The Effect of using Concentrates on Goats milk Production and Sheep Fattening Performance in Bara Locality of North Kordofan State, Sudan

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Abstract: The current study was conducted in Bara locality of North Kordofan state, 2014/2015 cropping season. The overall objective of the study was to identify the effect of using concentrates on milk and fattening performance of goats and sheep in natural range lands in Bara locality of North kordofan state. Primary data were collected via structured questionnaire. 50 head of milking goats and 50 head of lambs were selected using clustered random sampling method. Descriptive statistics, chi squire and T test were applied to analyze the data. Chi squire results showed that milk production was significantly increased at (p<0.001) percent from zero level. T test results also revealed that meat production have significantly increased at one percent from zero level.

Keywords: Chi square, T test, concentrate, milk production, meat production.

1. INTRODUCTION

The Sudan is the second large animal population country in Africa (Boyazoglu et al, 2005). Goat farming is practiced worldwide, with goat products having a favorable image **,** and the number of goats has increased globally, even in countries with high and intermediate incomes (Morand – Fehr *et al* ., 2004). Moreover sheep and goats, rearing is the mainstay of the land and most of the rural population depends on livestock and their by-products (Ben Salem & Smith, 2008).While the single most significant variable cost in any livestock operation is feed cost. Goats were among the first domesticated animals to be domesticated (Devendra and Solaiman, 2010). The goat population in the Sudan is estimated to be 42756 thousand (AOAD, 2007), forming about 31.7% of ruminants in the country, 18.2% of goats in Africa and 5.3% of the world goat population (FAO, 1999). The Eastern Africa region contains the highest concentration of goats (FAO, 2003). Different sources of protein vary in susceptibility to ruminal degradation and amino acid composition. The average concentrations of ruminally undegraded protein (UP) in blood meal, corn gluten, feather, fish, cottonseed and soybean meals is 80, 60, 75, 60 ,39 and 36% of total CP content (Preston, 2000).While the semi-arid zone has the greatest concentration of goats. The major source of livestock feed in the Sudan is the rangelands which forms an immense natural resource, covering about 116 million hectares. Various types of grazing land vary from open grasslands to seasonal water courses, flood plains, river banks and associated islands, woodlands, hills and mountain slopes. The pasture types and quality are influenced by the geographical location. The development of pastures has been lagging in the Sudan. To increase pasture availability for livestock, the Sudan National Action Plan-Framework for combating desertification has adopted several strategies to increase livestock feed. Bara Locality situated in North of Kordofan State in central Sudan between Longitude 30.35̊ E and latitudes 13.70 ̊ N), with a semi-arid climate having rainfall between 200 and 300 mm (Fadel-El Moula, 2005). In Bara Locality communities have been suffering from the effects of climate change, resulting in increased heat, dune encroachment, water scarcity and diminishing crop yields and livestock production year after year. The inhabitants main economic activity is livestock rising, mainly camels and sheep. Millet, watermelon and horticultural crops were grown. The soils vary from sandy interspaced by silt depression in the northern parts, where the topography is characterized by stabilized and disturbed sand dunes locally known as "goz". The silt depression or clay pockets are locally known as "gardud". The dominant soil type (sandy soil) sustains more cropping pressure by virtue of its good water relations and easy cultivation. Sandy soils were much degraded and set in motion by moving dunes to invade other areas of low contours. Climate change posses serious challenge to Sudan's overriding development priorities in agriculture, water resource management, and health. According to UNEP report 2007 an estimated 50 to200 km southward shift of the boundary between semi-desert and desert has occurred since rainfall and vegetation

records were first held in the 1930s. This boundary is expected to continue to move southwards due to declining precipitation. The remaining semi-desert and low rainfall savannah which represent some 25 percent of Sudan's agricultural land are at considerable risk of further desertification. North Kordofan state is classified by NAPA (2012) as one of the most vulnerable state to climate change.

2. MATERIALS AND METHODS

50 head of milking goats and 50 head of lambs for fattening were randomly selected from six villages using clustered sampling method. Group discussion and check list were used to augment information. Multiple visits were organized to collect information in short duration. Primary data covered basic information about the socio-economic characterization of producers. To achieve the research objectives the study used descriptive statistics, chi squire, and T test analysis were used.

