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RESEARCH ARTICLE

TRADITIONAL FARMERS' COPING MECHANISMS WITH RAINFALL VARIABILITY IN SEMI-ARID LANDS: A STUDY FROM SUDAN

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ABSTRACT

This study conducted in the semi-arid lands of central Sudan, aimed at investigating and analyzing the coping mechanisms that have been adopted by the traditional farmers on the main staple food (sorghum and millet) to cope with rainfall variability. Primary and secondary sources were used in the study. Five hundred (500) headed households were randomly selected from eight sample sites and questionnaire interviews were conducted focusing on the adopted coping mechanisms. Coefficient of variation and descriptive analytical methods were used in the data analysis. The results showed medium coefficient of variation for rainfall ranges (0.3 to 0.37) for the period 1972 to 2013. Similarly, high coefficient of variation for sorghum and millet production ranges (0.61 to 0.92) was found. A significant relationship between education and intercropping ($P \leq 0.05$) and between education and *Ramil* mechanism ($P \leq 0.01$) was found. The results showed that the coping mechanisms were adopted with no regards to the demographic variables. The efficiency and productivity of these mechanisms was found to be low except for the shift to quick maturing varieties under existing rainfall variability and crop's production uncertainty which represents the major constraints for the resilience of local communities.

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INTRODUCTION

Rainfall variability is an important feature of semi-arid climates, and climate change is likely to increase that variability in many of these regions (Batisani and Yarnal, 2010). A study from Alaknanda catchment in the Central Himalaya showed a decline in rainfall trends pattern and reflects that more chances of drought are expected in the future (Kumar *et al*., 2008). In Central Tanzania a study showed a decreasing rainfall trend between 1922 and 2007 (Mary and Majule, 2009).The changes have affected crops in a number of ways resulting in reduced productivity (Mary and Majule, 2009). In Sudan the situation is gloomy, as the country is a dry country exhibiting typical Sahelian zone with its characteristic low amount of rainfall, scarcity of water, and short agricultural season (3-4 month). Drought is a recursive phenomenon and frequent drought cycles extending over 2-3 years are common.

