



# **Social Capital and Expenditure on Farm Inputs: A Case Study of Paddy Farming Households in Kilombero Valley, Tanzania**

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## **Author's contribution**

*The sole author designed, analyzed, interpreted and prepared the manuscript.*

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## **ABSTRACT**

Social Capital refers to the networks of relationships that are built on trust to facilitate collective action in a community. The role of social capital in enhancing various aspect of farm production has become increasingly important. This article aims at examining the effect of structural and cognitive dimensions of social capital on expenditure on farm inputs in Kilombero Valley, Tanzania. Data was collected in the 2013/14 farming season in five selected villages of the study area from 309 randomly selected households. A structured questionnaire was the main tool for data collection. Analysis involved the use a Tobit regression which considers censored dependent variable. The results shows that farm households in Kilombero have cooperative attributes based on strong ties, kinships and networks. Households with high membership density and which invest on trust relationships were more likely to have increased spending on farm inputs. The other cognitive dimension of social capital, social cohesion, is particularly relevant in ensuring farm labour availability. The results generally support hypothesis that, social capital relax farm input liquidity constraints. Formulation of rural development strategies should thus aim at promoting formation of social groups and networks, which may address input liquidity concerns.

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## **1. INTRODUCTION**

Livelihoods in Sub Saharan Africa largely depend on subsistence crop cultivation. As a result measures to improve welfare of rural households often target at interventions that enhance farm productivity. Strategies have been set to facilitate increased availability of essential farm inputs among poor subsistence farmers who cannot afford various aspects of farm mechanization including farm inputs use. In addition, constraints in available cropping land due to unprecedented population growth calls for more intensification. Farm intensification requires more spending of inputs such as fertilizer, improved seeds, herbicides and pesticides. Therefore, measures that ensure adequate and affordable provisions of essential inputs are imperatives in the context of poor subsistence farming in Sub Saharan Africa.

One measure that has been adopted to facilitate provision of inputs is supply of inputs subsidy. Subsidy provisioning albeit does not have universal coverage and often target a few selected farm inputs. For example, in Tanzania, the now defunct National Agricultural Voucher scheme (NAIVS) only focused on improved seeds, and fertilizers for selected crops. However because of the prevailing cost outlay only a handful of farmers benefited from the scheme [1] which has also been introduced in Malawi. Even in the presence of free market economy, where private entities supply farm inputs, the inputs market in most rural Africa is rather imperfect [2,3].

Small holder agriculture in the study area (Kilombero Valley) is dominated by paddy production in which cultivation is already at a limit of land frontier, making land expansion to be almost impossible. Larger part of this fertile valley has been conserved and protected as wetland site of global significance under Ramsar convention. This is a United Nations convention aiming at protection of wetland of global significance and improving livelihood of surrounding communities [4]. Moreover population increase impose further limitations in terms of farm expansion. While Kilombero Valley is one of the largest rice producing areas of Tanzania, it remains the least productive compared to other wetlands [5]. In the situation where by only 5 of Tanzanian rice farmers use improved seeds and fertilizers [6,7], liquidity

constraints seem to be a major hurdle that limit input expenditure and use not only in the study area but also in other rice producing region of Tanzania. Without farm intensification and use of essential inputs, farming may lead to land degradation and poor yield, making it necessary to practice extensive cultivation in marginal land [8], which is a serious concern in Tanzania's wetlands including Kilombero valley [9]. Social capital may be a possible intervention among asset poor households in attempt to enhance farm input usage and thus increasing productivity.

Social capital simply defined as relationships and networks built on trust, is one of the few available assets that poor people possess as they are devoid of incomes, education and financial assets [10]. Social capital reduce transaction costs and relax and enhance information asymmetry when it comes to a number of agricultural production and marketing decisions [11] including expenditure on farm inputs. It is through networks and groups from which poor households may acquire input credits and hence enhance their expenditure on inputs and intensify their farming. It is important however to note that, the influence of social capital should reasonably depend on the nature of input and type of social capital dimension. This is particularly relevant in the context of study area where essential inputs required by paddy farmers are herbicides and farm labour which are crucial in intensive paddy farming practiced. For example, farm inputs that can be substituted for human labour may require different form of social capital compared to inputs that have no labour substitute.

