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Assessing Effects of Termite Infestation on Household Food and Nutrition Security: A Case of Nedjo District, Oromia, Ethiopia

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Abstract: **This research looks at the effects of termite infestation on food and nutrition security of household in Nedjo district, West wellega, Ethiopia. The study aims to document and better understand effects of termites' infestation on household food and nutrition security. The study employed a research strategy using both desk and case studies for secondary and primary data collection respectively. The data was collected through individual interviews, key informant interview, and Focus Group Discussion (FGD). The semi-structured interview guide were developed and used to collect the primary data. The FCS (Food Consumption Score), WFP's Food Consumption Analysis for measuring household food consumption, was used. The collected data was grouped, summarised, discussed and interpreted by theme. Then it was analyzed quantitatively and qualitatively based on the findings. Simple descriptive statics, mean and percentage, were used to analyze the quantitative data by using SPSS. The study investigated that termite infestation has negative effects on household food security of the study area. The result from FCS showed that only 26.7% are in acceptable food consumption score while 50% are in borderline and 23.3% are in poor consumption score. The study concludes that Integrated termite management strategies should focus on rehabilitating the degraded land while the strategies should create income for farmers. This will also reduce the effect of termite infestation on household food security situation in the district. It is advisable to encouraging farmers to cultivate vegetables and tubers that are tolerant to termites. It is important to take in to account the adaptation of termite resistant maize and sorghum improved varieties.**

Keywords: Effects; Termite infestation; food and nutrition security; Nedjo; Ethiopia

INTRODUCTION

Termite infestation is prevalent worldwide especially in the tropics where the distribution, problems and constraints result in livelihood threats (Fenemore, P.G., 2006), particularly among rural small-scale farmers (Sileshi et al., 2008). The growing interest in sustainable agriculture and food security on the African continent highlights the need for a more integrated approach to termite control (Sileshi et al., 2008) by integrating indigenous knowledge and practices with modern 'scientific' method. This is with the aim of preventing severe ecological damage and loss of ecosystem services provided by termites while using the available resources without exhausting them (Logan et al., 1990)

Termite infestation problem can have several effects such as agronomic, economic, or social constraints. The agronomic influence involves the role of termites as pests and ecosystem engineers; whereas, the economic aspect includes the destructive tendencies of termites due to their foraging activities on plants and wood products which cause economic hardship to individual producers (Fenemore and Prakash, 2006). On the other hand, termites are beneficial in that they assist in the conversion of dead trees and other plant products to substances that can be utilised by plants. Moreover, termites are an important part of the food chain for many animals including man. They supply materials for many food chains, soil engineering (translocating and altering soils physically and chemically and maintaining soil fertility (Lee and Wood, 1971).

Termites are abundant throughout the world (Donald and Dweight, 1970). According to Legesse et al. (2013) Termites are severe pests in several parts of Ethiopia, particularly in the Western regions of the country. They cause considerable damage to crops, rangelands, forestry seedlings, and wooden structures such as wooden houses, stores, fences and bridges crossing streams (Assefa, G., 1990). Tadese, A. (1998,) reported 45, 50 and 18 % yield losses of cereal crops due to termites at Bako, Didesa, and Asossa, respectively.

The World Food Summit of 1996 defined food security as existing *"when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life"*.

Objective: To identify the effects of termite infestation on household food and nutrition security

METHODOLOGY

This section presents the methodology of the research. The sections present the description of the study area, the research strategy, sampling technique, access to study area and method of data collection. Further, this section also describes method of data analysis.

The Study Area

The study was conducted in Wegari Buna and Muchucho Gyorgis Peasant Associations of Nedjo district, West wellega Zone of Oromia Region, Ethiopia. Nedjo district is located 515 km to west direction from the capital city Addis Ababa. It is located at 75 km from Gimbi to west direction, which is the capital city of western welllega zone. Nedjo district is one of 180 districts of Oromia region. It is bordered by Benishangul-Gumuz in the North, Jarso District