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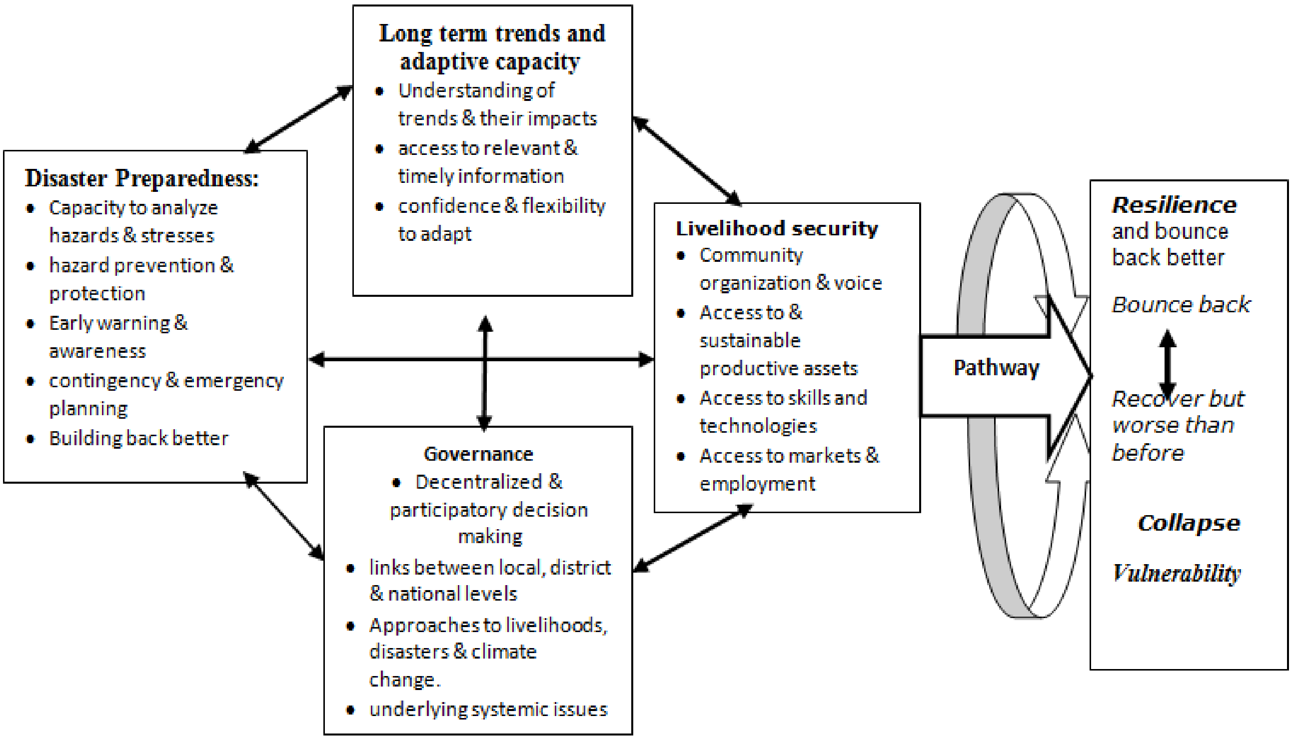
Out of the country's total area (1.87 million km2); 1.13 million km2 (60.2%) is desert and semi desert; the remaining 0.74 million km2 (39.8%) is divided between low rainfall savanna (300-500 mm of annual rainfall) and the rich savanna (over 500 annual mm rainfall) that extends extensively in the Republic of South Sudan (FAO and UNEP, 2011). Impacts of climate change are also evident in Sudan. Rainfall records from El Fashir, North Darfur, show a marked drop beginning with drought in 1972. More significantly, droughts have become more frequent as 16 of the 20 driest years recorded have occurred since 1972. Climate change models also predict a reduction in the length of the growing period of more than 20%. Environmental stresses mainly affect the rural sector of the arid and semi- arid zone which covers about 70% of the country's total, accommodates about 70% of the country's population, and where most of agricultural production takes place. Environmental stresses have been associated with enormous socio-economic problems important of which are poverty, famine, population instability and proliferation of natural resource-based conflicts. The drought and famine of 1983-85 had been associated with devastating impact on the different communities especially those along the southern margins of the Sahara in Darfur and Kordofan. According to some estimates 3.3 million people accounting for 15.7% of the country's total population were severely affected by the mid 1980s drought and famine (Wadi, 1997). The massive loss of livestock and crop failures forced 70% of the affected population to migrate from their original villages either to the water points in the area or outside the study area (Wadi, 1997). Such repetitive drought, rainfall variability and water deficit are among the main problems that face the traditional farmers in Semi-arid lands which is now experiencing the impact of changing climate (Goodin and Northington, 1985). Frequent drought in this area is one consequence of climate change causing agricultural failure and increase poverty. Indigenous communities have developed their own coping and adaptive mechanisms based on their traditional accumulated knowledge of their surrounding environment. The traditional knowledge, gained over time through experience and orally transmitted from generation to generation has over the years played a significant part in solving problems, including problems related to climate change and variability (Nkem *et al*., 2015). The main purpose of this article is to study the coping and adaptive mechanisms on the main staple food crops (Pennisetum typhoideum and Sorghum virgatum) that have been adopted by indigenous traditional farmers to cope with drought and rainfall variability in such vulnerable environment characterized by water scarcity with high spatial and temporal variability in the study area- central Sudan.

Theoretical considerations

The two concepts related to coping mechanisms and environmental stresses are vulnerability and resilience have become common thoughts in literature pertaining to the livelihoods of smallholder producers in developing countries. According to Chambers (1989); vulnerability refers to the '*exposure to contingencies and stress and difficulty coping with them*". Vulnerability has thus two sides: an external side of risks, shocks and stress to which an individual or household is subject; and an internal side which is defenseless, meaning a lack of means to cope without damaging loss. This definition could be decomposes into:

- The risk of exposure to crisis, stress and shocks;
- The risk of inadequate capacities to cope with stress, crisis and shocks; and
- The risk of severe consequences and the attendant risks of slow or limited recovery, which eventually means decrease of resilience

In his theory of entitlement Sen (1981); defines vulnerability to food insecurity as the denial of entitlement to food; it is about the exercise and lack of power and rights, specifically the rights to command food. Accordingly, people become food insecure not only because of decline in the overall production of food but because of the failure of their exchange entitlement that makes it no longer possible to acquire a commodity bundle with sufficient food. Besides income levels, exchange relations and accessibility to markets there is multiplicity of other factors of cultural and political nature that contribute to the increasing exposure and vulnerability of smallholder producers to food insecurity. The most important among these are: (i) access to land and natural resources; and (conflicts and civil disturbances). Also important is the functionality of the group's moral economy. The concept of resilience, on the other hand, refers to the ability of the social system (farming or pastoral) to withstand chocks, whether these chocks are of natural or human nature. Accordingly, sustainable livelihoods are often characterized as 'resilient', meaning the capacity to recover or bounce back when challenged.



