

Traditional Utilization of National Resources and Sustainable Livelihoods Support in Northwest Area of White Nile State

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Abstract

This study was conducted in the north-western part of the White Nile state; mainly focused to examine the interaction between human and the natural environment, to investigate the support provided by the different activities that make up the livelihood system of the rural population considering the factors affecting them. The study also meant to find out the livelihood strategies adopted by the households living in the area to mitigate and/or adapt to crisis. The primary data were obtained through the use of questionnaire from nine villages, each three representing a specific locality and each village representing a specific stratum. Secondary data was obtained from focus group discussions with village leaders and elder groups, available references, previous studies, researcher observations and available reports. Data were analyzed using simple descriptive statistics and analysis of households' income and consumption expenditure to determine dominant source of income and the most prominent items been purchased. Results obtained show that over 80% of respondents surveyed are dependent on agriculture and/or animal production. However, the results indicated that the agricultural production is very low where the majority of households (44.4%) produce only one sack of cereals per feddan from traditional rain fed cultivation, and have the lowest income from farming and animal production. The study revealed that the majority of households surveyed did not produce enough food to fulfill their household's food demand, and that their consumption expenditure is very high (SDG 6774.2) of which 58.4% spent on food. These are mainly due to a combination of environmental, ecological, technical and institutional problems as indicated by 70.6% of the respondents. This situation makes the people vulnerable to food shortage. As the study area, northwest White Nile state represents the dry lands of the country, the natural ecosystems are subjected to degradation, and the declining trends of the natural resources are eroding the life support systems in this area. Therefore, rural people have lower access to natural forests and trees which provided them with diversity of uses and benefits. The study revealed that most of the valuable tree species have disappeared and even those still existing, are subjected to grazing and cutting. The net result is the continuous degradation of forests and trees and more increase in vulnerability. The study also shows that, vulnerable households adopted different adaptive strategies to mitigate/cope with risks, based on the options available for them.

Keywords

Traditional, Utilization, Natural Resources, Degradation, Livelihoods, Vulnerability, Support, Income, Consumption, Coping Strategies

1. Introduction

The welfare of human societies and the quality of life are directly linked to sustainable use of natural resources. This

has been duly recognized in a number of world conferences convened by the United Nations. The Conference on Environment and Development (CED, 1992) held in Rio de Janeiro in 1992 emphasized the need to ensure access of all people to healthy and sufficient food at all levels, within the

framework of sustainable development. Livelihood strategies of rural households need to be characterized, through more powerful tools that reveal the problems and constraints, as well as opportunities and strengths of different land users. In addition, it should define the economic, ecological, human and socio-cultural aspects that they have, and hence their capacity to respond to changes and shocks, and to maintain resilience. The ability to adapt is a vital asset in dry areas.

In White Nile state people depend on the environment in different ways to meet their basic needs and earn an income. Agro-pastoralists have often agro-pastoral systems to maximize agriculture production to support their livelihoods. Depletion of these resources have seriously affected access and use of natural resources and further undermined their fragile livelihoods. An understanding of the different livelihood strategies is very useful to link resource management with these livelihood mechanisms.

The apparent advance of the desert and recurrent droughts in central Sudan during the last two decades have brought a series of environmental, ecological and socio-economic problems, particularly in rural areas. These events endanger both the resource base and the quality of life in a situation of increasing human and animal population numbers. Depletion of arable and grazing resources and decreased land productivity have led to serious problems in rural areas, and are all symptoms associated with land degradation and resource changes.

The area northwest of the White Nile state, mainly comprise Ed-Dueim, Um Rimtta and Al-Geteina localities is representative of the arid and semi-arid ecosystems of central Sudan, where drought is a significant factor in disturbing the rural economy. This is because the population depends mainly on natural resources for their livelihoods, as they are traditional rain fed farmers and livestock breeders. One of the greatest challenges currently facing humankind is the alleviation of poverty while maintaining life support systems on which people depend. Billions of people are dependant on natural resources that are often unsustainably used by the poor people themselves. A range of large-scale environmental problems is now threatening the long-term performance of many agricultural, forestry and livestock systems.

