

Impact Of Crop Production On Food Security In Zalingei Locality Of Central Darfur State-Sudan

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Abstract—This study was conducted in Zalingei locality-Central Darfur State during 2017/2018 cropping season. The study was designed to identify the impact of crop production on household food security situation. Clustered random sampling was employed to select a total of 50 households. The primary data were collected through structured questionnaires. Analytical tools were descriptive, frequency, percentages and the household economy approach. Results of socio-economic analysis showed that the average family size in the study area was 8 person. The experience of the household was 21 year. The average farm size was 2.3 hectare and the average age of the household was 47 year. The result of educational level shows that majority (92.2%) were educated while 7.8% were illiterate. Frequency distribution of food availability for millet and sorghum indicates that 12%, 28% and 60% and 12%, 12% and 76% said food was adequate, not adequate and fewer, respectively. Result also shows that 80.4% of household were male and 19.6% were female. Frequency distribution pertaining soil fertility explored that 15.7% good, 38.3% moderate and 46.0 claimed that soil is infertile. Food accessibility indicates that the months under food purchasing were 4, time of purchasing was 6 and the average price taken was SDG 600. The study further indicates that (30%) of the households migrated for off-farm income, 50% skipped some meals, 10% ate non preferred food and 10% change product for another. The study also shows that a total of SDG 62,917 was computed as yearly net income in Zalingei locality. Result of The household economy approach shows that the household was marginally food insecure (only 2244 kilo calories per person per day). Based on the findings of the research some recommendations were considered, these includes households should be trained on improved agricultural technologies to enhance crop productivity and food security and livelihoods situation.

Keywords—Food security, Descriptive, Household economy approach

1. Introduction

According to [5] food security is a broad term, which is defined in different ways by a number of organizations around the world. The basic definition of food security is that it refers to the ability of individuals to obtain sufficient food on a day-to-day basis. Internationally food security is defined as the ability of people to secure adequate food. More especially it has been defined by researchers as the access by all people at all times to enough food for an active healthy life. According to the World Food Summit [6] organised in Rome, food security exists when all people, at all times, have physical and economic access to sufficient, safe, nutritious food to meet their dietary needs and food preferences for an active life.

Agriculture is the main source of income in Central Darfur state. The majority of the population depends heavily on cereal crops production as a main source of livelihood; they make use of their local knowledge to achieve food security [4]. People cultivate many varieties of cereal crops in Central Darfur state; some were indigenous, while others were introduced. However, they cultivate a variety of cultivars of cereals, ranging from early maturing to late maturing, some were introduced by some institutions such as Jebel Marra Rural Development Project (JMRDP) and Ministry of Agriculture and livestock such as (Tabat and Wad Ahmed), some were entered from neighboring countries like (Subiansawa), while others were indigenous (Baladi, Faseikh, and Najjad. The local sorghum cultivars Baladi and Faseikh among others, are widely cultivated by the farmers in the area, as 52.5 of the farmers cultivate it in pure stand this can be attributed to the fact that, the soil in the study area is mainly of alluvial strata or flood plains (locally known as Wadi), where, the crop can exploit the available soil moisture reserved during the wet and dry seasons.

The economy of central Darfur state characterized by low input/low yield production system, small farms ranging from two to three feddans in size and relying on labour intensive cultivation with hand tools.

2. The objectives of the study

- To know the food security situation in the study area
- To investigate how agriculture crop production influences food security of household farmers

- To develop plan for research intervention in order to solve food security situation in the entire area

3. The Household Economy Approach

The household economy approach is a livelihoods-based framework for analysing the way people obtain access to the things they need to survive and prosper. It helps determine people's food and income needs and identify appropriate means of assistance, whether short-term emergency interventions or longer-term development programmes or policy changes. It is based on the principle that an understanding of how people usually make ends meet is essential for assessing how livelihoods will be affected by acute or medium term economic or ecological change and for planning interventions that will support, rather than undermine, their existing survival strategies, [1].

4. Food security levels

According to [2] food security exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritious food for a healthy and active life. In this report, households that meet a minimum of 2300 calories per person per day are considered as food secure. In the study area data were collected on household expenditure, quantities and type of foods, and number of days certain foods are consumed over a seven-day recall period, throughout the survey period. This information allows a calculation of household food security, based on kilocalorie (K.cals) intake data. Furthermore, thresholds of calorie consumption are used to categorize the severity of food insecurity in 5 groups from very severely food insecure to food secure, table 1.

