The Role of Conservation Agriculture in Bridging Gender gaps in Tanzania: The case of Sustainable Agriculture Tanzania

***Msuya, E., M. Mhanga and F.A. Massawe**

Department of Policy, Planning and Management, Sokoine University of Agriculture, P.O. Box 3035, Morogoro Tanzania

*Corresponding author e-mail: *elizabethmsuya@yahoo.com*

Abstract

Despite agriculture's great potential to Tanzania agricultural development, the sector faces diverse challenges. For example, existence of gender gaps in accessing agricultural production resources and benefits obtained from the same impede the sector's growth. Therefore, adoption of conservation agriculture (CA) has been seen as one of the measures to address the sector limited productivity. Nonetheless, there is limited knowledge on how CA has managed to reduce gender inequalities in accessing both reproductive resources and benefits accrued from agriculture. This paper examines gender gaps in conservation agriculture programme implemented by Sustainable Agriculture in Tanzania (SAT), by specifically analyzing gender participation and relations in CA in Morogoro municipality and Morogoro district. This study adopted a mixed method approach whereby both qualitative and quantitative data were collected from four sites where SAT implements its activities. Findings show that CA has significantly reduced gander gaps in accessing production resources and services as well as raising women's participation in decision making with regards to production and use of income obtained from sales of produce. Farmers regardless of the gender can access extension services, and credit, and are involved in various initiatives collectively. Despite the economic benefits, findings show that CA is laborious and takes much of farmers' time, women being more affected. Therefore, it is recommended that the central and local governments and various stakeholders should promote the spread of conservation agriculture technologies since it reduces the biasness in agriculture and empowering women. Ensuring access to advanced cheap technologies to farmers. Nonetheless, there is need to ensure that female farmers are not overburdened in the process.

Keywords: Conservation Agriculture, Gender gap, Sustainable Agriculture Tanzania

Introduction

Apart from technical challenges affecting the agricultural sector's performance, existence of gender inequalities characterized by gender gaps in access to agricultural production resources and productivity impedes the sector's growth (Huyer, 2016). Generally, gender gaps in the agricultural sector are more prevalent in six key areas i.e. land, labour, credit, information, extension and technology (Wekesah *et al.,* 2019). In some of developing countries women's access to land and other assets are restricted by statutory and customary laws hence, limiting their access to credit thus, low yields (United Nation, 2015). Gender gaps in the agricultural sector hinder the efforts of many developing countries to reduce poverty and food insecurity while at the same time affecting their economic growth and general well-being. According to the World Bank (2014) reducing gender gaps can significantly increase agricultural productivity hence reducing poverty, increased food security and economic growth.

To get rid of the effects and challenges of conventional agriculture, conservation agriculture (CA) has been introduced as the major alternative to address these challenges. CA aims at maintaining soil fertility while conserving water through the application of three major principles, which are i) little disturbance to the soil ii) covering the soil as much as possible and iii) use of crop rotation

and growing crops together (mixing cropping) as they can benefit each other (Richard *et al.,* 2014). Generally, CA is associated with high and stable crop yields, reduced production costs, less use of water, labour, nitrogen and less energy use per unit food produced, reduced soil erosion , improved structure and increased social interaction (Ladha *et al,* 2016; Bekunda and Womeer, 2010).

As a country seeking to have sustainable development through agriculture, Tanzania recognizes the importance of managing of natural resources sustainably (URT, 2011), thus the need to promote CA. Practice of CA in the country started in Dodoma, Karatu, Arusha, Kilimanjaro, and Morogoro (Mkonda and He, 2017).

In Morogoro Sustainable Agriculture Tanzania (SAT) is at the forefront of promoting CA particularly on the slopes and ranges of the Uluguru mountains mainly due to massive depletion of natural resources in the community living around these mountains (SAT, 2020).

Furthermore, SAT's vision is to ensure that most farmers use acknowledged agro-ecological methods to improve their livelihoods conserve the environment and reduce pressure on natural resources. SAT expects to achieve the above through proper dissemination of knowledge, capacity building to farmers to enable their effective participation in the organic farming value chain and through collaboration with relevant partners in the public and private sector so as to strengthen their capacity in agro-ecology (SAT, 2020).