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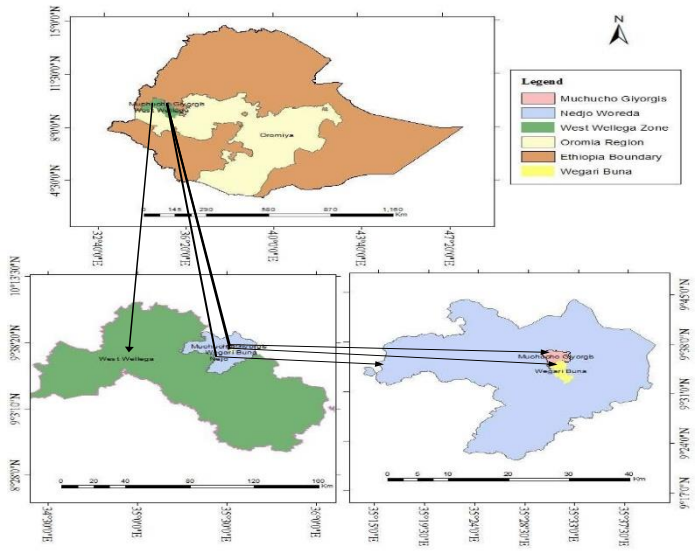
in the South, Bojji Dirmagi district in the East and Kiltu Karra district from the west.

The district has 39 peasant associations with four administrative towns. Nedjo district has an estimated total population of 144,302, of whom 70726 are men and 73576 women; 6725 of its population were urban dwellers and 137,577 residents were rural dwellers. Based on Nedjo district agricultural department in 2016 the total area coverage of this district is estimated to 72,601.777 hectares (NDBoANR, 2016).

The altitude of the district ranges from 1600 to 2200 meters above sea level. The temperature of the district range from 18 degrees centigrade with 800-1300 millimetres annual average rain fall. Majority of the district is under the agroclimatic zone of woina dega. Agricultural production is the main means of livelihoods for the district (NDBoANR, 2016).



Source: Adapted from GIS map data, 2017

Figure 1: Administrative Map of the study areas (including the map of Ethiopia, wellega zone and Nedjo district of the study area)

Research Strategy

Desk study and qualitative case study approach were used for this study. According to Laws, et al. (2013) case study is research method focused on an in-depth investigation of a single issue, individual, group or event. Therefore, a case study was conducted to gain an in-depth insight of effects of termite infestation on food and nutrition security in Nedjo District.

Access to study area

The researcher enters to the PA and introduces himself to PA administrators and DAs. Then the researcher again explained the purpose of his research and mentioned the criteria to select respondents and setting the dates and times for farmers to conduct focus group discussion with the support of the Development Agent in the PA. In undertaking his research, the researcher was supported by the development agents to appoint and contact farmers in their home as well as at their farms.

Sampling Method

Two Peasant Associations (hereafter PA) namely Wegari Buna and Muchucho Gyorgis were selected from Nedjo district purposively based on the severity of termite infestation. The PAs were selected with the cooperation of Nedjo District Bureau of Agriculture Experts. From each of the selected PAs, 15 respondents were selected and interviewed (using a semi-structured interview format) purposively based on their awareness and experience on termite infestation in order to get in-depth information. Three key informants were selected and interviewed based on their experiences on termite infestation from government and NGO working in the district. Finally, one FGD per PA was conducted.

Method of Data Collection

Primary and secondary sources were used for this study. Primary sources were collected through a case study with farmers and experts in Nedjo district while secondary information was collected through desk study. Primary data was collected through focus group discussion, semi-structured interview, and key informant interview. The World Food Programme. (2008) The FCS (Food Consumption Score), WFP's Food Consumption Analysis for measuring household food consumption was used. Before the actual case study, pilot- testing of the guideline was undertaken. Based on the pilot-test, some modifications were made on the checklist. Finally, the data was collected by using semi-structured guidelines, FGD and KII topic lists.

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Data Analysis

Data was analysed qualitatively. All data collected through individual interviews, Focus Group Discussion, Key Informant Interviews and observations were organised by theme and entered into Microsoft Excel programme daily from the beginning day of the data collection. The organised data was grouped, summarised, discussed and interpreted by theme. Then it was analyzed quantitatively and qualitatively based on the findings. Simple descriptive statics, mean and percentage, were used to analyze the quantitative data by using SPSS.