Table: 1 Levels of food security

Levels of food security	Kcal intake per person per day
Very severely food insecure	Less than 1500
Severely food insecure	1500 to 1799
Moderately food insecure	1800 to 2099
Borderline(marginally insecure)	2100 to 2399
Food secure	2400 and more

Source: Author, 2017

Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).

Food access: Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).

Food Utilization: Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all

physiological needs are met. This brings out the importance of non-food inputs in food security.

Food Stability: To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security [3].

5. Household's income

The main sources of income for household were agricultural production (crop production and animal production), plus off-farm activities.

6. Household's expenditure

Food needed by households classified into three categories, the food consumed in summer, autumn and winter as it is expected that people consumed different quantities of food among different seasons. When the quantities of food consumed by households in the different seasons summed together and the average was calculated, then the daily energy received per person per day in K.cal was calculated.

7. Research Methodology

7.1 Sampling and data collection

7.1.1 Data collection

The micro-level study was conducted in, Zalingei situated in Central Darfur State. Data was collected during the summer of 2017 for 2017/2018 cropping season. The required primary data regarding crop was randomly collected via questionnaires to represent the households 'heads in the target area. Yield of major crops was collected. In addition, secondary information were also used from relevant institutions.

7.1.2 Sample size

With reference to higher homogeneity in the entire study area, the sample size assumed to be 50 household.

7.1.3 Sample techniques

The study used clustered random sampling procedures which covered all the study area.

7.1.4 Analytical tools

Data were analyzed to drive frequency percentages, mean, and standard deviation. Household economy approach and statistical package for several sciences (SPSS) software were used.

8. Results and discussions

8.1 socio-economic characteristics of households

Results of socio-economic analysis showed that the average family size in the study area was 8 person. The experience of the household was 21 year. The average farm size was 2.3 hectare and the average age of the household was 47 year. The result of educational level shows that majority (92.2%) were educated while 7.8% were illiterate. Result also shows that 80.4% of household were male and 19.6% were female. Frequency distribution pertaining soil fertility

explored that 15.7% good, 38.3% moderate and 46.0 claimed that soil is infertile, Table 2 and 3.

8.2 Households food security situation

Food availability

Households frequency distribution regarding millet availability showed that 12, 28, and 60% adequate, not adequate and fewer food. While enough (12), abundant (12) and 76 % fewer for sorghum. These results highlighted that more number of households reported the forms of food access problems such as having fewer food (60 and 76%) in the household level, Table 4.

Food accessibility

Households asked to indicates food accessibility along 12 months. Results showed food purchased (4 months under purchasing), purchasing times (6) and average price is SDG 600. Therefore this result indicates food insecurity status, table 5.

Households coping strategies

Table (6) displays the responses regarding coping strategies adapted by households. As can be seen the most common strategy was sometimes buying the millet and sorghum from market to meet the basic subsistence needs to eat. Results revealed that 30% migrated for off-farm income, 50% skipped some meals, 10% ate non preferred food and 10% change product with another.

8.3 Sources of income

Analysis regarding income sources of households indicated that most earnings income generated from sale of agricultural crops, livestock and other sources of income. Results showed that most income generated from field crops income (23%), horticultural income (16%) and livestock income (5%). Sizable income earned from charcoal income (10%), small scale income (10%) and free work income (11%). The lesser income obtained from forest seed income (6%) and straw income (2%). However a total of SDG 62,917 was computed as yearly net income in Zalingei locality, Table 7.

8.4 Household expenditure

The food needed by households classified into three categories which are the food consumed in summer, autumn and winter as it is expected that people consumed different quantities of food among the different seasons. When the quantities of food consumed by households in the different seasons summed together and the average was calculated.

According to the annual income and average total costs of the food, the net income of household for the entire year found to be SDG 62,917. Therefore the household's weekly food expenditure was found to be 67,410. This result entailed that the household may experienced to food insecurity situation, Table 8.

8.5 Food Security Status

Table 9 displays the minimum food need in kilo calories per person per day. Results founded that the kilo calories required for food security per person per day was computed to be 2244. According to food security level which indicates 2300 as minimum calories per person per day, the household in Zalingei locality was marginally food insecure.