While CA has emerged as a solution to various environmental and climatic related challenges facing Tanzania's agricultural sector, limited knowledge is available on how gender gaps in agriculture can be addressed through. A study which conducted in Zambia revealed a 91% dominance of men compared to women's 9% when it came to implementation of agriculture CA projects (Hachiboola, 2016). Therefore, raising the question as to what extent organizations promoting CA for example, SAT integrate gender in the whole process. Generally, failure to integrate gender in the designing phase of a project/program results into outcomes that perpetuate gender inequality.

As an alternative to conventional agriculture, CA is expected to address a multitude of challenges including elimination of existing gender gaps in agriculture. Unfortunately, the extent to which new farming systems such as CA are contributing to the reduction of gender gaps through Gender Mainstreaming (GM) is largely undocumented (Kristjanso, 2017, Hachiboola, 2016, and Maher *et al.,* 2015). Therefore, the study on which the manuscript is based aimed at examining the extent by which the CA being promoted by SAT has reduced gender gaps among farmers Morogoro municipality and Morogoro district.

Knowing the existing association between CA and gender is of great importance, since its promoters can effectively ensure its introduction does not compound the already existing gender gaps in the agricultural sector. Therefore, the paper seeks to answer the following key questions i) What are key gender gaps in the designing, planning and implementation aspect of CA program related activities? ii) What is the participation level of men, women, youth and people living with disabilities in various CA project activities? iii) How does access to resources, information and opportunity differ among men and women? iv) How do training sessions, training materials, access to market, and agricultural information take care of various gender groups` needs? and v) Which CA practices are adopted more by men, women, youth and why?

Conceptual framework

The papers's conceptual framework is presented in Figure 1. Generally, it is hypothesized that through SAT's existing gender mainstreaming strategies in designing, planning and implementation enabled its CA project to introduce various interventions such as providing training, market linkage, value addition to agricultural produce and group formation to farmers. And that the provided interventions together with other factors such as norms, social hierarchy, demographic factors, economic factors institutional factors and legal parameters would determine division of labour in performing various productive and reproductive activities in the community

(March *et al.,* 1999). In addition, they will affect accessibility and control of productive resources such as credit, land, equipment, technology as well as the sharing of the benefits to be obtained by a household's use of resources i.e income, assets and basic needs. Moreover, it is expected that participation in the SAT CA project could contribute to reduction of gender gaps between various gender groups in the community.