The area faces a number of converging trends that include:

- High population growth rates of up to 3 percent and demographic pattern that will result in large numbers of young generations.
- The area is already water scarce and will be increasingly so, especially if climate change predictions are correct and the area become drier.
- Increasing dependency on neighborhood markets for grain and other foodstuffs.
- Increasing desertification, and loss of biodiversity.
- Increasing out migration of males from rural areas, which will result in the loss of traditional farming systems, and greater resilience on women as heads of households.

Evidently this situation facilitates the process of becoming vulnerable, due to unsustainable utilization of natural

resources. Mainly two issues or observations inspired this study. The first one is the evidence in literature indicating the availability of substantial stock of natural resource base in the study area, and the second is about the differences in the nature of the means rural people use to earn a living and the factors affecting them.

The primary broad concern of this research is to investigate about the current uses of available resources in the area, to recognize the diverse activities that make up the livelihood system and to explore the livelihood strategies of rural households to escape crisis.

2. Materials and Methods

The study was conducted in three localities, namely Ed-Dueim, Um Rimtta and Al-Geneina of the White Nile State that extends between Lat. 15° 00'N to 15° 12' N and Long. 33° 15' E to 33° 33' E. The state lies north of Republic of South Sudan, south of Khartoum and North Kordofan state, east of South Kordofan state and west of Gezira state. The total area of the state is approximately equal to 39, 71 square kilometers, which is equal to about 4 million hectares, about 66% of which is under vegetation cover (El Nadi 2006). The area is dry with an average rainfall of 200 mm per annum. The principal climatic zones of north White Nile state has been classified as semi-arid in the north and low woodland savannah to the south, rainfall varies between 200 mm – 300 mm per annum. Vegetation is composed of mixture of scattered trees, bushes and grasses. According to previous studies and surveys conducted by Hunting Technical Services between 1974 and 1976, soils of the area has been grouped into six soil groups, the major types are the soils of the flood plain, are dark grey to dark brownish black, slowly permeable cracking clay soils. The alluvial plains are soils formed along the wadi flood plains west of the White Nile river, dark brown, silt clay loam, they are somewhat stony, with low clay content, but are fertile. They have been extensively utilized for dry cultivation of sorghum. The sand dune areas (qoz) are mainly associated with stabilized sand dunes; these soils are fully used for millet, sesame and groundnut cultivation.

This variation in climatic zones and soil types will be examined to explore the interaction of people living in the study area and the natural environment, as they are mainly traditional farmers, livestock breeders and forest dwellers.

Primary data obtained from semi-structured household questionnaire. Data on natural resources, livelihoods supporting systems, food production, income, food consumption, migration, agriculture problems and household priorities were collected. Qualitative data obtained from observations, informal discussions and interviews with local people. Method of geographical segmentation was used to determine the actual locations across the sampling universe. The area was stratified into three strata:

- Areas lie closer to the Nile,
- Middle transitional areas, and
- Areas to the outmost western boundaries of the state.

Three locations were selected randomly from each locality, each representing specific stratum. For determining the desired sample size, it has been noticed that villages in the study area differ in sizes and population numbers. Moreover, by referring to the records of the localities it has been found that the average number of households in small size villages is (100), average of medium size villages is (140) and average of large size villages is (180), therefore the average household number of all villages was calculated as (140). To ensure that the data were statistically significant over the whole population, a desired sample size of 10% taken from the average household number of all villages, and then the sampling interval was determined; by dividing the total number of households in each village (sampling units, or total number of units in a population) over the desired sample size. Simple random sampling technique was employed as a tool for selecting target households for the purpose of the study. Data were analyzed using simple descriptive statistics and households' budget analysis.

3. Results and Discussion

Analyses of the households agriculture production showed different results, where 44.4% of the total households surveyed produce only 90 kg/fed (approximately one sack) of cereals (18.3% in Ed-Dueim, 13.5% in Um Rimtta and 12.7% in Al-Geneina). On the other hand, 35.7% produce 180 kg/fed (two sacks) of cereals (8.7% in Ed-Dueim, 15.9% in Um Rimtta, and 11.1% in Al-Geneina). 12.7% produce 270 kg/fed (three sacks). And only 3.2% produce more than 270 kg/fed. Results of analysis of variance (at $p < 0.05$) showed no significant difference between localities with respect to the crop yield produced. The study revealed that most of the respondents are mainly pastoral or agro-pastoral household i.e. nomadic or semi-nomadic, and it has been found that the majority of households 47.6% owned goats, 13.5% have sheep, and 4.0% owned cattle and 11.2% possessed mixture between goats and sheep or sheep and cattle or all. On the other hand, 23.8% of the total respondents surveyed haven't any type of animal, or have lost their livestock during the drought that hit the area in early 1980's. Analysis of variance indicates no significant difference between localities with regard to animal

ownership; the majority of respondents own goats.

