

Assessing Natural Resource used Management of Groundnut Production under Traditional Rain fed in North Kordofan State, Sudan

Ibrahim B. Elnour¹, Mahmoud A. Amassaib¹, Ibrahim E. Ibrahim¹, Maruod E. Maruod¹
and Elkhail E. Breima²

¹Department of Agricultural Economics and Rural Development,
Faculty of Natural Resources and Environmental Studies,
University of Kordofan, Elobeid, Sudan

²Agricultural Research Corporation,
Zalingei Agricultural Research station, Zalingei-Sudan

Corresponding Author: Ibrahim B. Elnour

Abstract

Natural resources (land, rainfall, labor, capital, and time) considered as fundamental equipments of Agricultural production in Sheikan locality; this study was conducted to identify and assess the resources that were used in groundnut production, resources efficiencies and the correlation between crops productivity and resources management under traditional rain fed in sheikan locality of North Kordofan State. Data were collected from 196 farmers' households using questionnaire through random sampling technique. SPSS analysis ver.22 and Excel2007, resources efficiency and correlation coefficient analysis were applied to compute data. Socioeconomics analysis results showed that about 67.9% of the farmers had educated basic, secondary and university education, while the rest (32.1%) were illiterate. Results also explained that farmers family size ranged between 1- 13 persons with average 8 persons 4 of them were males and the rest were females. The results revealed that 75.5% of farmers land was rented and 24.5% owned by farmers. The results showed that the most efficient resources used to produce a hectare of groundnut were land 56.7Kg/ha; followed capital 0.049 SDG/Kg; time 15.75 day/ kg and labors 10.1kg/man or women respectively. The correlation coefficients between educations, family size, land tuner and groundnut productivity were, -0.13, 0.11, and - 0.10 respectively. The study found out that productivity of groundnut increase due to increasing family member. The study recommended that farmers should be provided with education, extension services and mechanization to improve socioeconomics activities, therefore productivity be improved and natural resources managed.

Keywords: Correlation, Economic Resources, Production Factors, Dry Land

INTRODUCTION

Agro-food industries have a profound impact on the natural environment because they use natural resources as inputs to produce their goods, since the supply of these resources is limited; there is increasing concern about their management and efficient use, to ensure that food needs of future generations can be met (Badar, 2014). The environmental dimension of property development incorporate comprehensive management and redesigning of organizational processes and practices during a means that minimizes the environmental impacts of human activities (Glover *et al.* 2014; Neven, 2014). Efficiency is associated with activities based on resource used tend in some way or another to maximize benefits and minimize costs. Many economic concepts and their associated terminology are linked in one way or another to the goal of achieving economically efficient outcomes

“using natural resources such as land, water, capital and labors”. They include opportunity cost, productivity and marginal analysis, (Mulhearn, 2012). Vincent (1968) defined that Productivity is the ratio between an output and the inputs used to achieve it.

According to Lovell, (1993) the productivity of a unit is the ratio of its output to its input. If a single input is used to obtain a single output, this ratio is simple to calculate, these inputs and outputs must be aggregated so that productivity becomes the ratio of two scalars. When the ratio relates to a single productive factor, we refer to the concept of partial productivity, where every factor of production is considered, we speak of productivity, productivity and efficiency as the ratio between output and input, not indicating any difference between the two concepts (Tomaet *al.*, 2017). Daraio

and Simar, (2007) defined efficiency as the distance measure, that is, the difference between the actual ratio of inputs and outputs and the best possible combination of them, Efficiency and productivity, in any case, remain complementary concepts, Measures of efficiency are more accurate than those of productivity, as they involve a comparison with the most efficient combination, whereas productivity is based solely on the ratio of outputs to inputs. The State of North Kordofan is endowed with a rich natural resource base and abundant human resources. Natural resources such as land, water, good soil and favorable weather do support the agricultural activity. The economy is predominantly agricultural, with 79% of the population deriving their livelihoods from this sector—and contributes towards approximately 30% of the country's nonoil exports. The main farming systems are (i) rain fed and semi-mechanized; (ii) rain fed traditional agriculture, with mixed and highly diversified.