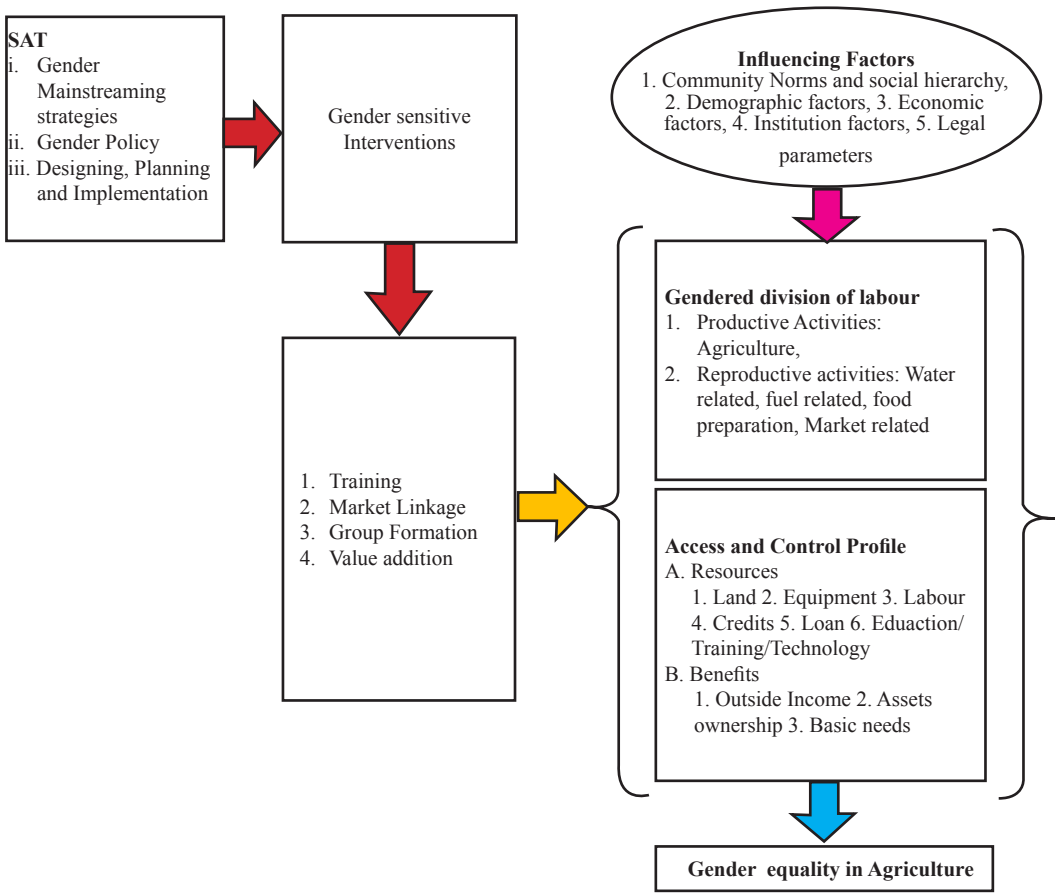

Figure 1: A Conceptual framework on how Planning Designing and Implementation of SAT activities in CA create gender equality in agriculture

Source: Adopted and Modified from Harvard Gender Analysis framework (1985)

Methodology

This study on which the manuscript is based was conducted, in Morogoro municipality and Morogoro district, in Morogoro region , the areas were chosen simply because they are the one among areas where SAT conduct its activities of promoting CA. Morogoro region it is in the eastern part of Tanzania, 196 kilometres (122 mi) west of Dar es Salaam, the country's largest city and commercial centre, and 260 kilometres (160mil) east of Dodoma the country's capital city.

This study adopted a Case study design. The selected case is Sustainable Agriculture Tanzania (SAT) project that is operating at Morogoro region: the use of SAT emanates from the fact that it is the leading organization in Morogoro promoting CA, and for so long it has recorded number of success and helped many farmers to get their eyes open and grab the opportunities provided by CA.

The study adopted the mixed methods approach whereby both qualitative and quantitative, data were collected from four villages where CA is being practiced as promoted by SAT, two from each of the study areas. Therefore, the respondents were

residents from Kiroka, Lamkamangala, Tulo and Ruvuma villages. Four focus group were conducted, one in each village. A questionnaire was administered to 60 farmers to obtain quantitative information to complement the qualitative data collected through the FGDs. In addition, two key informants from SAT were interviewed to understand how the organisation operates. Content analysis was used to analyse the qualitative information while quantitative information was analysed by employing descriptive analysis.

Results and Discussion

Socio-economic profile of the respondents

The majority (74%) of the respondents were females (Fig. 2), this interesting finding reveals a rise in women's participation in agriculture particularly, in CA. The findings concur with the findings which presented by World Bank in 2016 urging that in Africa agriculture has become more feminisation. Other socio-economic characteristics of the respondents are presented in Table 1, the average age of the farmers involved in CA was found to be 44.5 years, suggesting most of the farmers were mature adults, respondents age raged between 28 and 70 years therefore, the youth are also participating in CA, showing conservation agriculture can be practiced by all age categories in the society.

On average most respondents had basic primary education, which enables one to count, read and write, the average years of schools of the respondents in the study area was 5.9 years, with a maximum of 12 years for those who have attained secondary education, some respondents lacked formal education (Table 1).