Table: 2 Descriptive statistics of households

Variables	N	minimum	maximum	mean	stdv
family size	50	2.00	19.00	8.42	3.98586
experience	50	3.00	50.00	21.3	12.55117
farm size	50	1.00	20.00	2.3	4.26228
age	50	18	82.00	46.6	13.45951

Source: Author 2017

Table: 3 Percentage distribution of socio-economic

characteristic of households

Variable	frequency	valid percentage %
Educational level		
Illiterate	4	7.8
khalwa	1	2.0
elementary	17	33.3
primary	11	21.6
secondary education	6	11.8
university	10	19.6
post graduate	2	3.9
Total	50	100
Gender		
male	41	80.4
female	10	19.6
Total	50	100
Soil fertility		
good	8	15.7
moderate	19	38.3
bad	23	46.0
Total	50	100

Source: Author 2017

Table: 4 food availability distribution

food availability	frequency	valid %
1. Millet		
adequate	6	12
not adequate	14	28
fewer	30	60
Total	50	100
2. Sorghum		
adequate	6	12
not adequate	6	12
fewer	38	76
Total	50	100

Source: Author, 2017

Table: 5 food accessibility distribution

food accessibility	number
number of months under purchased	4
time of purchasing	6
average price	600

Source: Author, 2017

Table: 6 household coping strategies

coping strategies	frequency	valid %
migration for off-farm income	15	30
skipped some meals	25	50
ate non preferred food	5	10
change product with another	5	10
Total	50	100

Source: Author, 2017

Table: 7 sources of income

source of income	Income SDG
Agricultural production (field crops)	14748 (23%)
Horticultural production	9848 (16%)
livestock production	3057 (5%)
forest seed production	1274 (2%)
fire wood income	3502 (6%)
straw income	1211 (2%)
charcoal income	6840 (10%)
small scale income	6500 (10%)
salary income	9175 (15%)
free work income	6762 (11%)
Total	62,917

Source: Author 2017, 1 SDG= \$45

Table 8: the weekly food need per household and average costs SDG

Food items	Seasons								
	Summer			Autumn			Winter		
	Qnt kg	Price SDG	Total costs	Qnt kg	Price SDG	Total costs	Qnt kg	Price SDG	Total costs
sorghum	7.2	26	187.2	7.7	30	231	8	28	224
wheat	2	23	46	3	25	75	2	23	46
millet	7.2	35	252	7	36	252	7	35	245
meat	2.4	64	154	6	64	384	8	60	480
milk	2	7	14	5	7	35	5	8	40
sugar	6	3	18	7	3	21	7	3	21
tea	0.4	14	5.6	0.4	14	5.6	0.4	14	5.6
coffee	7	30	210	8	32	256	3	7	21
oil	2.3	27	62.1	2.3	28	64.4	2.3	26	59.8
salt	0.4	3.4	1.36	0.4	3.4	1.36	0.4	3.5	1.4
okra	1.3	21	27.3	1.5	21	31.5	2	20	40
fruit	3.2	21	67.2	2.7	22	59.4	3	22	66
vegetables	3.1	25	77.5	1.3	25	32.5	1.2	25	30
onion	7	30	210	7	31	217	7	31	217
Total			1332			1666			1497
Av. Costs/HHs/year									67,410

Source: HHS survey 2017

Table 9: The weekly minimum food need and the equivalent K. cal per person per day

Food items	Summer			Winter Autumn			
	k. cal	Q.kg	Total k.cal	Qnt kg	Total k. cal	Qnt kg	total k.cal
sorghum	3350	7.2	24120	7.7	25795	8	26800
wheat	3320	2	6640	3	9960	2	6640
millet	7.2	7.2	24120	7	23450	7	23450
meat	2020	2.4	4848	6	12120	8	16160
milk	660	2	1320	5	3300	5	3300
sugar	4000	6	24000	7	28000	7	28000
tea	1080	0.4	432	0.4	432	0.4	432
coffee	685	7	4795	8	5480	3	2055
oil	8840	2.3	20332	2.3	20332	2.3	20332
okra	350	1.3	455	1.5	525	2	700
onion	410	7	2870	7	2870	7	2870
Total			113932		132264		130739
per person per day (8)							2244

Source: HHS survey 2017

Conclusions

Statistics of food availability highlighted that most of the households reported food problems. However accessibility to food should be covered from market. The study concluded that most household income was earned from agriculture. The food security situation in the study area indicates that the household is marginally food insecure. The study recommended that households should be trained on improved agricultural technologies to enhance crop productivity and food security and livelihoods situation in the entire area.

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