The existing literature on the role of social capital on several agriculture practices, e.g. in adoption of agriculture technology, [2,12,13] or use of input such as fertilizer [14] do not disaggregate structural and cognitive social capital dimensions which should supposedly have differing effects on sets of agricultural practice. In addition, based on review of available literature, the specific influence of social capital on herbicide and farm labour as farm inputs is a subject that has been rarely investigated at least in the context of Sub Saharan Africa. In attempting to fill this literature gap, this study examines the role structural social capital (association membership) and cognitive social capital (conceived as social trust and cohesion) on spending on both herbicides and farm labour.

## **2. THE EFFECT OF SOCIAL CAPITAL ON FARM INPUTS EXPENDITURE AND USE**

Social capital is a multi dimensional concept and has gained increasing interests in social science investigations. It simply means a network of relations in which individuals are embedded [15, 10]. Social capital is built on associations built on trust, norms, reciprocity and social cohesion that facilitate collective actions. The central argument is that, due to close cooperation and shared trust, transaction costs are reduced and individuals in these networks acquire benefits in terms of resources. For example one may have access to credits by virtual of being part of networks or association groups and use this credit to finance farm inputs.

A handful of studies have examined the effect of social capital on various aspect of agriculture production. [13] has attributed adoption of new technology to bonding and bridging social capital. That is, bonding in terms of relationship among individual in the same community and between individual with different power relationship matters on several aspects of technology adoption. Viewing social capital in terms of bonding (horizontal relationship and bridging (vertical relationship has been one of the trajectory of conceptualizing social capital for a number of researchers [16,10]. In attempt to capture less addressed cognitive dimensions of social capital, this paper deviates from bonding/binding social capital trajectory and focus on social trust and social cohesions.

Being a multidimensional concept, social capital has adopted other conceptualizations apart from vertical or horizontal bonding/binding approaches. According to [11] social capital can be distinguished into two dimensionally distinct components, namely structural and content (cognitive). Structural dimensions includes more tangible elements of group memberships and networks [15,8] where as cognitive dimension refer to rather abstract attributes of social trust, social cohesion inherent in social capital. [17] and [18] consider these cognitive aspects as key ingredients in social capital. Consistent with this trajectory of understanding social capital, [19] and [20] found that community participation in networks and groups in rural Georgia lead to more sustainable agricultural practice. In the context of rural Africa, [2] and [21] have shown a positive association between association membership and fertilizer use in Tanzania and

mulching in Uganda respectively. The argument behind these findings is that, networks and groups facilitate availability of resources among members. Through these resources that are invested in these groups, individual can accrue benefits in terms of both credit to finance input and information on availability of farm inputs in rural areas. Of course, considering prevalence of information asymmetry for agricultural information, networks and groups are important. It should however be noted that, with broad and diverse varieties of agricultural technology and practice including input expenditure and use, disaggregation of social capital roles matters. This paper moves away from traditional discussion that focus on fertilizer see [2] to a less researched but yet essential farm inputs in the study areas which are herbicides and labour costs.

Most of studies conducted in African small farmers contenxt have focused on more objective, and tangible merasure of social capital, i.e. group memebrship and networks. Nonetheless, it is argued from earlier theorist [22,15] that, subjective element of social capital such as social turst and social cohesion are relevant since they determine social connectedness and investments made in social capital. Associational membership as a standard measure of social capital however, does not certainly capture an important aspect of social connectedness [20]. It is expected that by including social trust and social cohesion the coverage in this study will bring together both structural and cognitive dimensions of social capital.

## **3. METHODS OF STUDY**

### **3.1 Study Area and Sample Selection**

Predominance in paddy cultivation formed the main basis of selecting the study area, Kilombero Valley, located about 300km from Tanzanian commercial city of Dar es Salaam. This is one of the major rice producing area of Tanzania with a total coverage of 11 600 km<sup>2</sup> [23]. Following [24], two strata were identified based on land resource availability and remoteness. Two villages of Mwaya and Lumemo were selected to represent resource poor, accessible location and three village of Mngeta, Malinyi and Lupilo were selected to represent resource rich, more accessible rural locations.