FINDINGS

Termite mound situation in Nedjo district

Nedjo District is one of the western wellega Districts located 515 km to the west of Ethiopia's capital city, Addis Ababa. Nedjo District is profoundly affected by termite infestation. One of the bottlenecks of agricultural production in the area is termite infestation. Farmers in the area are using different methods to control termite. Intensive use of insecticides, which is of significant environmental and health concerns, is the most frequently control option.

Termite infestations existed from ancient times but not seen as a threat as it did not affect farmers' food crops. In Nedjo district termite mound are counted from time to time by farmers on their respective farmland and experts estimate the number of mounds on forestland and grazing land. Termites consume grasses from grazing land resulting in a shortage of animal fodder. Termite removes trees from land, exposes soil for erosion, and reduces its fertility, increases soil acidity due to this production and productivity is reduced.

The causes for termite infestation are population growth, increased number of livestock, and deforestation for expansion of farmland, extinction of termite predators like ants, overgrazing, firing grass and crop residue for land clearing which is feeds for termites. Data from Nedjo District Bureau of Agriculture and Natural Resources shows that the Ministry of Agriculture started queen removal campaign in 1978. The previous termite control methods focus on eradication by chemical but failure to address the root causes.

Termite infestation has an impact on livelihoods of farmers in Nedjo district. Termite infestation is resulting damage to agricultural crop and livestock fodder. It has a wide scale impact on communities in Nedjo district; social impact (seasonal migration and children school dropout, poverty); economic impact (reducing production and productivity of crops and livestock, food shortage, damaging houses, deforestation); and environmental impact (It disturbs climate because of deforestation, Soil erosion-removes grasses and forests from land) (NDBoANR, 2016). In order to cope with the effects of termite infestation farmers are migrating with their livestock to Benishangul-Gumuz region. According to Nedjo District Bureau of Agriculture and Natural Resources (here after NDBoANR) 2016 annual report the number of migrants is about 40 % of the district total population. The other 60% depend on coffee production. Agricultural and livestock are nevertheless important sources of food and income.

Effects of termite infestation on household food security

This section answers the research question 'What are the effects of termite infestation on Food and nutrition security in Nedjo district? '. The research found that termite infestation has adverse effects on food and nutrition security of farmers in the district.

All of the respondents said that termite infestation has adverse effects on their household food security. Farmers reported that they stopped cultivating maize and teff on land infested by termites that have a direct impact on production of main staple crops for consumption. For some, this resulted in serious food shortage forcing them to migrate (seasonally) to the neighbouring region of Benishangul-Gumuz region. Some of them drop out children from school to send children for off-farm activities due to food shortage. They cope up the problem by cultivating maize on wetland previously however they said that it started to attack maize in the wetland recently

Data obtained from key informant shows that 40% of the district farmers are migrating seasonally to farm in another region and the left 60% produce coffee as coping strategies. One of the respondent in Wegari Buna stated the effects of termite infestation as follows.

'*I don't know how to tell you. We are buying food crops for consumption from the market as urban dwellers. We are farming, but we are buying. Due to termites we are facing food shortage from year to year. This termite problem is not visible as other natural disasters like shortage of rainfall. Our production is not enough for family consumption. We are here by our soul, but we were migrated*'.

Another respondent in Wegari Buna also stated the effects of termites on household food security as follows.

'…reduce production; previously we used to produce six quintals of maize from half a hectare, but now we produce about one quintal per half a hectare. For this reason, we are unable to pay the cost of inputs. It damages trees like coffee that we were generating income. We are unable to feed ourselves with products. We depend on the market, trading, seasonal migration to region 6, selling all livestock. Our enemy is termites.'

The effect of termite infestation on household food security is shown in the table below. Accordingly, 10 of the respondents (33.3 %) said termite infestation has a very strong effect on household food security whereas the majority of them 18 of the respondents (60 %) replied that termite infestation has a strong effect on their household food security. Only two respondents (6.7) responded that it has an average effect. None of the respondents said termite has low or no effect.