2.1 Chi square test

The chi-square test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. Do the number of individuals or objects that fall in each category differ significantly from the number you would expect? Is this difference between the expected and observed due to sampling error, or is it a real difference. (Maben, cited 2016)The chi-square formula expressed in form of:-

$$X^2 = \underline{(O - E)^2} / E$$

Where:-

O is the Observed Frequency in each category

E is the Expected Frequency in the corresponding

df is the "degree of freedom" (n-1)

X^2 is Chi Square

2.2 *T* test

The *t*-test assesses whether the means of two groups are statistically different from each other. However, the results of a *t*-test aren't entirely black-and-white. The results actually indicate that the means are probably different, or if the study fails to show an effect, that the means are probably the same. Chi square formula takes the form of:-

$$t = \frac{\overline{X}_1 - \overline{X}_2}{S_{\overline{X}_1 - \overline{X}_2}}$$

3. RESULTS AND DISCUSSION

The effect of additional feeding in increasing milk production

In Alhomara village the increase in milk production was gradually shooted up to the third week (W3) and was stable at 1.5 litter/day (Table1 and Fig 1). In Shag enoum there was no change in the first week (W1), the increase started in the third week (W3) and reached maximum value of 1.4 litter/day, then it reduced to1.19 litter/day in the fourth and fifth week. In Al ehemrat, Um-nabaq and Abu-dalam the situation was similar to Alhomara, but the increase in production reached maximum of 1.39, 1.10 and 1.38 liter/, respectively. In Fuja the increases in milk production started in the first week and increase at increasing rate till extended to the five week. Chi squire results showed that milk production was significantly increased at ($p<0.001$) percent from zero level. (Add the tables and of chi square and *t* test plus *t* test results)

Table1. Effect of Additional feeding in milk production by village

village	Average prod. before the intervention- liter/day per head	Average production after the intervention- liter/day per head				
		First week	Second week	Third week	Forth week	Fifth week
Alhomara	0.34	0.63	1.01	1.5	1.5	1.5
Shag enoum	0.29	0.29	0.58	1.4	1.19	1.19
Al ehemrat	0.33	0.33	0.78	1.39	1.39	1.39
Um- nabag	0.28	0.28	0.83	1.10	1.10	1.10
Fuja	0.33	0.63	0.92	1.2	1.39	1.5
Abu- dalam	0.42	0.48	0.75	1.38	1.41	1.47

Felid survey 2014/2015 cropping season

* Average production before the intervention day/liter (0.33), * Average production after the intervention day/liter (1.35), chi squire value (32.66) significant 0.000