Source: Adopted from Susan and Maggie (2012)

Fig. 1. The Resilience Framework

A working definition of resilience in situation of disaster resilience was provided by Young and Cormack (2013) who defined resilience as "*The ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses such as earthquakes, drought or violent conflict without compromising their long-term prospects"* From this perspective, resilience is a descriptive quality of the social system and decided by four interrelated constituents of (a) adaptive capacity; (b) Disaster Preparedness; (c) livelihood security; and (d) prevailing governance aspects (Fig. 1). From this perspective, resilience could be strengthened and enhanced or weakened and even collapses. Importantly, it also involves a time dimension, from gradual weakening to possibly sudden collapse (Egemi, 1994).

MATERIALS AND METHODS

The Study Area: Geographical and Environmental Account

Using Thornthwaite (1948), system of climatic classification, all parts of the study area fall within the semi-arid zone. The area is part and parcel of the Sahelian zone and it lies between Longitudes (32^0 25$'$-24^0 30$'$ E) and latitudes (11^0 20$'$- 14^0 30'N) as shown in Fig. 2. This area is characterized by fairly high temperatures throughout the year or day, especially during the summer season. May is the hottest month in the years (Elfaig 1996, Elfaig *et al*., 2013). This area is a most variable area in Sudan in terms of rainfall. Majority of the population in this area depend upon rainfall for their agricultural activities and animals rearing. The rainfall varies enormously from north to south and from east to west of the study area. In Ed-Dueim area west of the White Nile State (most eastern part of the study area), ecological changes and rainfall variability are dominant phenomena (Alredaisy and Davies, 1993).

The main agricultural practice in the study area is subsistence traditional farming. The agricultural activities used to be carried out in a short walking distance from the village. Nowadays the agricultural activities are carried out in a radius ranging from two to five kilometers.

The crops grown are short-season crops. The area has only one rainy season (July- October). Therefore, only one crop per year can be grown in the same piece of land unless mixed cropping is practiced. Cultivation is based on traditional farming system, traditional methods and local crop varieties which sometimes fail seriously to meet requirements of the local people. The main subsistence food crops are millet (*Pennisetum typhoideum*) and sorghum (*Sorghum virgatum*), which are mainly grown on sandy and sandy clay soils, respectively. Most of agricultural operations are performed manually using traditional cultivation tools and the peasants practice what is generally known as hoe cultivation which reflects lack of advanced methods of cultivation and technical instruction at the peasant level.

Methods of Data Collection and Analysis

Three types of data are needed to perform this study namely, rainfall data, data on production of major crops (millet and sorghum) and data for coping mechanisms.

A. Rainfall Data

The data needed for the study of rainfall variability was collected from secondary sources for El Obied, En Nuhud, El Fashir and Ed-Dueim from meteorological Authority, Khartoum for the period 1970-2013 as show in Annex 1.