Stratification was further imposed on each selected village. The stratification and sampling

at this stage followed the following procedure. First, participatory wealth ranking (PWR) was conducted in each of the five villages to form three distinct wealth categories which were poor, middle and non-poor. Each wealth group formed a stratum to which, a "probability proportionate to size" (pps) random sampling of the households was carried out. At the village level, 5% of the households were selected. Being a cross sectional study, the purpose was to focus on paddy farming households, i.e. those who had at least cultivated paddy during 2012/13 and 2013/14 seasons. In each village a list of households available from village register was used as a sampling frame. The sample size that was employed was thus 309.

### **3.2 Methods of Data Collection**

Data collection involved two phases. Phase one employed largely, a rapid rural appraisal technique to collect village level data and to conduct participatory wealth ranking. Village and sub village leaders were interviewed to collect some basic information which was then used to consolidate the main survey questionnaire. An interview guide was used in this exercise.

The second phase involved household level survey which was conducted between February-May 2014. Households' heads were interviewed with structured questionnaire. Households' information collected included households' composition and characteristics, social groups and networks, type and amount of expenditure on farm inputs as well as the sources of income.

### **3.3 Measurement of Social Capital**

Measurement of social capital rises a key methodological concern. It is such a multifaceted concept with different interpretations such that a single comprehensive definition that should have simplified its measurement is hardly available in literature. The selection of indicator for social capital measurement should in addition based upon other issues such as the geographical area or the sector studied [25]. In recognition of this methodological challenge the Word bank [26] has provided an integrated questionnaire for the measurement of social capital (SC-IQ) that should serve a purpose of measuring social capital in developing countries. The questionnaire developed which was adapted in this study captures information about "groups and networks; trust and solidarity; collective action and cooperation; information and communication; social cohesion and inclusion;

empowerment and political action" [26]. Other empirical studies [e.g. 27, 28] that have been conducted in developing countries have adapted the SC-IQ questionnaire to serves their specific cases.

Group membership was measured as membership density indicating number of formal and informal groups to which a head of household and a spouse belong. For social trust, three items were developed each having a scale range between 1, low level of trust to 5, high level of trust. These items measured trust at fellow villages, government leaders and village leaders. These indicators have also been used in another study that examined social capital in peri urban Tanzania [29]. The scores for each item were then aggregated to obtain a composite score for trust. The same approach was used to measure indicators for social cohesion. One of the items on social trust states 'fellow villagers always able to assist in situation of hardship'. In these items, the score of 1 indicated lowest level of solidarity and 5 highest level of solidarity. The computation of a composite social cohesion indicator followed the same procedure as one for trust as described earlier.

## **3.4 Hypotheses and Estimation Procedure**

### **3.4.1 Hypotheses**

Social capital level is assumed to affect households' expenditure on inputs. However, this relationship depends on a particular dimension of social capital and the nature of input described. Social capital theory [14, 15] predicts that, social trust as a social capital cognitive dimension may drive households to engage in several potential networks and groups from which households may acquire credits. Credits acquired may then be used as a source of capital investment for purchase of inputs. In the same vein, group membership may result into more networks and possibility of acquiring capital through credits from other group members. Households may thus capitalize on these credits to have increased spending on input. Hence, it is hypothesized that both social trust and group membership have positive effect on expenditure on inputs. The empirical question that still abounds is whether the effect of both social trust and group membership is uniform across all input categories i.e. herbicides and hired labourers.

Social cohesion drives more unity and solidarity either within or outside networks or groups [18].

Individuals who have high perceived or actual social cohesion may respond more readily to liquidity concern when it comes to input spending. This is because of close interactions in communities built on kinships and familiar relations. Social cohesion matters in situation of adversity brought about by imperfect credit and input market. Hence, it can be hypothesized that, social cohesion is positively related to spending on inputs.

