U. of K. J. Agric. Sci. 23(1), 165-175, 2015

Impact of Triangle Generation Humanitaire Food Security Program on Food Production in Central and West Darfur, Sudan

Abdelmoneim A. Babiker[1] and Babiker M. Elmann[2]

Department of Agric. Extension and rural Development, Faculty of Agriculture, University of Khartoum, Shambat, Sudan.

Abstract: Triangle generation humanitaire (TGH) is a French main NGO actor in the field of food security and livelihood activities in Central and West Darfur areas since 2003.Seed fair organization is one of its activities to provide seeds of cereal and cash crops for farmers in the target area(beneficiary farmers) to enhance increasing food production and consequently food security .This study was carried out to compare between beneficiary and non-beneficiary farmers in the production of food crop cereals (Sorghum and millet) as well as comparing seed post-harvest practices. TGH post-harvest survey was conducted in 2013 where 868 beneficiary and 918 non-beneficiary farmers were randomly selected and interviewed through a comprehensive questionnaire. The results of the Chi square analysis for testing the hypotheses revealed the acceptance of the (null) hypothesis that no significant difference between beneficiary and non-beneficiary farmers with respect to Sorghum and Millet production. This similar production could be attributed to other production constraints encountered in the area. Also no significant difference existed between beneficiary and non-beneficiary farmers in post-harvest seed practices of seed storage, seed selling and seed consumption within the house-hold. The two categories consume or sell seeds in the market to fill the food gap during the off-season, which is the traditional period of food scarcity. The recommendations of the study were to address production constraints, apply training in seed selection and storage and intensify post-harvest research for better food access in the area.

Key words: NGO, TGH, Food Security, Food Production, Darfur.

INTRODUCTION

Food security, a situation that exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets dietary needs and food preferences for an active and healthy life (FAO, 2011). It consists of three main components: food availability, access and utilization.

In order to improve food security situation it is essential to improve production. Randela (2003) established that It is evident that post-harvest research complements the production research and the two should not be viewed as mutual exclusive processes. Food security has to be viewed as having both the production and post-production legs. Both these are of equal importance as only a well-managed post-production system allows the consumer to have access to the food produced. While Goletti and Wolff, (1998). emphasized that while research on the improvement of agricultural production has received considerable attention, until recently post-harvest activities have not attracted much attention. But it is important to realize that agricultural production does not end at harvest time; rather there is a production-consumption continuum, which includes a variety of post-harvest activities.

Seasonality of cereal crops and use of low seed quality were among the major causes of insufficient production to enhance food security in Central Darfur as confirmed by Bagson *et. al* (2013) who revealed in their study (the Assessment of a Smallscale Irrigation Scheme on Household Food Security and Leisure in Kokoligu; Ghana) "that the second quarter of the year (April to June) marked the peak period of food insecurity annually. This was attributed to the fact that the single rain fed farming season did not yield adequate harvest to cater for the average household size of five individuals throughout the year. The majority of respondents (78%) identified the regular use of poor quality seeds and incessant farming on the same piece of land as the most obvious causes of low food crop yield in the traditional area". Again Karanja (2010) pointed to the fact that African indigenous vegetables contribute significantly to improve nutrition, food security, incomes and overall livelihoods for rural

and urban poor, the potential to meet the growing demand for these vegetables in the region is limited by lack of good quality seeds. Onim and Mwaniki (2008); Abukutsa (2010) confirmed that African indigenous vegetables are traditionally and significant contributors to food security and nutrition for smallholder farmers in the East and Central Africa (ECA) region, and Darfur is not an exception.

David *et. Al.* (2011) insisted that there is potential for smallholders to play a larger role in multiplying open-pollinated crops. Both the GoE and non-governmental organizations have invested in various projects aimed at strengthening farmers' skills in seed multiplication, with the goal of increasing the supply of seed for improved varieties, both within communities and to the formal seed system. The outcomes to date have been mixed, partly due to poor incentives offered to farmers, insufficient capacity on both sides, and the constant threat of food insecurity that causes farmers to use their seed stocks for food.
Reports are common of seed being distributed after the optimal planting time or of varieties being distributed that are not appropriate to changes in farmers' expectations of seasonal weather conditions at the local level (Sahlu and Kahsay 2002; DSA, 2006; EEA/EEPRI, 2006).