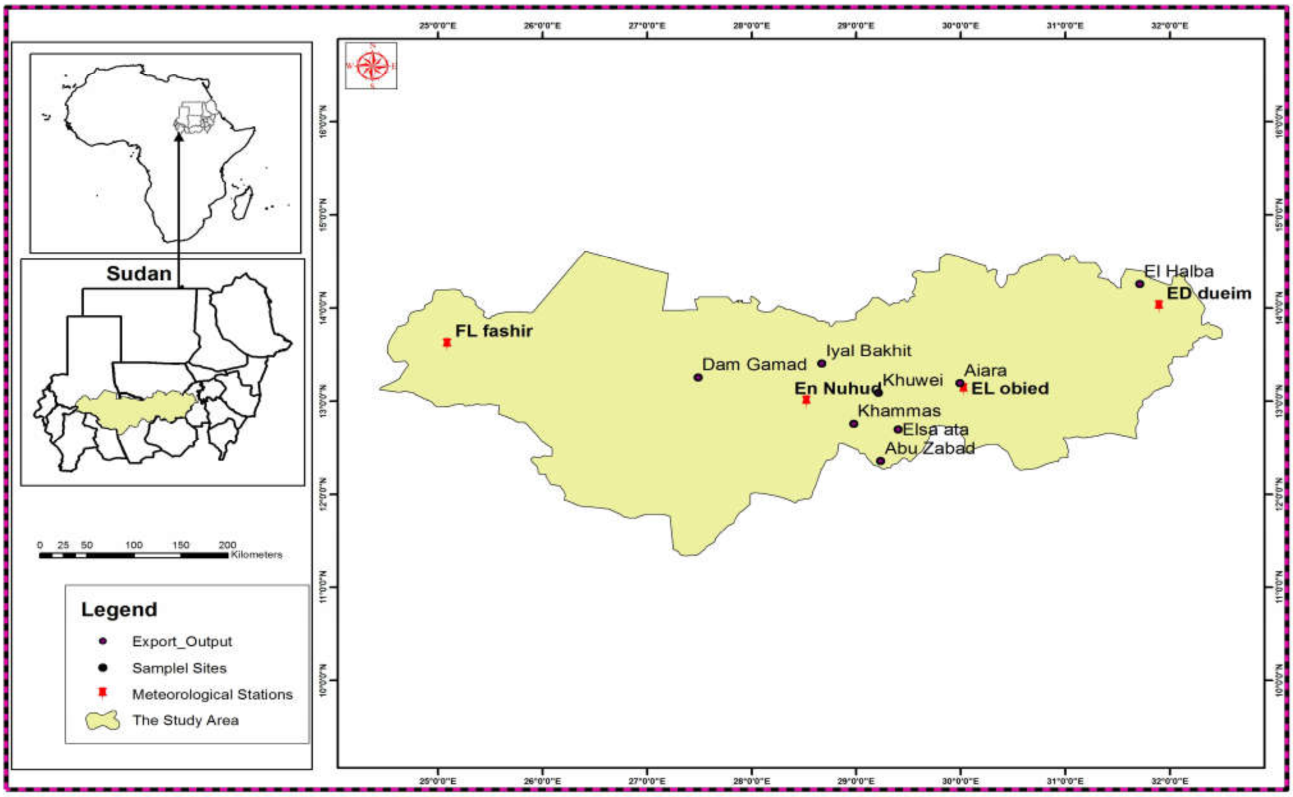


Fig. 2. Geographical Location of the Study Area

B. Data on production of *Pennisetum typhoideum* and *Sorghum virgatum*

Data on production of millet and sorghum as a major staple food crops are obtained from the records of the Directorate of Agricultural Planning and Economics, Ministry of Agriculture and Forests, 2014 as presented in Annex 2.

C. Data for Traditional Farmers' Coping Mechanisms

Due to lack of systematic data and information on the coping and adaptive mechanisms in such remote area, the researchers have used primary data where a questionnaire-interview was designed to study the local status of population (farmers). The questionnaires cover the farmers' socio-economic backgrounds, different agricultural operations, local knowledge and experience concerned with agriculture, measures adopted by the local population to cope with rainfall variability and improve output. The headed household was the unit of measurement in this questionnaire.

Sample Size and Sites

Based on the population census of 2008 (last census) a total of five hundred (500) headed households were randomly selected using equation No. 1. The sample size was distributed among the sample sites (Fig. 2) using equation No. 2 and presented in Table 1.

$$n = \left(\frac{\sigma \times 1.96}{SE}\right)^2 \qquad \text{.......................................} (1)$$

n: is sample size
SE: is standard error
1.96: is the confidence level at 0.95

(Y = (n*Z) N) ....(2)

Y: is the number of the selected samples
N: is the sample size
Z: is the number of household at each site
N: is the total number of households

Table 1. Sample Size and Sites

Site name	Z	Y	Percent
Aiara	558	61	12.2
El Khuwie	705	77	15.4
Abu Zabad	713	78	15.6
Eiyal Bakhit	534	58	11.6
Khammas	483	52	10.4
El Halba	531	58	11.6
Dam Gamad	542	59	11.8
Elsa'ata	523	57	11.4

For the analysis of rainfall and crops production's data, the coefficient of variation that describes and compares the amount of variability relative to the mean and highlights the degree of variation in the data set was adopted. The descriptive analytical methods were used for the analysis of data related to traditional farmers coping mechanisms and the results were presented in tabular formats.

RESULTS AND DISCUSSION

The data collected from the official statistics, reports and other secondary sources, coupled with data from the field survey provided clear evidences for rainfall variability, crops production uncertainty and coping mechanisms with low to medium efficiency can be described as follows:

Rainfall Variability and Crops' Production Uncertainty

The expression of rainfall variability has come from the perception and knowledge of the local people. About 72.6% of the respondents indicated that there was a decrease and fluctuation in rainfall in the last three decades. The high rainfall events such as in 1994 and 1998 which show high rainfall were considered rare cases. The respondents identified the years 1984, 1990 and 1992 as dry years. This perception was consistent with rainfall records as these years (1984, 1990 and 1992) had shown relatively low amount of rainfall as reflected by the rainfall records (Annex 1 and Fig. 3-6).

In the western and central parts of the study area, medium coefficient of variation for rainfall are found (CV = 0.37, 0.35, 0.30 and 0.31) for El Fashir, En Nuhud, El Obied and Ed-Dueim respectively, for the period 1970-2013 which reflects the irregular distribution of rainfall overtime and concentration of rainfall in short summer season. The figures also indicated that there was a week to medium relationship between productions of *Pennisetum typhoideum*, *Sorghum virgatum* as dependents variables with rainfall (r range between 0.1 - 0.57). The CV for the production of *Sorghum virgatum* indicated high level of variability ranges between 0.61 at the minimum level to 0.79 at the maximum level during the last four decades. Similar result was also found for *Pennisetum typhoideum* production where CV ranges between 0.76 at the lowest level to 0.92 at the utmost level. The traditional farmers usually respond to crop failure, which is influenced by rainfall variability, climate stress, as well as other constraints (Coulibaly *et al*., 2015) that necessitate the adoption of coping mechanisms.