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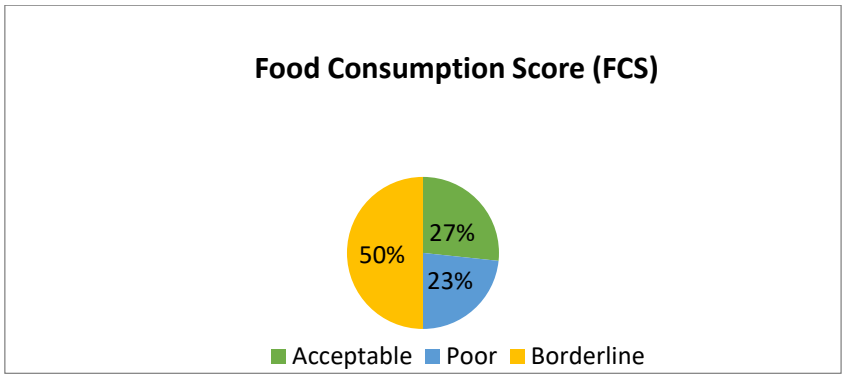
Table 1: effects termite infestation on household food security (N=30)

	Frequency	Percent (%)
Very strong effect	10	33.3
Strong effect	18	60.0
Average	2	6.7
Total	30	100.0

Source: own field result 2017

According to the result from FCS showed that only 26.7% are in acceptable food consumption score while 50% are in borderline and 23.3% are in poor consumption score from the 30 respondents interviewed.
Food Consumption Score (N=30)



Source: own field result 2017

DISCUSSION

Effects of termite infestation on household food security

The study investigated that termite infestation has negative effects on household food security of the study area. Most of the farmers did not believe termites has benefits. Nevertheless, few of them heard that termites has benefit for soil. Although termites are eaten in some parts of Africa considered as nutritious insect and used for food security, it is not consumed in the study area. In the study area it is perceived as unethical to ask whether termites are eaten let alone eating termites. Only a few of the respondent heard that termites are used as food in other countries.

The effects of termite infestation on household food security result shown in the above table. Accordingly, 10 of the respondents (33.3 %) said termite infestation has a very strong effect on household food security whereas the majority of them 18 of the interviewees (60 %) replied that termite infestation has a strong effect on their household food security. Only two respondents (6.7) responded that it has an average effect. None of the respondents replied as termite has no or low effects on their food security. All of the farmers said that they faced food shortages from year to year due to termite infestation.

Some of the respondents reported that they faced food shortage and forced to migrate to a neighbouring region, Benishangul-Gumuz region, Data obtained from key informant shows that 40% of the district farmers are migrating seasonally to farm in another region. Some of them drop out children from school to send them to off-farm activities due to food shortage. They cope up the problem by cultivating maize on wetland previously however they said that now termite started to attack maize in the wetland.

A study conducted by (Legesse, H., et al., 2013) in Diga District, Ethiopia also supports the above findings. According to study farmers reported that termites contributed a lot to poor agricultural productivity and poor soil fertility that leads to increasing of the out migration of the community. For instance, from the households interviewed, 96% believed that their farm income has decreased, two third (66%) thought that their household food security was threatened termites and a quarter (28%) indicated that they are vulnerable to poverty due to termite infestation. They also noted that 75% of the household interviewed reported that they faced food shortage and all household in different wealth category faced food shortages. Household food security has been increasingly under threat with increasing termite infestation that reduces crop productivity and livestock production. Farmers have adopted different coping strategies like reducing the quantity of food per day, selling of animals and other productive assets.

Farmers in the study area reported that they stopped cultivating mainly maize, sorghum and teff. This study conducted by Loko, L.E.Y. et.al.., 2017 on Farmers' perception on termites in northwest Benin showed that termites are important pests of many crops with maize, sorghum, and yam as being the most susceptible.Due to sucsebility of the cereal crops production and productivity is reduced. Because of these effects of termites' infestation, the land was becoming less productive, and cost of production and farm inputs was increased due to increased demand for inorganic fertilisers to improve the poor soil

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fertility caused by termites. This is in line with Tadese, A. (1998,) reported 45, 50 and 18 % yield losses of cereal crops due to termites at Bako, Didesa, and Asossa, respectively.

All of the respondents said that termite infestation has adverse effects on their household food security. They said that they stop cultivating mainly maize and teff. Due to this their production and productivity is reduced. This study conducted by Loko, L.E.Y. et.al., 2017 showed that termites are important pests of many crops with maize, sorghum, and yam as being the most susceptible.