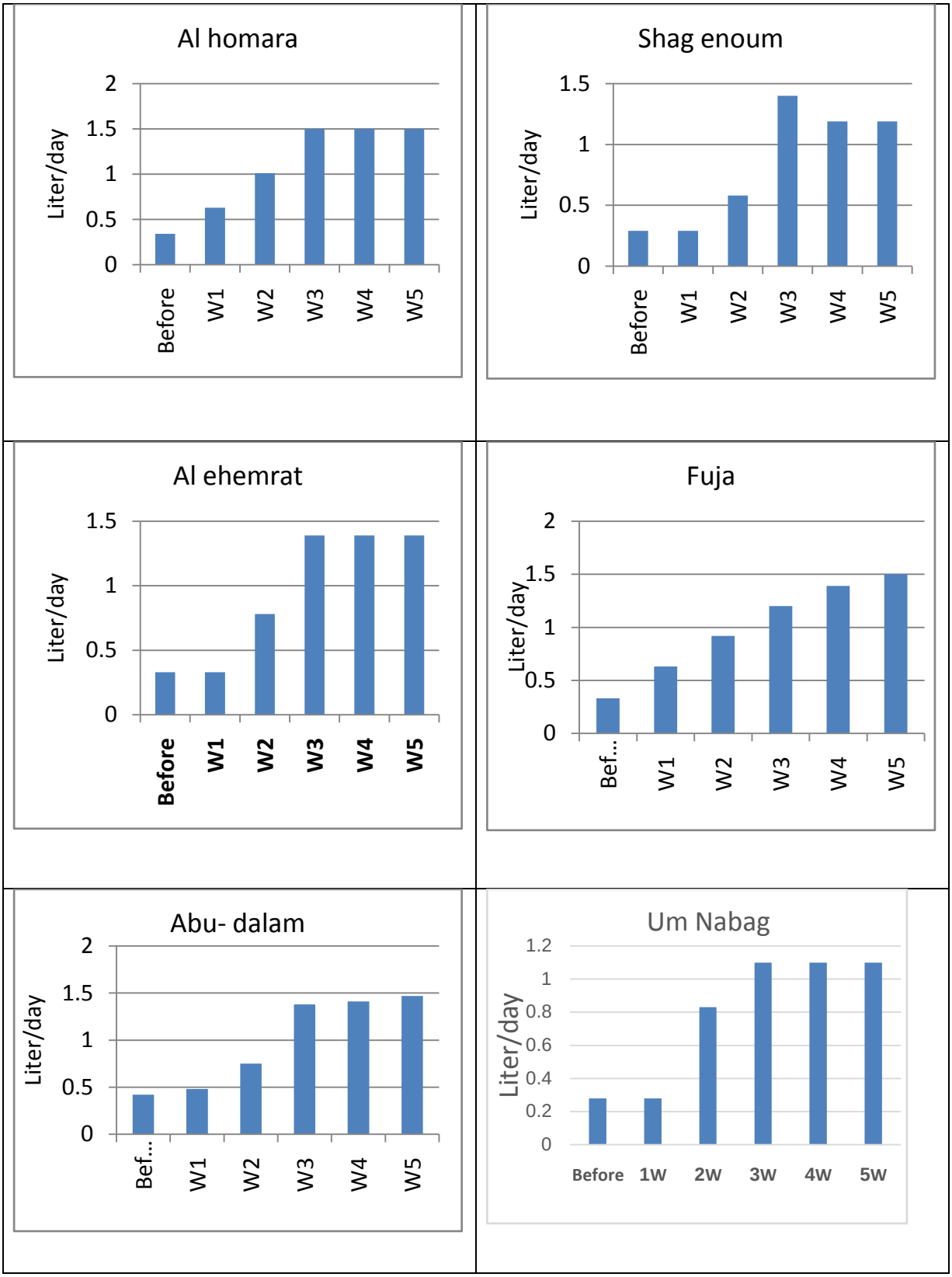

Fig. 1. The effect of additional feeding in increasing milk production in six villages in the study area:

The effect of additional feeding for lamb fattening

Maximum increase in meat production was 10.5 kg per head attained recorded at Al ehemrat followed by Meshqa and Fuja (10.4 and 10.1 kg/head respectively). The least increase (9.0 kg/head) was recorded at Abu-dallam as indicated in table 2 and Fig. 2

Table2. Additional feeding for lamb fattening

village	Number	Age	average weight before intervention	average weight after intervention	Average increasing weight
El-humara	20	4.8	18.4	27.8	9.4
Shag-enoum	20	5	22	32	10
Fuja	20	5	17.7	27.8	10.1
Mashga	20	5.2	16.7	27.1	10.4
Abu-dalam	20	5.7	23	32	9
Al ehemrat	20	5.8	24	34.5	10,5

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-Average weight before intervention (19.75) kg-,-Average weight after intervention (30.31) kg

-Average increasing weight Kg (10.6), -T value (21.69) - Significant (0.000)