Respondents' Demographic Characteristics and Farmers' Coping Mechanisms

This part deals with the analysis of the demographic data of the respondents as well as the coping mechanisms adopted by them. The traditional farmers in the study area can be classified as experts on traditional farming. They have been reacting to the uncertainty of crop production by adopting different coping mechanisms to meet their survival needs. These coping mechanisms in agricultural practices reflect coping with failure of rainfall, fluctuation and decrease in rainfall amount, delay in rainfall arrival time and long dry spell. These coping mechanisms range from simple Ramail, shifting to quick maturing varieties and to intercropping system. These coping mechanisms may help in reducing vulnerability to rainfall variability and ensure short-term food security.

Demographic Data

The demographic characteristics of the respondents were summarized in Table 2. The table shows that 93% of the respondents were male while the rest 7% were female.

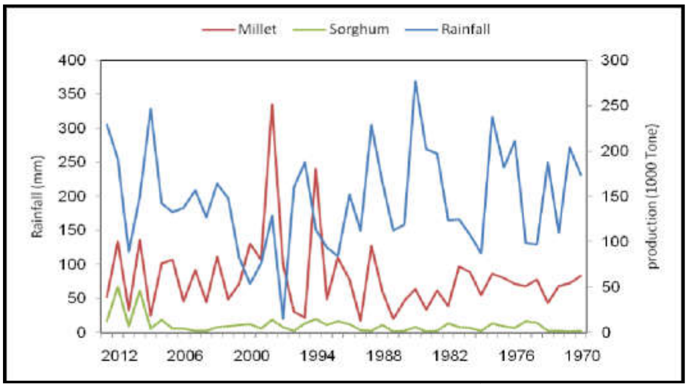


Fig. 3. Crops Production and Rainfall at El Fashir Area

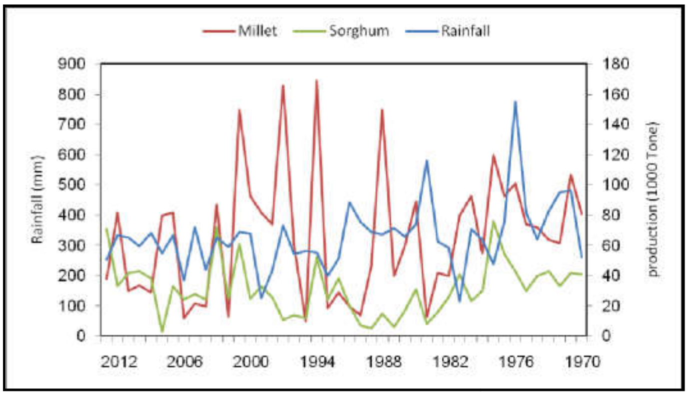


Fig. 4. Crops Production and Rainfall at EN-Nuhud Area

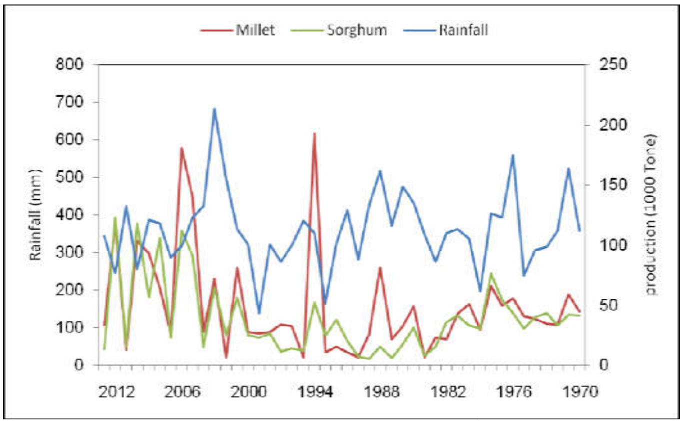


Fig. 5. Crops Production and Rainfall at El Obied Area

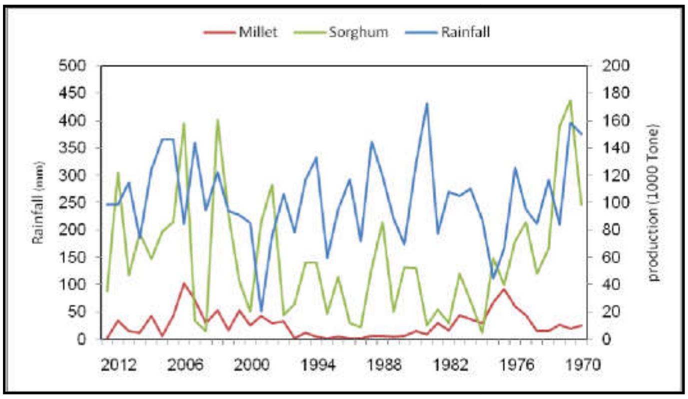


Fig.6. Crops Production and Rainfall at Ed-Dueim Area

This feature is justified by the fact that the sampling has been based on the headed household whom are normally men in that traditional conservative society an men do most of the work in agriculture. The women headed households were either widows, divorced or their husbands were away as in semi-permanent migration. Data on tribes show that most of the respondents were from Hammar tribe. The study also shows that large segment of the respondents (42.5%) received primary and intermediate education.

Table 2. Characteristics of the Sampled Population in the Study Area

Demographic Characteristics	Frequency	Percent	Cumulative percent
Sex:			
Male	465	93	93
Female	35	7	100
Age:			
>30	62	12.5	12.5
31-40	183	36.7	49.2
41-50	113	22.5	71.7
<50	142	28.3	100
Tribes:			
Hammar	416	83.3	83.3
Dar Hamid	34	6.7	6.7
Other tribes	50	10.0	100
Family member :			
1-3	91	18.3	18.3
4-6	159	31.7	50.0
< 6	250	50.0	100.0
Educational level:			
Uneducated	138	27.5	27.5
Primary education	146	29.2	56.7
Intermediate education	66	13.3	70.0
Secondary education	133	26.7	96.7
University education	17	3.3	100

Ramail Coping Mechanism