Analysis of forest resources in the study area in relation to abundance, where 30.8% indicated that *A. tortilis*, locally known as seyal" is the species found in their area which lies to the north of the study area, 21.4% of the respondents have revealed existence of *A. nilotica*, "locally known as sunut" mainly along river sides and/or khores. Sidir "Ziziphus spina-christi", Hegleig "*Balanites aegyptiaca*" and Talih "*A. seyal*" are found at a lesser percent 4.0%, 2.4% and 2.4% respectively as indicated by respondents who are mainly living either to western or southern parts of the study area. The result is in line with (Elsiddig, 2003) who stated that this area has been subjected to overcutting, over cultivation and overgrazing which resulted in forest and land degradation. Consequently local people are losing land and tree tenure and have limited access to valuable trees and forests that they used to have under previous customary systems. Results obtained from analysis of household income as a proxy indicator to assess household's development, in relation to income sources that depict the opportunity enjoyed by people to generate an income. The analysis revealed that 49.2% practiced agriculture, 14.3% of the households surveyed practiced livestock rearing, 10.3% of the households tried to diversify income by maximizing agriculture production to support their livelihood and generate income, while only 3.2% of the total respondents had access to forest resources. The Chi-square test indicates that there is no significant difference between localities with respect to the source of income; the majority of respondents are depending on agriculture to generate an income. However, analysis undertaken to assess the pattern of households' consumption expenditure, as an indicator of the standard of living, in the different localities revealed that; on average, the total household consumption expenditure was (SDG 6774.2), of which 58.4% spent on food. The expenditure on food constituted the major component of household's consumption pattern as people preferred to spend more on food than other items, since their income is limited and they could not enhance their consumption on other items. 26.6% on the non-food items and 15.0% on the other expenditure as education, health, transportation, etc., in this context, it can be concluded that the household consumption expenditure among the locality level was found not significant.

Table 1. Household Crop Production.

Locality		Yield per feddan/kg					Total
		< 90	90	180	270	>270	
Ed-Dueim	Count	4	23	11	4	0	42
	Percent	9.5	54.8	26.2	9.5	0	100
Um Rimtta	Count	0	17	20	5	0	42
	Percent	0	40.5	47.6	11.9	0	100
Al-Geteina	Count	1	16	14	7	4	42
	Percent	2.4	38.1	33.3	16.7	9.5	100
Total	Count	5	56	45	16	4	100
	Percent	4.0	44.4	35.7	12.7	3.2	100

Table 2. Household distribution with regard of animal type.

Locality		Animal Type					Total
		None	Goats	Sheep	Cows	Mixture	
Ed-Dueim	Count	8	26	4	0	4	42
	Percent	19.0	61.9	9.5	0	9.5	100
Um Rimtta	Count	12	16	6	3	5	42
	Percent	28.6	38.1	14.3	7.1	11.9	100
Al-Geteina	Count	10	18	7	2	5	42
	Percent	23.8	42.9	16.7	4.8	11.9	100
Total	Count	30	60	17	5	14	126
	Percent	23.8	47.6	13.5	4.0	11.2	100

Table 3. Number and percent of respondents in relation to tree abundance.

Species	Number	Percent
Seyal	39	30.8
Sunut	27	21.4
Merekh	18	14.3
La'oot	13	10.4
Tondub	12	9.5
Sareh	6	4.8
Sidir	5	4.0
Hegleig	3	2.4
Talih	3	2.4
Total	126	100.0

Table 4. Household income source by locality.