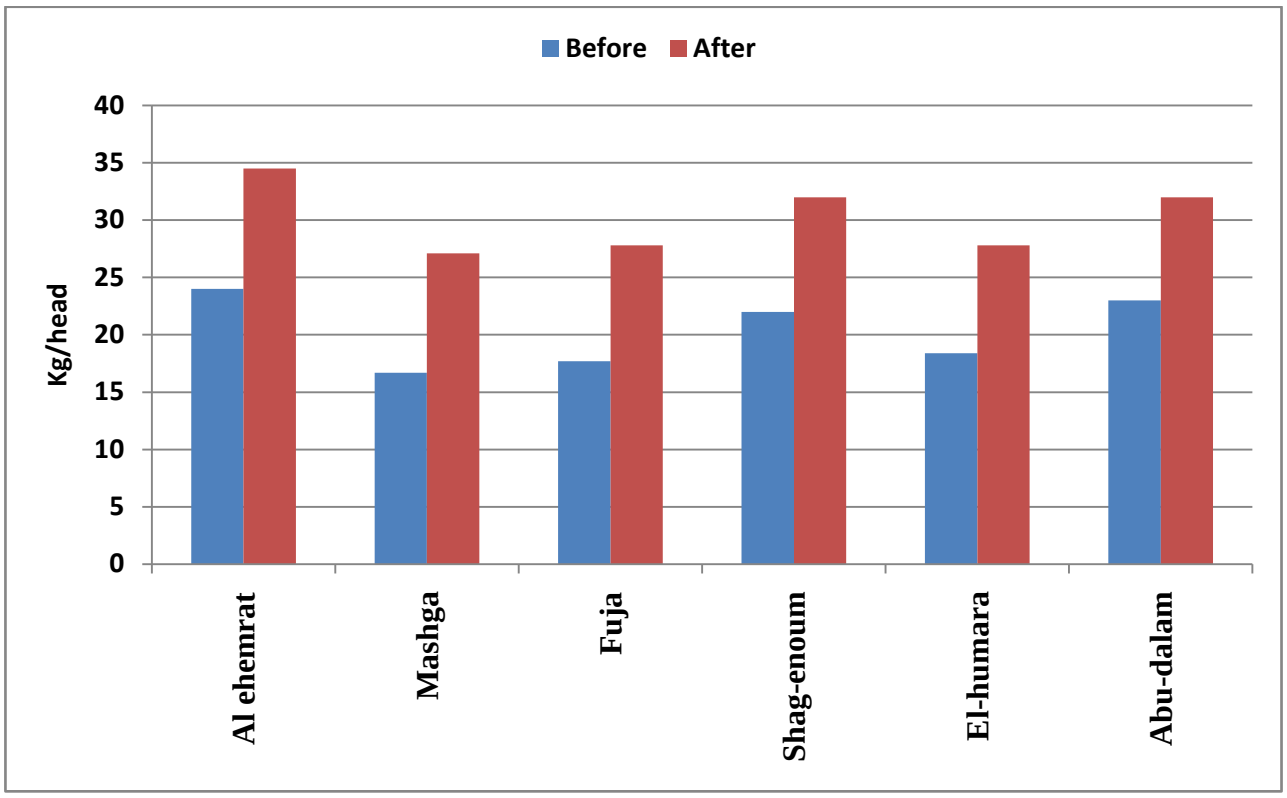

Fig.2. the effect of additional feeding for lamb fattening in six villages in the study area.

Economical revenues from goats milk production and lamb fattening

Table 3 explain that net profit from milk production for goats head was 7.3 SDG per day and from that table net profit from lambs head fattening was 206SDG per month.

Table3. Economical revenues from goats milk production and lamb fattening

Activities	Average/litter average/kg	Total revenue/(day-month) SDG	Total cost/(day-month) SDG	Net revenue/(day-month) SDG
Milk production/head	1.4	10.8	3.5	7.3
Weight increasing/head	10.6	324	118	206

Felid survey 20……
From tables 1, 2, 3 showed that Chi squire, T value indicates its overall significance.

Also from these activities the families achieve profits increased income and making it possible to avoid the risk of climate change on the pastures.

4. CONCLUSION

Small ruminants are critical to the development of sustainable and environmentally sound production systems. The socioeconomic role of sheep and goats in communities living in arid and semiarid regions will be maintained over the forthcoming decades. Efforts should be intensified to improve productive and reproductive performances of these animals using simple and cost-effective options. Desertification, drought and global warming justify the needs for a serious reflection on the readjustment and or the establishment of new feeding strategies targeting the improvement of animal production without detrimental effects on the environment. Therefore, the development objectives should move towards resource conservation and natural resource management while striving for greater agricultural production.

A wide range of local and alternative feed resources and secondary compound-containing plants and their extracts could, if adequately used, improve sheep and goat health, performances and the quality of their products. However, the wide transfer and adoption of these technical options at the farm level should be associated with the organization of local institutions (farmers associations, NGOs, etc.), market organization and the support of policy makers to boost livestock production in arid and semiarid regions.

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