Ramail is a dry sowing of seeds before rainy season begins. The reasons for adopting this mechanism as stated by the respondents (54.2%) was to make benefit from early rains and to have sufficient time to repeat sowing in case the first seeds fail. The Ramailed crops mature earlier before the actual end of the rainy season and give good yield .The results show that the success of Ramailed crops depend on the continuity of rainfall. If the first rain is followed by a short dry spell, the crop usually succeeds. On the other hand, the rest of the respondents (45.8%) stated that they did not practice Ramail, because the process fails in most cases as the first rain is usually followed by long dry spell which the newly germinated crop species cannot tolerate as shown in Fig. 7. Ramil is one process of adjusting agricultural calendar which usually starts in early June. Adjusting the agricultural calendar as a climate variability response is widely practiced in most of African countries such as in Republic of Benin (Yegbemey *et. al.*, 2014).

Shalikh Mechanism

Shalikh mechanism is a method of pulling and taking out some of the germinated seeds after fifteen days of its growth. This mechanism came out from the fact that the traditional farmers sow large quantities of seeds per hole. As a result, the density of plants per hole increased and reduces the possibilities of being blown away.

Source: Field work, 2015

Fig.7. Obvious failure of Ramiled Crops

When the rains fall the crops germinate as a bush especially millet and sorghum resulted in competition on the scarce water and nutrient. In order to reduce this competition, farmers practice what is known as Shalikh. This mechanism is practiced by 78.3% of the respondents. Despite the advantages of Shalikh as a coping mechanism, it is found to be time consuming for traditional farmers i.e. leads to low production per person.

Intercropping System Mechanism

Intercropping system is one of the coping mechanisms which is practiced by 80.8% of the respondents. Two types of intercropping are used:

- Traditional farmers' plant more than one crop in the same hole e.g. intercropping sesame (*Sesamum indicum*) with *Sorghum virgatum*.
- Traditional farmers plant a crop between rows of different crops previously planted or planted simultaneously, such as intercropping *Sorghum virgatum* and watermelons (*Citrullus vulgaris*) and intercropping of *Arachis hypogaea* with *Pennisetum typhoideum* and *Hibiscus sabdariffa* as shown in Fig. 8.

The objectives behind the intercropping system are:

- To reduce the competition between crops as different crops have different nutrients requirements, even in the same hole.
- Through intercropping system, farmers can take advantages of the limited area they can cultivate and reduce the risk of complete crop failure as compared with one crop system.
- By intercropping a farmer can produce different crops of the same time, effort and cost.

The success of intercropping depends on the rational choice of the crops to be combined, since some crops can hardly flourish and grow with the presence of other crops. It's worth mentioning that the only limitation to this mechanism is the weeding practice between the rows for the main crop sown.