Generally, farmers producing crops under the CA system farmed both field and horticultural crops: major crops include maize, paddy, tomato, strawberry, pepper, banana, cassava, pineapple, sweet potato, yams, cabbage, carrots, onions, avocado, and coconut. Nonetheless, most of the crops are produced based on the SAT CA guidelines. In addition, the crops were farmed by Apart by both males and females, however, paddy was mainly produced by females as said by one FGD participant women from Kiroka "*In paddy production women are the ones who make most of the decisions and most of the management*". The main reason being paddy farming is laborious and time-consuming thus, needing farmers' patience, a situation which males are not interested in as shown in the quote from another woman from Kiroka village "*if you talk to a man about producing paddy he will not understand you, because producing paddy is not an easy task, its farm preparation and management is laborious and time consuming: men are not capable of tolerating all these*". The argument was also supported by a male farmer

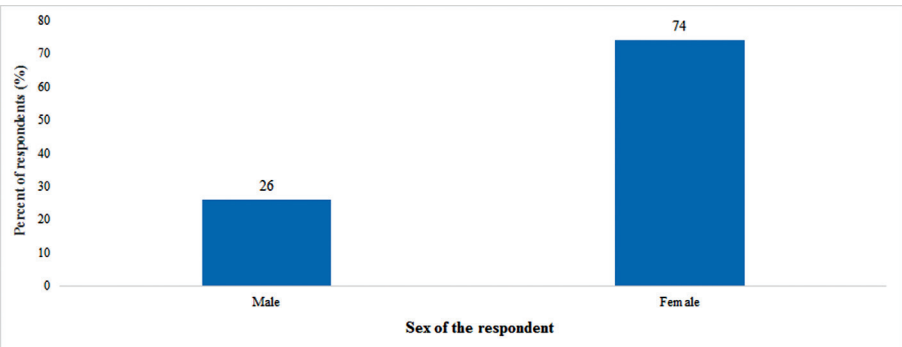

Figure 2: Distributions of sex of respondents (***Source:*** Survey data 2020)

Table 1: Age and Education of the respondents

Characteristics	Mean	Minimum	Maximum
Age	44.5	28	70
Year of Schooling	5.9	0	12

Source: Survey data 2020

from Kiroka village who said "*As regards paddy, it is not about lacking of time but, it is the toughness of the management practices*".

Farmers practicing CA also engage in other non-farm economic activities such as food vending, operation of kiosks, lending and borrowing money, village community bank (VIKOBA), livestock keeping mainly, local chicken. Therefore, the farmers are trying to use all the available opportunities to supplement their income to meet their households' cash needs. Economic activities such as food vending and lending and borrowing money are dominated by women (Table 2). These findings revealed that majority of the farmers do not have adequate time to get involved in off-farm income generating activities as they spend much time tied up with CA farming activities nearly throughout the year due to bimodal rainfall nature of Morogoro region.

Table 2: Non-farm/non-crop income activities which are undertaken by farmers

Activity	Percent of cases
Kiosk	22.4
Food vending	6.3
Lending/Borrowing money	20.2
VICOBA (Village community bank)	86.1
Livestock Keeping	37.9
Entrepreneurship (making home-made local soap)	11.6

Source: Survey data 2020

Access to production resources under Conservation Agriculture

Access to agricultural land and ownership

In the study villages the ownership of various means of production varied from one village to another, based on the type of main crop which is under production. Starting with land, which is the major means of production, the findings show that access to land for CA production is a challenge since there are some farmers who do not own any land but, rely on renting from others. Farmers on average owned 1.9 acres per household with a minimum of 0.5 acre and a maximum of 5ha (Fig. 3). In Kiroka village the majority of land under CA is owned by women as one woman from Kiroka village said "*... to a large extent most of the land under crop production under conservation agriculture is owned and managed by women*". The claim was supported by another woman from Kiroka who said "*as for me the land for paddy is owned by me, while that for maize is jointly owned with my husband*". is the observations are contrary to the other study villages of Ruvuma, Tulo and Lamkamangala, where most of the land under CA production is co-owned and managed by men and women (i.e. spouses/partners).