Production of crops such as watermelon Seeds is (70% of country-wide production), *Hibiscus* (65% of country-wide production), Gum Arabic (60% of country-wide production) and groundnut (30% of country-wide production). Within the sector, crop production represents 53% of agricultural output, livestock 38%, and forestry and fisheries 9%. Mineral resources are available and offer promising opportunities for industrial development. The government has been active in attracting investments in agriculture, light industries and has so far been reasonably successful. By the beginning of 2010, the State Ministry of Investment indicated that the State received 913 investment projects in agriculture, trade and industries. The Ministry indicated that North Kordofan has become one of the most attractive locations for investment in the Country. However, much of the current statistical economic data reflect the economic difficulties of the past several years and the prevailing situation for the vast majority of the population", and goats in the south (NKS, 2010).

Objective of the Study

The overall objective of the study was to assess the natural resources used management of groundnut production in Sheikan locality of north Kordofan. While the specific objectives were:

1. To identify the main resources used in field crops production in Sheikan locality
2. To assess resource efficiency of field crops in Sheikan locality
3. To measure the relationship between crops productivity and socioeconomic factors

Hypotheses

Natural resource is used inefficiently in North Kordofan State

There is a relationship between socioeconomic factors and increasing groundnut productivity

RESEARCH METHODOLOGY

Study Area

Sheikan locality occupies a central position in North Kordofan state. It lies between latitudes 12-14° N and longitudes 29-30° E. The locality lies within the poor savannah zone characterized by sandy plains (gozland) making it suitable for growing millet, sorghum, groundnut, watermelon, Roselle and sesame through shifting cultivation. Recurrent drought has resulted in continuous cropping of millet without crop rotation leading to poor soil fertility. The season of rain starts from June to October. The average family size was found to be 7 persons who indicate availability of labor for various agricultural activities. The average rainfall estimate is 250 – 400 mm, which is sufficient for cultivation of main crops. The main sources of income depend mainly on crop production and livestock rearing beside other off farm activities (Elnour and Breima, 2013).

Data Collection

The micro-level study is conducted in Sheikan locality situated in north Kordofan State. Data collected during the summer of 2019 for 2018/2019- 2019/2020 cropping seasons. The required primary data regarding crops (sesame, millet, Dura and groundnut) randomly collected by:

Questionnaire

Structured questionnaire is distributed randomly to represent 196 (23 woman and 173 men).

DATA ANALYSIS

Descriptive Statistical Method

All questionnaires were checked by supervisors in the field prior to leaving each village to ensure they were completed fully and correctly. Data is analyzed to drive frequency percentages, mean, and standard deviation, applied as well as Statistical package for Several Sciences (SPSS, 22) and EXCEL 2007 software.

Resource Efficiency Method

EF= productivity/ units of production factors

Correlation Coefficient Method

A correlation coefficient is a single number that represents the degree of association between two sets of measurements. It ranges from +1 (perfect positive correlation) through 0 (no correlation at all) to -1 (perfect negative correlation). The Pearson Product-moment Correlation Coefficient is a measure of the correlation (linear dependence) between two variables X and Y, giving a value between +1 and -1. It is widely used in the sciences as a measure of the strength of linear dependence between two variables (Strode -).

Linear relationships between variables can be quantified using the Pearson Correlation Coefficient, (Breima, 2015) or

$$r_{XY} = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{nS_X S_Y}$$

The value of this statistic is always between -1 and 1, and if X and Y are unrelated it will equal zero.

Where:

X = dependent variable (education, family size and land tuner)

Y = independent variable (groundnut productivity)

RESULTS AND DISCUSSION

Socioeconomic characteristics of farmers in Sheikan locality:

Table (4.1): Farmers socioeconomics' characteristic in Sheikan locality

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Family size	190	1.00	30.00	7.8737	4.18043
Education (1=illiterate , 0 otherwise)	196	0.00	1.00	.3214	.46822
land owner(1 owned , 0 rented)	196	0.00	1.00	0.2449	.43113