Source: Field work, 2015

Fig. 8. Intercropping *Arachis hypogaea* with *Pennisetum typhoideum* and *Hibiscus sabdariffa*

Shifting to Quick Maturing Crops Varieties

The variable nature of rainfall including fluctuation over both space and time, scarcity of rains, delay in arrived time, dry spell during rainy season and concentration of rainfall in short periods are well comprehended phenomena in the study area. To cope with these phenomena the traditional farmers resorted to using quick maturing crops as shown in Table 3. These crops are known for their early maturity, less water requirements and resistant to drought and have been domesticated and introduced since mid 1970s. This coping mechanism was supported by 80% of the respondents. These crops are known for their early maturing, high yield and better tolerance to unpredictable nature of rainfall in the study area.

Wide Spacing Mechanism

Wide Spacing is one of the coping mechanisms that have been adopted by the traditional farmers. This mechanism is practiced by 70.8% of the respondents. The wide spacing mechanism means that the space between crop rows are wide and the distance between crops holes are longer for instance, in *Pennisetum typhoideum* crop cultivation, the interval between the rows is about 3-5feet while during the 1960s and 1970s, it was only 2-3 feet. In *Citrullus vulgaris* cultivation, it was about 3-5 feet compared to 5-7 feet at present. For *Sesamum indicum* it was 1.5-2 feet compared to 2-2.5 feet at present.

Table 3. Shifting to Quick Maturing Varieties

Traditional Crop varieties	Maturity days	Newly introduced Crop varieties	Maturity days
Dimbi (*Pennisetum typhoideum*)	85-100	Herhier (*Pennisetum typhoideum*)	65-80
Tageel (*Sesamum indicum*)	90-100	Herhier (*Sesamum indicum*)	65-75
Eltageela (*Hibiscus esculentus*)	60-75	ELkhafifa (*Hibiscus esculentus*)	45-60

Source: Field work 2015

Table 4. Efficiency of Agricultural Coping Mechanisms with Rainfall Variability

Coping mechanism	% of household practicing	Main objectives	Efficiency of coping mechanism
Ramail	54.2	Avoid rains uncertainty, benefit from early rains	Low
Shailkh mechanism	78.3	Reduce competition on nutrient, and make good aeration exploitation of nutrient, avoid rainfall uncertainty, good	Low
Intercropping	80.8	use of small plots	Medium
Shift to quick maturing varieties	80	Secure crop production	High
Wide spacing	70.8	Reduce completion on water	Low

The respondents confirmed that the wide spacing reduces crops competition on the scare amount of water and nutrients and make good aeration. Although this mechanism secure part of the production and benefit from the available rain water and nutrient, however, this process means that the wider the spacing, is the more the land will be brought under cultivation.

The relationships between the selected demographic characteristics and the selected coping mechanisms have been tested using Chi-square test. It is noticed that the various selected demographic factors (except education) have no influence on the level of adoption of each coping mechanism. They reflect that large segment of the respondents whether they relatively younger or older adopt the coping mechanisms. The ratio of adoption ranges from 54% in Ramail mechanisms to 80% in shifting to quick maturing varieties. No significant relation was found between sex, age, race and occupation and coping mechanisms with rainfall variability. It was also found great differences between those adopting and practicing coping mechanism and those non-practicing ($P \leq 0.01$). The results also indicated that there is a significant relationship between education and intercropping ($P \leq 0.05$) and between education and Ramil mechanisms ($P \leq 0.01$).

Efficiency of Agricultural Coping Mechanisms with Rainfall Variability

The various coping mechanisms that have been adopted by the traditional farmers in the study area were helping them to sustain their livelihood with uncertain rainfall in the vulnerable environment. These efficiency and ranking are shown in Table 4.

Conclusion

Rainfall variability and water deficit have become prominent features of environmental and climatic stresses prevail not only in the study area, but also in many regions of the Sudan. Such rainfall variability may link up with global climatic changes. To adapt with the ongoing stresses the local farmers have traditionally developed local coping mechanisms to maintain the continuity of agriculture as the major mean of livelihood. These coping mechanisms depend on the available resources and capabilities of the local environment as well as the local mentality and indigenous knowledge of local farmers as gained through long periods of experiences by trial and error. These mechanisms reduce competition between crops on scarce water and nutrients. Despite the fact that such coping mechanisms have been practiced to cope with rainfall variability the livelihoods of the farmers could be described as non resilient livelihoods as they remain subject to overwhelming odds of external and internal nature including limited adaptive capacity, limited disaster preparedness, livelihood insecurity and a wide range of governance limitations that involve market failures and unequal exchange processes, lack of supportive agricultural policies, and land rights insecurity.