The practice of both, spending and use of inputs is related to awareness and sensitization which is the question of level of formal education of the household head. Because of enhanced knowledge on better farming practice including input usage, the expected direction between education and input expenditure is positive. Expenditure of input could also be related to a number of adult household members, dependency ratio, and off-farm income earned. Households with large number of adult often may employ labour to substitute for input. As a result, they may have reduced input spending. However, this may not apply in the case of farm input expenditures that doesn't have labour substitution such as weeding. On the other hand, households with alternative income sources (off-farm income) will invariably earn more income that can be invested in expenditure input as predicted in farm-off-farm linkages theory [30]. Village location dummy is also specified and expected that, resource rich, remotely, located village are negatively associated with expenditure on inputs. This is because farming in these villages will be less intensified as a result of availability of ample farming land.

### **3.4.2 Estimation procedure**

Estimation of inputs expenditure involves a two stage decision making problem for a household. The first is a discrete decision of whether or not the households had actually spent on farm inputs, whereas the second is a continuous decision of how much income is spent on input expenditure conditional on a positive first decision. If unobserved household attributes affects both decisions of whether to spend on farm inputs or not (discrete) and amount spent per hectare (continuous), the error terms in both estimations will be correlated. In addition, household's expenditure on input is a case of cornered solution in which Ordinary Least Squares (OLS) regression will yield biased parameter estimates [31]. The two decision making processes may be affected by different sets of variables. The appropriate econometric

estimations for this sort of decision problem are Tobit and Two part models (TPM). Because I make an assumption that the two process are determined by the different processes (i.e. variable that determine discrete choice may not necessarily determine the second decision on amount of input to spend), then a Tobit is model of choice.

The estimation procedure can simply be modeled as follows:

$$Y_i^* = \beta_0 + \beta_n X_i + \varepsilon_i$$

But  $Y_i = \{Y^* \text{ if } Y^* > 0\}$  and  $\{0 \text{ if } Y^* < 0\}$

$Y_i^*$  is a latent variable for input expenditure in the  $i^{\text{th}}$  household.  $X_i$  represents independent variables that are expected to influence input expenditure as described in section 3.3 and table 1.  $\beta_0$  is constant term and  $\beta_n$  is a parameter under estimation and  $\varepsilon$  is the error term which is assumed to be normally distributed, with a zero mean and a constant variance. For different sets of independent variables the equation becomes,

$$Y_i^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n + \varepsilon \dots$$

## **4. RESULTS AND DISCUSSION**

### **4.1 Descriptive Statistics of the Sample**

Descriptive statistics of dependent and independent variables that have been used in regression model are presented in Table 1. The aim of this preliminary analysis is to get an overview of the sample. Farm inputs are categorised into herbicides and hired labourers. Generally expenditure on hired labourers is relatively higher (with the mean expenditure of 52,320 Tshs) compared to herbicides. This is expected due to intensive nature of farming and necessity of human labour even for activities such weeding since, the herbicides used are selective to particular species of weeds. In essence, this indicates the cost of hiring labour depends on the nature of investment in social capital and familial relations. Generally, group participation is rather modest with the average membership of 1.89 groups per household. It should be noted that, there is cost associated with membership which has not been captured in this analysis. This is monetary cost associated with becoming a member, imposes restrictions for poor households. Among cognitive indicators of social capital, social trust level is comparably higher (with average of 6.4) than social cohesion as Table 1 shows. The households size is 4.9,

which is more or less similar to one reported on Tanzania national statistics of 5.1 [32]. The other interesting variable that deserves attention is participation in off-farm employment. The reported 71.8% of participation rate is close to a rate of 69.5 reported by [33] in semi arid rural districts of Tanzania. This higher rate of households participation might reflect higher social capital levels.

**4.2 Social Capital Effect**

The Tobit model (Table 2) provides estimation of social capital effect on input expenditure. Separate estimations were run for labour cost and herbicides. Due to potential threat of endogeneity the interpretation is rather based on direction of associations rather than magnitude in terms of marginal effects. This should suffice in terms of understanding the role of social capital on farm inputs expenditure. Generally, the model shows that, different social capital attributes have different effect on these two separate inputs under estimation.