Access to productivity enhancing technologies

In CA, most of the production inputs such as fertilizers, herbicides, pesticides are self-made using natural things such as trees, grasses, crops remain, farmyard manure, and urine of animals such as rabbits. Farmers reported that all gender categories in their communities can have access to production inputs since they are locally available, as stressed by one widow from Ruvuma village who said "*... in this kind of agriculture, even those of us who do not have husbands have managed to produce crops since the inputs for production are self manually made using the trees and other crops which are abundantly available in our surroundings*''. Therefore, the only thing that determines how much to have is one's efforts in making and collecting the required materials from different places. Though they stated that the process of making these natural made inputs are time consuming and laborious and could be a challenge to old farmers and women who are also tied with other unpaid works at home and those tied up with other non-farm activities

Access to credits

The farmers' groups mobilized by SAT enable farmers to access credit through village

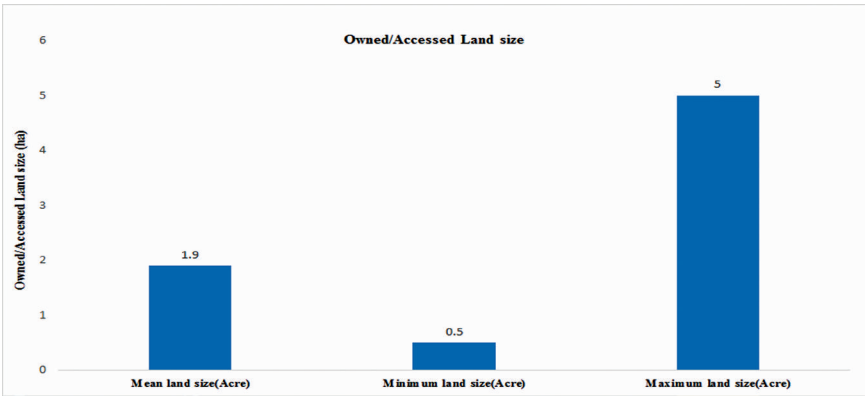

Figure 3: Land access under among farmers under conservation agriculture (*Source:* Survey data 2020)

community bank (VICOBA), which they establish within their groups. Thus, farmers can borrow money and repay at very low interest rates, as stressed by a women from Tulo village "*....another benefit that we get is access to loans from our village community bank from which I can borrow money to help finance some farming activities as well as paying school fees to my children or in case of any emergence and returning it latter, which could not be easy if we did not have this farmers group*". Accessed credit enables farmers to facilitate various activities with respect to production of crops and solve various cash needs challenges in their households.

Access to enabling services

Access to extension advisory services

Farmers from all the four villages pointed out that they all have access to agricultural advisory services which they get through various trainings offered by SAT. In addition, they acquire various techniques and knowledge thought farmer's networks which have been made possible by SAT in particular, the various conferences which involve farmers and various government and non-government stakeholders. They further reported that they also share the knowledge among themselves through their weekly meetings, when they meet to discuss various progress/challenges/way out for their groups, as reported by one man from Lamkamangala village as ''*....through SAT we all benefit from the provided trainings with respect to conservation agriculture*''.

Access to Market

Farmers from the study sites reported that they sell their produce through market channels offered to them by SAT, they also stated that they sell their produce for a premium price, which is nearly 75% more compared to that of conventional produce. All farmers regardless of their sex, age category or status were reported to selling their produce through the agents appointed by SAT, as stressed by a male farmer from Kiroka village *".... SAT linked us with the market channels for our produce something that give us assurance of selling our products, and avoiding the risk of lacking markets and getting loss"*, another male farmer from Ruvuma village said "*Currently, we have a contract to sell pepper to a certain Indian company for which without SAT and being in a group we could not get this benefiting market channel, and all of us has can take produce to these market outlet".*

Collective action/group mobilisation and Networking

Farmers engaged in CA reported to be members of farmers groups formed by SAT as supported by the quote from male framer from Lamkamangala *"...all farmers who are under SAT are group members, and this enables us to get help and various training collectively*", through these groups, farmers manage to do many things with respect to CA collectively. For example, access to advisory services in relation to crop production has become easy through groups, they also confirmed that they can access credit through VICOBA owned by themselves whereby one can easily borrow

which has enabled them to finance their various crop production activities.