A brief account on TGH organization
Triangle G.H. was present in Sudan since 2003. Since then it worked in the fields of water and sanitation, camp coordination and hygiene promotion and extended its activities to food security in the rural areas around Geinena through support to agriculture and breeding activities in the form of suuply of inputs and training. In 2005 it started working with internally-displaced population (IDP) in Bindiziand refugees in Um Dukhun, as well as their host communities and now is the main international actor in these areas. Seed fairs were among the activities organized by TGH. Local markets were enhanced to provide selected seeds to local farmers to buy in cheaper prices from local suppliers (TGH Report, 2013a). In this way agricultural production was supported and consequently food security in the area.

This study aimed at comparing two beneficiary and non-beneficiary farmers in production and post-harvest practices in (whether seeds were stored, sold in the market or consumed within the house-hold). (TGH report, 2013b)

Specific objectives of the study

- Study TGH activities in the area concerning food production and food security in the study area.
- Study post-harvest practices of **beneficiary** respondents concerning seed storage for the coming farming season, selling seeds in local markets or seed consumption within the house-hold.
- Study post-harvest practices of **non-beneficiary** respondents concerning seed storage for the coming farming season, selling seeds in local markets or seed consumption within the house-hold.
- Comparing the behavior of the two categories with respect to post-harvest practices of seeds.
- Putting suitable recommendations to enhance seed production and food security in the study area.

Hypotheses of the study

This study is conducted to test the following (null) hypotheses:

1st: No significant difference between beneficiary and non-beneficiary farmers concerning Sorghum and Millet production in the target area.

2nd: No significant difference between beneficiary and non-beneficiary farmers concerning seed post harvest practices of storage, selling in the market and self-consumption.

METHODOLOGY

THE STUDY AREA: The study which was carried out in Central and West Darfur, namely from villages of Bindizi, Um Dukhun, Mukjar in Central Darfur and Geneina city in West Darfur.

SAMPLING and SAMPLE FRAME: 1786 Respondents were randomly selected (868 beneficiaries, 918 non-beneficiary farmers). It was an accidental sample because respondents were not listed and the security situation was unstable. For these reasons stratified sampling was not undertaken.

DATA COLLECTION: The primary data were gathered through a questionnaire, focused on crops grown and post-harvest related activities. In addition to that post harvest Information was gathered from farmers through a number of rapid appraisal techniques (focus group discussions), plus direct observation of post-production operations. The secondary data were obtained from relevant sources to support the primary data.

DATA ANALYSIS: The study which was carried out in Central and West Darfur was focused on TGH food production project which has two phases, namely the planning phase (phase 1) and the implementation phase (phase 2). The paper focused on phase 2 that deals with the actual undertaking of the surveys.The Statistical Package for Social Sciences (SPSS) was used to analyses the data. The results were presented in descriptive statistical tables (frequencies and percentages) and qui^2 tables to test the study hypotheses of the degree of association between the beneficiary and non-beneficiary respondents.

Equation for calculating Q^2 test:

$$Qi\text{-}^2 = \sum \left(\frac{(O - E)^2}{E} \right)$$

Where: O = observed frequency

E = Expected frequency

$$E = \frac{(CT) \times (RT)}{GT}$$

Where: CT = Column Total.
RT = Row Total.
GT = Grand Total.

The Rule:
If the calculated value of Qi^2 is more than the tabulated value a significant difference exists between the 2 categories and vice versa.

RESULTS AND DISCUSSION

Results of the descriptive statistics

The results in Table1. show that nearly half (40%) of beneficiary farmers tend to consume their sorghum seeds stocks of the next farming season. While few farmers (9%) tend to sell their coming season stock in the market in an attempt to fill the food gap. Such a situation reflects food shortage resulting in food insecurity during the lean period preceding the next season. Very few farmers store seeds for the next season. The same could be applied for non-beneficiaries where percentages were 31%, 8%, 6% for seed consumption, seed selling and seed storage respectively.

The results of Table 2. Reflected the same trend for millet beneficiary farmers where 43%, 10% and 8% consume, sell and store their produce respectively, reflecting again the same behavior. Percentages for non-beneficiaries were 29, 6 and 5 respectively.

This behavior of both farmer groups reflected the fact that although TGH was active in organizing seed fairs in the area, but the majority of farmers either consume their seeds or sell them in local markets in an attempt to support food security. Few percentage store seeds for the next farming season.