Locality		Household Income Source							Total
		Agric	Livestock	Agro-pastoral	Forests	Employee	Private Business	Others	
Ed-Dueim	Count	22	7	5	2	2	2	2	42
	Percent	52.4	16.7	11.9	4.8	4.8	4.8	4.8	100
Um Rimtta	Count	21	8	6	1	1	2	3	42
	Percent	50.0	19.0	14.3	2.4	2.4	4.8	7.1	100
Al-Geteina	Count	19	3	2	1	4	6	7	42
	Percent	45.2	7.1	4.8	2.4	9.5	14.3	16.7	100
Total	Count	62	18	13	4	7	10	12	126
	Percent	49.2	14.3	10.3	3.2	5.6	7.9	9.5	100

Table 5. Household consumption expenditure (SDG) and percent.

Items	Locality			Total N=126
	Ed-Dueim	Um Rimtta	Al-Geteina	
	n=42	n=42	n=42	
Food items	3754.3 (56.6)	4422.9 (59.3)	3685.7 (59.1)	3954.3 (58.4)
Non-food items	1842.9 (27.8)	1937.1 (26.0)	1628.6 (26.1)	1802.8 (26.6)
Other expenditure	1037.1 (15.6)	1097.1 (14.7)	917.1 (14.8)	1017.1 (15.0)
Total expenditure	6634.3 (100.0)	7457.1 (100.0)	6231.4 (100.0)	6774.2 (100.0)

4. Conclusion

The main objective is to study the relation between the natural systems and human needs and socio-economic responses within rural communities in the study area. The study attempts to investigate about the combination of assets to understand the livelihood outcomes of rural households and the adaptive strategies to improve their well-being and increase resilience to possible hazards or risks. In the study area livelihoods are based predominantly on traditional

farming and pastoral activities. Susceptibility to droughts, coupled with highly constrained and unequal access to assets, are defining features of vulnerability of people pursuing rural livelihoods in the study area. Recurrent drought is a common feature of the climate of the study area, which represents dry lands of Sudan. This drought has contributed to severe hardship, poverty, dislocation and even hunger. Yet there is obvious interaction between rural households and environment to increase resilience for coping with drought and its effects. The cumulative impact of recurrent droughts is over cultivation, overcutting and overgrazing which has

drastically depleted the vegetation. The local resource base has been degraded, undermining livelihoods and leaving households more vulnerable to adverse effects of future droughts.

Data analysis has shown that the relationship between households surveyed and their natural environment that they used to depend on for subsistence or income generating has been disturbed. This is very clear from the results obtained from this study.

The study revealed that the majority of households surveyed practiced agriculture as the main activity. However, they produced the lowest agriculture yields from farm lands, and generate the lowest income from sales of agriculture, livestock and forest products. This is because the crucial assets for households such as cropland, grassland and forests have been seriously degraded as a result of over-use by these households.

The natural resource-base was greatly affected by human activities. The study revealed that most of the valuable tree species rural population used to have in the past and provide them with diversity of benefits such as gum, firewood, charcoal, building poles, agriculture tools, fodder and protection have disappeared as a result of overexploitation and mismanagement.

In response to these devastating conditions, rural households have adopted adaptive capacities to cope with such changes, some are considered as being developed spontaneously as a regular action of on-going resource management such as selling of animal or cultivating more land in response to declining productivity, and others are planned specifically in light of specific climate-related risk by government, NGO's and international agencies; which have benefited the livelihoods assets on smaller scale.

Recommendations

- Agro-forestry can contribute significantly in mitigating degradation of dry lands natural resources by providing various products and services. Promotion of agro-forestry options should be tied to other economically beneficial activities that address the expressed need for food, income generation, risk management and social objectives of the rural poor and build from knowledge capital and expectations of rural communities.
- The need to increase the capacity of land users and institutions to formulate their own location-specific solutions through capacity building and extension programs.
- The future of dry lands management lies on enhancing people's participation in the utilization and conservation of its natural resources.
- Considerable participation of local people in the planning process is important. Much greater attention should be paid to the attitudes, aspirations, perceptions, and socio-economic priorities of rural households.
- National, regional and international initiatives are needed for the development of programs that will enable local

people, in particular vulnerable areas, to participate in, and benefit from these programs to increase resilience of present food production systems and to support climate change adaptation, mitigation and technology development, transfer and dissemination.

- The importance of application of sustainable principles for the management of resources and necessity to combat desertification are fully in line with the mandate of the UNCCD. This requires the application of new approaches that will rehabilitate degraded lands and maintain the productive and protective functions of healthy ecosystems.

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