Involvement in management practices in conservation agriculture

Generally, production of crops under the CA requires commitment since it is a time-consuming kind of production, from planting to harvesting. Thus, involvement in CA requires time to prepare most of the inputs using natural substances, and since most of farmers prepare these manually it has left them with a heavy burden. It was revealed that most of the activities are mainly performed by the family members since it is difficult for a single person to manage by himself/herself especially with large farms, as reported by a male farmer from Tulo village: *"….it is not easy for you alone to manage all farming activities in CA since they are too many and tedious, so we work as a family"*. Despite most of the activities being done collectively by family members, it was reported that it is the woman who spends more time on those activities compared to man. as pointed out by a female farmer from Kiroka village: *"... women are the ones who spend much time in doing various activities in the field, men spend less time compared to us, may be they are involved in producing crops which do not need much time and are easily managed"*

Decision making on production, marketing and on use of proceeds obtained from sales of produce from conservation agriculture

Decision making in production of crops under the CA system is vital since it determines the level of production of a given crop and the end use of the crop. In the study areas the decision making with regards to what crop should be produced, how much to produce and on which plot to use is mainly done jointly (i.e by spouses/partners), as pointed out by a male farmer from Ruvuma village noted; *"...I sit down with my wife and discuss what crop to produce"* the claim is contrary to experience from Kiroka village where decisions on which crop to be produced depends on who owns the land on which the crop is to be produced and who will participate more in managing the crop as pointed out by a female farmer from Kiroka village: *"...most of the decisions are made by women because they are the ones who labour more in producing crops"*

With regards to the use of the earnings derived from selling the crops under the CA production system it was reported that decisions are made jointly by spouses/partners as supported by the quote from a female farmer from Ruvuma village: *"... In the use of income, the majority of the decisions are made by husbands and their wives with the exception of those who are single or widows who decide themselves"*.

Performing of reproductive activities among farmers involving in CA

Findings from study area show that the reproductive activities such as fetching water, house cleaning, collection of firewood, cooking, taking care of children are mainly done by women with help from their children. Nonetheless, men also help their families in performing these activities though not often. Therefore, woman reported to lack time for leisure as pointed out by a female farmer from Lamkamangala village, *"….perhaps in collecting firewood husbands can somehow help but, for the remaining activities these are left upon the wives to perform"* another female farmer from Kiroka village said *"Under the CA we don't have leisure time as in the past, you just pray that you should not get ill, because you have to attend your field every day or every other day and still you have to perform the household chores, now we cannot even visit our relatives as frequent as it used to be in the past"*.

Role of SAT in CA through Planning and Designing and Implementing of Various activities

In the beginning of each year Sustainable Agriculture Tanzania (SAT) management sits down to plan and designing their various activities with regards to the CA, while doing this they also evaluate the activities of the past year. To ensure that their planning captures all gender categories they have the gender department with experts who advise on how best to have gender issues taken on board. Generally, SAT plan and design their programmes and activities in such

a way all groups in an agricultural society have an equal chance of being involved. The above is supported by the quote from SAT's Monitoring Evaluation and Learning Officer, *"...at the start of each year we do plan on how to design and implementing our activities, we also have gender department which ensures all groups even the less privileged groups in the society benefit from CA"* .

Gender departments and Advisory

In ensuring that SAT follows its policy in ensuring all categories of farmers are involved and benefit from the programmes implemented. Therefore, SAT established a gender department which is used as an instrument for checking and reminding the organisation on inclusion of all gender groups. The above is supported by the quote from SAT's, gender expert, *"the gender department is an instrument that checks and advices on how to solve any gender related matter with respect to implementation of SAT's various activities so as to ensure no gender group is left behind"*. In addition, SAT has employed all staff by giving equal chances to male and female applicants.

Implementation of the planned activities

In implementing and delivering their services to farmers in promotion of CA, SAT has enough human capital/experts who ensure all SAT registered farmers benefit from their services. In delivering services such as trainings, distribution of farm equipment and inputs such as irrigation equipment and chicken breeds; providing market linkage and organising farmers concerts, SAT gives equal opportunities to all farmers as pointed out by SAT's Monitoring Evaluation and Learning Officer,

"...we do have many experts who are good in matters pertaining to conservation agriculture and delivering of agricultural advisory services. In addition, we make follow up to see how farmers are doing with the knowledge we have impacted to them to solve the various challenges they encounter. Moreover, in delivering our services we make sure that all gender categories are involved by offering them equal opportunities in accessing to our services"