Table1. Frequency distribution of respondents by usage of sorghum seeds:

Categories	Beneficiaries		Non-beneficiaries	
	Frequency	%	Frequency	%
Seed Storage	61	7	55	6
Self consumption	347	40	285	31
seed sell in market	78	8	73	8
Total	513	55%	413	45%

Table 2. Frequency distribution of respondents by usage of Millet seeds:

Categories	Beneficiaries		Non-beneficiaries	
	Frequency	%	Frequency	%
Seed Storage	69	8	46	5
Self consumption	373	42	266	29
seed sell in market	89	10	55	6
Total	531	60%	367	40%

Results of the Qui^2 analysis

Qui^2 is used to compare the mean of two groups: the beneficiary farmers who benefited from the project by purchasing seeds from the organization of TGH seed fairs, and those who did not. The results from Table 3 revealed that the average production did not deviate largely between the two categories ($P< 0.05$), which means the acceptance of the formulated null hypothesis that no significant difference between beneficiary and non- beneficiary farmer with respect to Sorghum and Millet production.

Table 3. Qui^2 to test the expected association between beneficiary and non- beneficiary respondents concerning Millet and Sorghum production

Categories	Millet (Kg)	Sorghum (Kg)
Average production per input beneficiary farmer	436	273
Average production per non beneficiary farmer	303	223
Total	739	496

Significant at $P< 0.05$
Chi^2 Calculated = 1.9
Chi^2 Tabulated= 3.84
d.f. (r-1) (c-1) = 1

Applying the method for sorghum seed post-harvest activities in Table 4 ($P< 0.05$) and millet in Table 5 ($P< 0.05$) indicated no significant difference between the two categories of beneficiaries and non-beneficiaries in relation to post harvest activities of seed consumption, selling and storing.

Table 4. Qui^2 to test the expected association between respondents concerning usage of Sorghum production:

Categories	Storage	Self-consumption	Sell
Beneficiary farmers	61(7%)	347(40%)	78(8%)
Non-Beneficiaries	55(6%)	285(31%)	73(8%)
Total	116(13%)	632(71%)	151(16%)

Significant at P< 0.05
Chi^2 Calculated = 0.22
Chi^2 Tabulated= 5.99
d.f. (r-1)(c-1) = (2-1)(3-1)=2

Table 5. Qui^2 to test the expected association between respondents concerning usage of Millet production:

Categories	Storage	Self-consumption	Selling
Beneficiary farmers	69(8%)	373(42%)	89(10%)
Non-Beneficiary farmers	46(5%)	266(29%)	55(6%)
	115(13%)	639(71%)	144(16%)

Significant at P< 0.05
Chi^2 Calculated = 0.054
Chi^2 Tabulated = 5.99
d.f. (r-1)(c-1) = (2-1)(3-1) = 2

CONCLUSION

This study aimed at studying the effort of TGH organization in Central Darfur in areas of food production and security. The study classified farmers into two categories of beneficiaries and non-beneficiaries. It was expected that beneficiaries store their seeds for the next season, but their behavior was similar to the non-beneficiaries (those not benefiting from the project by buying seeds from seed fairs). The indication was that the severity of food security resulted in that farmers tend to consume their seed stocks within the house-hold or sell them in market during the off-season.

Previous research focused on production with very little emphasis on post-production sector. Thus, investment in post-harvest research and extension activities is imperative towards the achievement of food security, poverty reduction and the sustainable use of resources. Care should be taken into account not to aim at reducing food losses per se, but include institutional arrangements, processing industries and market information. Research results seem to indicate that more post-harvest research work should be done and should recognize and complement the indigenous knowledge possessed by the communities.

REFERENCES

Abukutsa, M.O.O. (2010). African Indigenous Vegetables in Kenya: Strategic repositioning in the Horticulture Sector. Second Inaugural Lecture of the Jomo Kenyatta University of Agriculture and Technology, 63 pages.

Bagson, T.et al (2013), Assessment of a Small-scale Irrigation Scheme on Household Food Security and Leisure in Kokoligu; Ghana. Research on Humanities and Social Sciences University for Development Studies ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online) Vol.3, No.1, 2013.

David, J. *et al* (2011) *Seed, Fertilizer, and Agricultural Extension in Ethiopia*. Development Strategy and Governance Division, International Food Policy Research Institute – Ethiopia Strategy Support Program 11 ESSP II Working Paper 020.