Source: study survey, 2020

Natural Resources Efficiency For Groundnut Productivity In Sheikan Locality

In table 4.2 land efficiency implied the productivity of a hector cultivated for groundnut was 56.7Kg/ha. However the possible solution to increase land productivity/ha is using technology and suitable crop variety regarding soil structure and rainfall. In table 4.2, time/day represents the available days of farmers to finish a hectare of groundnut, was 17 days, with efficiencies of 16.7 Kg/ day. Time efficiency was increased due to increasing of crops productivity; this meant farmers reduce losing time by focusing on

In table1, the educational status of the respondents was that about 67.9% of the farmers had educated basic, secondary and university education, while the rest (32.1%) were illiterate. it is possible for them to build their capacities and easily adopt technology and select high profitable crops. The table also explained that family size ranged between 1-13 persons with average 8persons4 of them were male while others were female, with standard deviation of 2.1, 2.8 respectively. This indicated that availability of labor force founded within the farmers. And could be employing in cultivation activities such increasing area planted in hectare to assure family needed from food and participating more in agribusiness. Table (4.1) revealed that 75.5% of the land was rented and 24.5% owned by farmers.

highly productive crops in study area and using other time to have worked in other job. Moreover, in table 4.2, also Labors were the vital production factors represent number of labors needed to cultivate a hectare of millet, sorghum, groundnut, and sesame. Labor efficiency for groundnut was 10.1Kg/man or women. It is clearly noticed from the study analysis that labor productivity increased for groundnut because of its high productivity, this is due to labor experience, skills and date of sowing, therefore labor efficiency improved by providing extension services, education, farmers association , and price promotion (showed in Table, 4.2).

Table (4.2): Efficiency of resource used for groundnut production in Sheikan locality

Res. used		Land/ha		Capital/SDG		Time/day		Labor/manor woman	
Crop	Pro/Kg	mean	effici	mean	effici	mean	Effici	Mean	Efficiency
Ground	283.5	5	56.7	57.56	0.04	17	16.7	28	10.1

Source: study survey, 2020. Effici=efficiency, Res= resources used, Pro= production

Correlation Analysis of Resources Used for Groundnut Production in Sheikan Locality

In table (4.3) the study showed the Correlation coefficient between the productivity of groundnut and education level; therefore it appeared a weak, negative - 0.13 relationship, and it meant that increasing of groundnut productivity did not depend on education in this study, mostly depend on other production factor such as area cultivated. In same table there was a weak positive correlation which was 0.11, between family size and groundnut productivity. That approved labours availability to increase area cultivated of groundnut, where farmers saying that they were facing labours

shortage due to travelling and mining goals. They study emphasized that farmers could increase their productivity of groundnut in return to large family sized. Table 4.3, also reviled that there was a weak and negative relationship correlated between groundnut productivity and land tuner -0.10; that meant about 10 % of farmers were own land, while the rest cultivate land by renting, and that effect on productivity through cost of rent.

Table: 4.3 Pearson Correlation analysis of groundnut in Sheikan

Variables	Education	family size	land owner	groundnut production /sack
Education Pearson Correlation	1	.224**	-.011	-.134
Sig. (2-tailed)		.002	.880	.315
N	196	190	196	58
Family size Pearson Correlation	.224**	1	-.047	.011
Sig. (2-tailed)	.002		.519	.934
N	190	190	190	58
land owner Pearson Correlation	-.011	-.047	1	-.104
Sig. (2-tailed)	.880	.519		.439
N	196	190	196	58
groundnut production/sack Pearson Correlation	-.134	.011	-.104	1
Sig. (2-tailed)	.315	.934	.439	
N	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

CONCLUSION

No one can deny the vital of natural resources used management, especially in sub-Saharan Africa which is one of the most venerable areas. Land, capital labor and time were identified as main resources used which were managed improbably in study area, and had low efficiency in production. Therefore to enhance efficiency of those resources, policy maker and facilitators should provide farmers with technical and extension services, in a matter of land tuner and land cultivation as well as labor management.

ACKNOWLEDGMENT

My indeed grateful extends to the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) for funding the study though Transforming African Agricultural Universities to meaningfully contribute to Africa's growth and development (TAGDev) funded by the MasterCard Foundation. My thanks also received to all my co-authors for their help and valuable comments.

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