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Annex 1. Rainfall Data (mm) of the Study Area (1970-2013)

Year	Meteorological Stations			
	Elfashir	En Nuhud	Elobeid	Ed-Dueim
1970	306.3	254.3	343.1	**247**
1971	255.9	334.8	245.7	**246**
1972	119.4	327.7	423.8	**287**
1973	199.5	299.1	256.9	**186**
1974	329	343.4	387	**310**
1975	190.5	274.6	377.2	**365**.7
1976	176.7	334.3	286.4	**366**
1977	183.4	186.9	317.6	**212**
1978	208.9	359.8	391.7	**360**
1979	169.9	219.8	423.8	**237**
1980	219	327	681	**306**
1981	197.2	296.3	494.4	**235**.3
1982	110.4	346	363.1	**227**.5
1983	72.1	339	321.2	**212**.8
1984	101.5	127	138.9	**51**.5
1985	171.6	219.2	320.9	190.5
1986	20.1	364.8	274.7	**2**65.3
1987	214	271.8	318	**195**.9
1988	250.3	283.1	382.9	**2**92.2
1989	151.7	277.5	350.9	332.9
1990	125	199.5	164.6	**149**.2
1991	112.6	258.2	322.2	**2**37.9
1992	202.8	442.6	411.3	**292**.5
1993	150.2	378.7	281.9	**180**.1
1994	304.8	344.7	425.7	361.1
1995	221.1	337.7	517.2	**298.3**
1996	149.9	359.2	372	**222.4**
1997	159.1	329.4	474.7	**174.5**
1998	369.6	370.6	430.9	**322**.5
1999	269.5	581	347.8	**431**.5
2000	263.1	314.5	276.3	**19**4.5
2001	165.2	292.5	351.6	**270**.2
2002	166.7	116.9	363.2	**263**.3
2003	143.3	355	335.8	**275**.8
2004	116.5	318	198.4	**219**.6
2005	317.2	237.5	403.3	**111**.5
2006	242.2	379	391.7	**165**.8
2007	281.7	775.6	557.7	**313**.7
2008	132	411.2	238.4	**238**.5
2009	130.1	321.2	306.6	**211**.6
2010	250	414.1	315.3	291.4
2011	147.1	477.5	357.3	**210**.8
2012	272.1	483.1	523.0	**397**.1
2013	232.2	261.5	358.3	375.8

Source: Meteorological Authority, Annual Records, (2014)

Annex 2. Production of Sorghum and Millet (000 ton) in the Study Area (1970-2013)

Crops production								
Year	Elfashir		En Nuhud		Elobeid		Ed-Dueim	
	Millet	Sorghum	Millet	Sorghum	Millet	Sorghum	Millet	Sorghum
1970	62	2	81	41	45	41	10	**99**
1971	54	1	107	42	59	42	8	**175**
1972	51	2	62	33	34	33	11	**156**
1973	32	2	64	43	35	43	6	**67**
1974	58	11	72	40	39	40	6	**48**
1975	51	12	74	30	41	30	18	**86**
1976	53	5	101	43	56	43	24	**72**
1977	60	7	93	54	50	54	37	**40**
1978	65	10	120	76	66	76	27	**60**
1979	41	2	55	30	30	30	12	**5**
1980	66	5	93	23	51	33	15	**28**
1981	73	6	80	41	43	41	18	**48**
1982	29	10	40	26	22	36	7	**12**
1983	46	2	42	16	23	15	12	**22**
1984	25	1	13	8	7	8	4	**10**
1985	48	6	89	31	49	31	6	**52**
1986	35	2	60	17	33	17	3	**53**
1987	15	1	40	6	22	6	2	**20**
1988	45	8	150	15	82	15	3	**86**
1989	95	2	47	5	26	5	3	**52**

Continue…..

1990	**13**	**3**	**14**	**7**	7	7	**1**	**9**
1991	58	9	20	20	11	20	1	**12**
1992	82	12	29	38	16	38	2	**46**
1993	36	8	19	24	11	24	1	**19**
1994	180	15	169	52	193	52	2	**56**
1995	16	10	10	12	7	12	5	**56**
1996	23	2	60	14	33	14	1	**26**
1997	75	6	166	11	34	11	13	**18**
1998	251	14	74	26	28	26	12	**113**
1999	80	4	82	33	27	23	17	**86**
2000	98	9	93	25	28	25	10	**20**
2001	53	8	150	61	82	56	21	**43**
2002	36	7	13	25	7	25	7	**92**
2003	83	6	87	72	72	64	21	**161**
2004	33	2	20	24	28	15	12	**6**
2005	69	2	22	28	140	91	29	14
2006	34	4	12	24	181	112	41	158
2007	80	4	82	33	27	23	17	**86**
2008	76	14	80	03	65	106	3	79
2009	19	4	29	38	93	57	17	59
2010	102	46	34	43	104	118	5	78
2011	24	7	30	42	13	15	6	47
2012	100	50	82	33	118	123	14	122
2013	39	12	38	71	34	13	1	35

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