DSA (Development Studies Associates). (2006). *Study on Improving the Efficiency of Input Markets*. Addis Ababa: Ministry of agriculture and Rural Development, Federal Democratic Republic of Ethiopia.

EEA/EEPRI (2006). Ethiopian Economic Association/Ethiopian Economic Policy Research Institute). *Evaluation of the Ethiopian Agricultural Extension with Particular Emphasis on the Participatory Demonstration and Training Extension System* (PADETES). Addis Ababa: EEA/EEPRI.

FAO. (2011). State of food insecurity in the World. Food and Agriculture Organization of the United Nations, Rome, Italy.

Goletti, F. and Wolff, C. (1998). *The impact of post-harvest research*. MSSD Discussion Paper No 29, International Food Policy Research Institute, Washington, USA.

Karanja,D.(2010) Promoting farmer-led seed Enterprises of African indigenous vegetables to boost household incomes and nutrition in Kenya and Tanzania. CAB International (CABI), Nairobi, Kenya.

Onim, M. and Mwaniki, P. (2008). Cataloguing and Evaluation of Available Community / Farmers-based seed Enterperises on African indigenous vegetables (AIVs) in four ECA countries. 95pp.

Randela, R. (2003) The Incidence of Post-Harvest Problems Among Small Farmers Surveyed in Three Regions of the Limpopo Province. *Human Sciences Research Council – Integrated Rural and Regional Development. Agrekon, Vol 42, No 2*

Sahlu, Y., and M. Kahsay, M. (2002). Maize seed production and distribution in Ethiopia. In *Proceedings of the Second National Maize Workshop*, Addis Ababa, Ethiopia, November 12–16, 2001:160–165.

TGH Report (2013). Towards Improved Food Security and Livelihoods within Conflict-affected Communities of Central Darfur.

TGH Report (2013) Guide to Support Seed Fair organization through Vouchers System in West and Central Darfur.

أثر برنامج الأمن الغذائي مثلث الجيل الإنساني علي إنتاج الغذاء بوسط وغرب دارفور ، السودان

عبدالمنعم عوض الله بابكر[1] وبابكر محمد بابكرالمنا[2]

قسم الإرشاد الزراعي والتنمية الريفية ، كلية الزراعة ، جامعة الخرطوم

مستخلص: منظمة مثلث الجيل الإنساني من المنظمات غير الحكومية فرنسية الأصل وهي منظمة رئيسية تعمل في مجال الأمن الغذائي وسبل كسب العيش بوسط وغرب دارفورمنذ العام 2003. ويمثل إقامة معارض البذور أحد الأنشطة التي تقوم بها المنظمة من أجل توفير بذور محاصيل الحبوب والمحاصيل النقدية لمزارعي المنطقة من أجل تعزيز إنتاج الغذاء، وبالتالي دعم الأمن الغذائي. أجريت هذه الدراسة للمقارنة بين المزارعين المنتفعين من البرنامج وغير المنتفعين لمقارنة إنتاج محاصيل الحبوب ، والمقارنة بينهم في عمليات ما بعد الحصاد فيما يتعلق بتخزين البذور أو إستهلاكها أو بيعها لسد الفجوة الغذائية في فترات شح الغذاء. ثم أجري مسح ما بعد الحصاد في العام 2013م حيث تم إختيار 868 من المزارعين المنتفعين و918 من غير المنتفعين عشوائياً بغرض إجراء المقارنة وتم معاينتهم من خلال إستبيان موسع أعد لهذا الغرض. أوضحت نتائج تحليل الدراسة باستخدام مربع كاي لاختبار فروض الدراسة عدم وجود فروق معنوية بين المزارعين المنتفعين وغير المنتفعين من حيث كميات إنتاج محاصيل الغذاء (الذرة والدخن)، ربما يعزي ذلك لمعوقات إنتاج المحاصيل الأخري . كما اوضحت نتائج التحليل ، من جانب آخر ، عدم وجود فروق معنوية من حيث ممارسات ما بعد الحصاد فيما يتعلق بتخزين البذرة أو إستهلاكها غذائياً أو بيعها في السوق لسد الفجوة الغذائية أثناء الفترة التقليدية لشح الغذاء . أوصت الدراسة بتذليل عقبات الإنتاج الأخري وتدريب المزارعين علي برامج إنتخاب وتخزين البذوروالتركيز علي أبحاث ما بعد الحصاد.