**4.2.1 Social cohesion and expenditure on herbicides and farm labour**

Social cohesion is positive and significant at 5% in the herbicide model but negative in the labour cost model as shown in Table 2. This implies that, social cohesion is associated with increased expenditure on herbicides and it leads to less costly labour. This is not a surprising observation as social cohesion leverage availability of

herbicides. It reduces transaction cost for purchasing input as predicted in social capital literature [17]. On the other hand, it is possible to argue that people in Tanzanian rural communities live together in close cooperation as relatives to the extent that in Kilombero this solidarity formed labour sharing arrangement. This was particularly observed in phase one of data collection through interviews and discussion with village leaders. This pattern of social capital formation that involves labour sharing has got historical root in rural Tanzania. Tanzanian adopted political philosophy of *Ujamaa* (African socialism) which insisted on the brotherhood. The solidarity and cohesion facilitate informal arrangement of sharing labour particularly during time of intense farm activities such as weeding season. In Kilombero, it is not uncommon to find people working in farm owned by those who share strong kinship ties. In most cases, farm labour is remunerated by in-kind payments. For example, one may be just work for the mere few kilogrammes of maize meal or rice. In addition during cash shortage peak farming season some of households face hunger thus are desperately forced to work on other peoples' farm.

**4.2.2 Membership density and Input expenditure**

Results (Table 2) indicate positive association between group memberships and expenditure in both labour and herbicides. The same set of explanation can be offered to explain influence of group membership in both dependent variables.

**Table 1. Description of Variables (n=309)**

<b>Variable</b>	<b>Mean (percent/SD)</b>	<b>Description</b>
Expenditure on herbicides	18,955 (4,265.9)	Amount of money (Tshs/ha) spent on purchasing herbicides in 2013/14 season
Expenditure on hired labour	52,320 (60,548.9)	Amount of money (Tshs/ha) spent to hire labour for household farm in 2013/14 season
Membership density	1.89 (1.58)	No of groups the households and spouse belongs
Social trust	6.4 (2.5)	A composite variables obtain from three likert items that capture perception of trust towards, fellow villages, village leaders and central government leaders
Social Cohesion	5.9 (1.8)	A composite variable obtained from three likert scale items that capture level of solidarity and feelings of safety in a village.
Education of household head	6.7 (5.6)	Number of formal schooling years of the household head
Age	43.7 (15.5)	Age in completed years of household head
Household size	4.9 (1.9)	Number of household members
Mwaya/Lumemo	109	Dummy for household location in Lumemo or Mwaya
Off-farm employment	71.8%	Dummy for household engagement in off-farm employment
Remittances	209,267 (12,334)	Dummy for households that received remittance (Tshs) in 2013

*N.B: All expenditure are in Tanzania shillings (Tshs). During time of data collection, the exchange rate was 1USD=1,635 Tshs; SD = Standard deviation*

**Table 2. Results of the Tobit Regression for farm inputs expenditures**

Variables	Farm labour costs coefficient (S.E)	Herbicides costs coefficient (S.E)
Social Trust	-367 (451)	-346 (448.3)
Social cohesion	1534** (657.6)	1571** (653.9)
Group membership	1670** (764.4)	61074.3** (22096)
Household size	18193*** (5236)	17831.6*** (5204.8)
Crop shock	-19451 (22279)	-23515 (22182.2)
Education of household head	11241*** (3781)	-4087.7 (20929)
Membership to financial institution	66878.8*** (22153)	12149** (3774)
Age of household head	6402 (7097)	7350 (7070.4)
Off-farm income	0.013** (0.006)	1621.7** (759.5)
Remittance income	-0.137 (0.120)	0.012 (0.006)
Mwaya/lumemo dummy	69962*** (21578.4)	-0.143*** (0.119)
Paddy production in 2013/14	-309.1.(370.4)	70997 (21474)
Constant	-318258 (82825.5)	-311641 (82258.5)

Note: \*\*\* statistical significance,  $p < 0.01$ ; \*\* statistical significance,  $p < 0.05$ ; \* statistically significance,  $p < 0.10$

Most of farmers in Kilombero have membership to the so called Village community banks (VICOBA). One can have membership in several VICOBA in which members pays fixed amount of money as weekly contributions depending on the agreed terms and income. It is largely through these associations that farming households acquire credits. The credit acquired is diverted to paying for labour (during the peak of farming season) and purchase of herbicides. This particular finding on positive interrelation between group membership and input usage and spending is consistent with other studies that have observed positive impact of social capital on agricultural inputs [34, 35]. Within groups, member access credit which is used in addressing farmers input liquidity concern. This role of social capital seems to go beyond addressing input spending as it enhance other farm production activities in Tanzania as noted by [14], whose analysis focused on associational membership, as a social capital measure.