Conclusion

Conservation agriculture in Morogoro municipality and Morogoro district under the umbrella of SAT has bridged the existing gender gap in conservation agriculture, which were inequalities in accessing production resources, information and benefits accrued from selling of the produce. Both gender categories (i.e. male, female, youth, old and less privileged people) can obtain the necessary inputs of production through the knowledge that the have been equally acquired from SAT. Majority of decisions on what to produce, how much to produce, where to produce, as well as expenditures of income obtained from selling the produce are mostly co-jointly done by man and woman.

The level of cooperation in performing management practices and reproductive activities is very high in this kind of agriculture; Nonetheless woman is a little more burdened as she spends more time in performing both productive and reproductive activities as compared to men. In this kind of farming farmers are more united as they perform most of the initiatives collectively.

Recommendations

There should be public and private sector support from central and local government and other stakeholders in promoting the dissemination of CA as it removing inequalities in agriculture and empowering women. This should go along with ensuring that farmers are enabled to access the advanced cheap technologies to perform farming activities which will reduce burden of doing farming operations and will eventually rise the participation level of other farmers who are less tolerant to this kind of agriculture.

Acknowledgments

Authors wish to express their sincere heartfelt gratefulness to Sustainable Agriculture Tanzania (SAT) for their great cooperation and support in linking them with organic farming producers. Many thanks to farmers who involved in conservation agriculture under umbrella of SAT for their time and wonderful assistance they had given us during data collection particularly farmers from Kiroka village, Tulo village,

Lakamangala village and Ruvuma village.

References

Bekunda, M., Sanginga, N. and Woomer, P. L. (2010). Restoring soil fertility in sub-Sahara Africa. In; Advances in Agronomy (Vol. 108, pp. 183-236). Academic Press.

Hachiboola, P. (2016). Gender Mainstreaming in Conservation Agriculture: lessons from conservation agriculture Programme II in Mapanza, Southern Zambia.

Huyer, S. (2016). Closing the gender gap in agriculture. *Journal of Gender, Technology and Development,* 20(2): 105-116.

Kristjanson, P., Bryan, E., Bernier, Q., Twyman, J., Meinzen-Dick, R., Kieran, C., Ringler, C., Jost, C. and Doss, C. (2017). Addressing gender in agricultural research for development in the face of a changing climate: where are we and where should we be going?. *International Journal of Agricultural Sustainability,* 15(5): 482-500.

Ladha, J.K., A.Tirol-Padre, C.K. Reddy, K.G. Cassman, S.Verma, D.S. Powlson, C. van Kessel, D. de B. Ritcher, D. Chakraborty, and H. Pathak (2016): Global nitrogen budgets in cereals: A 50-years assessment for maize, rice, and wheat production systems. Scientific Reports 6: 19355.

Maher, J.A. N.E., Wagstaff, P. and o'Brien, J. (2015). Empowering women through conservation agriculture: rhetoric or reality? Evidence from Malawi. Conservation Agriculture in Subsistence Farming: Case Studies from South Asia and Beyond. CABI Publications, UK. pp226-238.

March, C., Smyth, I.A. and Mukhopadhyay, M. (1999). A guide to gender-analysis frameworks. Oxfam.

Sustainable Agriculture Tanzania (SAT) (2020): Annual report 2020. Morogoro, Tanzania.

United Nations. (2015) . The world's women 2015. New York: United Nations, Department of Economics and Social Affairs, Statistics Division.

United Nations. (2016). The Sustainable Development Goals Report. New York

URT (2011). National website [http://www.tanzania.go.tz/home/pages/92] site visited on 25th May 2019.

Wekesah, F.M., Mutua, E.N. and Izugbara, C.O. (2019). Gender and conservation agriculture in sub-Saharan Africa: a systematic review. *International Journal of Agricultural Sustainability,* 17(1), 78-91.

World Bank, (2016). LAC Poverty and Labor Brief, February 2014: Social Gains in the Balance-A Fiscal Policy Challenge for Latin America and the Caribbean. The World Bank.