The World Food Programme. (2008). FCS was used for measuring household food consumption and evaluate the food security situation in the study area. Accordingly, to the result from FCS showed that only 26.7% are in acceptable food consumption from the 30 respondents interviewed. This shows that there is food security problems in the study area. This result is obtained as dairy products are consumed frequently in the study area. The food security problems in the area has a direct relation with termite infestation as understood during FGD.

CONCLUSIONS

The study investigated that termite infestation has negative effects on household food security of the study area. Farmers in the study area are facing food shortages from year to year due to termite infestation. They reported that they stopped farming cereal crops on their land mainly maize, sorghum and teff. Due to this production and productivity of crops and livestock is reduced, the land was becoming less productive, and cost of production and farm inputs was increased due to growing demand for inorganic fertilisers to improve the poor soil fertility caused by termites. Some of the respondents reported that they faced food shortage and forced to migrate to a neighbouring region, Benishangul-Gumuz region. About 40% of the district farmers are migrating seasonally to farm in other places. Some of them drop out children from school to send them to off-farm activities due to food shortage. Previously they cope up the problem by cultivating maize on wetland. However, now a day termites started attacking maize grown in the wetland.

RECOMMENDATIONS

- **Adapting termite resistant maize and sorghum variety:** It s important for Agricultural Research Centers and University to take in to account the adaptation of termite resistant maize and sorghum improved varieties because the present improved maize and sorghum varieties are susceptible to termites in the district.
- **Encouraging farmers to cultivate vegetables and tubers that are tolerant to termites attack**. This can be done through Farmers to Farmers Learning by arranging farm visit to vegetables and tubers like potatoes, sweet potatoes etc. that are tolerates termites attack.

Conflict of Interest

I declare that there is no conflict of interest

REFERENCES

[1] Assefa, G. 1990. Maize Stalk Borer Research in Ethiopia. Proc. of the 10th CEE Annual Meeting. February 7 - 9, 1990, Addis Ababa, Ethiopia
[2] Donald JB., Dweight MD., 1970. Introduction to the study of insects. Third edition. Holt, Rinehart and Winston INC, 152-158.
[3] Fenemore, P.G., 2006. *Applied entomology*. New Age International. (P) Ltd publishers. 200-203.
[4] Laws, S., Harper, C., Jones, N. and Marcus, R., 2013. *Research for development: A practical guide*. Sage.
[5] Lee, K.E. and Wood, T.G., 1971. *Termites and soils. London, UK, Academic Press*.
[6] Legesse, H., Taye, H., Geleta, N., Swaans, K., Fikadu, D., Zziwa, E. and Peden, D., 2013. Integrated termite management in degraded crop land in Diga district, Ethiopia. ILRI.
[7] Logan, J.W., Cowie, R.H. and Wood, T.G., 1990. Termite (Isoptera) control in agriculture and forestry by non-chemical methods. *Bulletin of Entomological Research*, *80*, p.330. London, UK: Overseas Development Institute.
[8] Loko, L.E.Y., Orobiyi, A., Agre, P., Dansi, A., Tamò, M. and Roisin, Y., 2017. Farmers' perception of termites in agriculture production and their indigenous utilization in Northwest Benin. *Journal of ethnobiology and ethnomedicine*, *13*(1), p.64.
[9] NDBANR, 2016. Nedjo District Bureau of Agriculture and Natural Resources annual report.
[10] Sileshi, G., Akinnifesi, F.K., Ajayi, O.C., Chakeredza, S., Mng'omba, S. and Nyoka, B.I., 2008a. Towards sustainable management of soil biodiversity in agricultural landscapes in Africa. *Biodiversity*, *9*(1-2), pp.64-67.
[11] Tadese, A., 1998. Control strategies and future needs for research on insect pests of maize in Ethiopia. pp. 291 - 305.
[12] World Food Programme. (2008). Food consumption analysis: Calculation and use of the food consumption score in food security analysis. *United Nations Vulnerability Analysis and Mapping Branch*.
[13] Declaration, R. (1996). Rome Declaration on World Food Security and World Food Summit Plan of Action.