Results for other control variables behave as expected. Household size is positive and significant at 1% in both models implying large households are associated with more input spending on herbicides and labour cost. On spending on farm labour hiring, this finding is albeit counterintuitive. It was expected that large households should have more labour available hence lowering labor costs. The findings may probably imply large households are a reflection of more children who may not provide reliable supply of labour. For countries with high fertility such as Tanzania, households do reasonably have large number of dependent individuals. As expected membership to financial institution increase the likelihood of more input spending. It

should be obvious that, these institutions may facilitate availability of credit that can be reinvested on input. It has also been shown that households with off-farm income source have higher expenditure in both labour and herbicides. This observation though may need a caveat, as it may points to possible endogeneity between off-farm income and input use. That is, reverse causality may be the case as households with more input expenditure are likely going to have more productivity and farm income. High farm income may be invested in off-farm activities and hence more off-farm income. However, in Kilombero this is unlikely since farm income (from rice marketing) do not correlate with time of prevalence of off-farm activity due to nature of paddy production. In addition, evidence from [24] study in Kilombero Valley suggested that farm income is rarely invested on off-farm activities. Hence, whatever the threat of endogeneity caused by off-farm income, will not have significant effect in this study's results.

Finally results show the relevance of location factors on input expenditure. Table 2 shows a dummy for household location in Mang'ula/lumemo (Man/lum) is positive and significant. As it has been pointed out, villages sampling and selection was based on remoteness criteria expecting that village in a more developed urban areas to be land constrained leading to more intensifications in terms of expenditure on inputs.

In summary, high level of social capital, both in terms of cognitive and structural dimensions is associated with more spending on inputs. However this does not always apply to all types of inputs. Expenditure on hired labour decrease with social cohesion indicating strength of

communal ties in supporting others farm works. Generally it can be deduced that, returns in social capital in a setting of paddy farming households might be as important as returns in other physical capital.

## 5. CONCLUSION

Social capital has been associated with a number of agricultural practises, from adoption of agriculture technologies to use of fertilizer. This paper has examined separately, the influence of structural and cognitive dimensions of social capital on expenditure on two selected farm inputs among paddy farming households. Results presented are consistent with evidence provided in other literatures, that social capital has significant impact on enhancing spending on farm input in Tanzania [14]. The evidence here however suggests that, disaggregating dimensions of social capital matters in understanding its influence on farm inputs. Group membership does affect costs incurred on purchasing herbicides and hiring farm labour. This may indicate that, investing social capital resources in groups does not result in support in terms of labour rather it provides liquidity for investing in paying for labour and herbicides. The findings from economic estimations have also emphasised the relevance of social cohesion in enhancement of expenditure on farm inputs. In essence, this expenditure implies more farm productivity. It should however be noted that, social cohesion has negative effect on spending on farm labour. Informal labour sharing built on solidarity is important in reducing labour costs and ultimately improving productivity. In theory these findings show different contributions of two dimensions of social capital (structural and cognitive dimensions) on two different forms of farm inputs, an observation that recognises heterogeneity in social capital concept.

The analysis here also provides evidence on the relevance of other socio-economic attributes on farm input expenditure. For example estimation provided indicates the positive influence of household head education, membership to financial institution and household size on expenditure on input. It is recommended that agriculture development policies and strategies that will enhance group formations are relevant in the contexts where farm input market is poorly functioning such as in the study area. Local government should facilitate and encourage formation social networks and associations which will enhance social capital level, and leverages

accessibility of liquidity for poor farming households.

## COMPETING INTERESTS

Author has declared that, no competing interests exist.

## REFERENCES

1. Todd B, Kirama S, Selejio S. Uganda strategy support programme. The supply of inorganic fertilizer to smallholder farmers in Tanzania. International Food Policy Research Institute (IFPRI). Policy note; 2013.  
Available:<http://www.ifpri.org/sites/default/files/publications/uspprn17>  
(site visited on 2/05/2016)
2. