigations and seasonal migration.

But fishing, civil service are not recorded. Others reported were local crafts, potash mining, date cultivation and few local trading. Observing at the isolated and disperse nature of the rural settlements couple with brief rainy duration and degraded vegetation, the inhabitants are really constrains and endangered by numerous socio economic crisis in many angles of assessments. Their utmost option is to engage in nomadic herding owing to the critical moisture and posture in adequacies. The migration is due to poverty that sends them outside their home to various urban areas for generating economic remittances back home for social responsibility burden. Another predicament to this area is remoteness from local and state governments headquarters. This leads to their socio-economic backwardness.

Based on the outcome of the results from the two areas, it is clear that the northern axis is much more vulnerable to climate fatalities. While the southern zone is typified with destructive wind storm due to the change of land use covers from rural to urban types. The land cover and modern built up structures are heat absorbents, thus lead to rise in local temperature with corresponding fall in pressure. And fall of pressure may locally lead to more destructive wind extreme events like: flood, heat wave and drought.

The analyses were based on local people perceptions. Thus, more scientific explanations ought to be supplemented for further advancement. This was recommended by Nabegu (2010) and Iguebuike (2010). Nabegu was of the view that deforestation in quest of fuel wood, farm activities, shelter and overgrazing are some of the human actions responsible for the degradation of our natural environment apart of the recurrent droughts. As result many tree and animal species to what is referred as biodiversity reductions. The ecological habitat has changed and left man with negligible shading habitat, medicinal resources seeds and fruits. Now man has to travel outside the zone before his access to some of the valuable resources.

Analytical Tests

Considering the analysis of spearman s correlation, the result indicated on disasters a very low inverse correlation between the two zones. This is due the -0.147 value. While adaptations analysis between the north and south of the study area has revealed 0.308 values which indicated a very low correlation. Refer to the appendixes table for details.

Observed Potential Recourses

Field observation has indicated that Gashua and its environs are blessed with potential environmental resources for future expanding economic diversifications towards sustainable development. Such resources include:

- Vast agricultural land for livestock rearing and cultivations
- Potential alluvial plains, oasis depressions and river Yobe water for irrigation opportunity
- Suitable land for growing arable gum plantation(NEAZDAP)
- solar and wind energy harnessing opportunities
- available source of labor for prosperity in secondary occupations
- promising rural market for population density
- dunes and oasis depressions serve as tourisms potentials

Conclusion

Based on the paper findings following recommendations were made.

- Massive adaption of agro-forestry by using drought resistant trees which has economic values.
- Economic diversifications through mixed farming, crop rotation
- Improvement and provision of social amenities to the rural populace
- Sustainable rural integrated model of rural sustainable development through NGOS, CBOS, local authority and maintenance of NEAZDAP initiative programme.
- Establishment of special veterinary hospitals in each local government centers.
- Development of appropriate technologies with local farmers for achieving sustainable utilization of the available recourses.

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Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
SLZ	7.5000	6.00000	8
NCZ	4.7500	6.49725	8

Correlations

		SLZ	NCZ
SLZ	Pearson Correlation	1	-.106
	Sig. (2-tailed)		.802
	N	8	8
NCZ	Pearson Correlation	-.106	1
	Sig. (2-tailed)	.802	
	N	8	8

Nonparametric Correlations

Correlations

			SLZ	NCZ
Spearman's rho	SLZ	Correlation Coefficient	1.000	-.147
		Sig. (2-tailed)	.	.729
		N	8	8
	NCZ	Correlation Coefficient	-.147	1.000
		Sig. (2-tailed)	.729	.
		N	8	8

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
SAD	7.5000	7.54037	8
NAD	4.7500	6.64938	8

Correlations

		SAD	NAD
SAD	Pearson Correlation	1	.308
	Sig. (2-tailed)		.458
	N	8	8
NAD	Pearson Correlation	.308	1
	Sig. (2-tailed)	.458	
	N	8	8

Nonparametric Correlations

Correlations

			SAD	NAD
Spearman's rho	SAD	Correlation Coefficient	1.000	.311
		Sig. (2-tailed)	.	.454
		N	8	8
	NAD	Correlation Coefficient	.311	1.000
		Sig. (2-tailed)	.454	.
		N	8	8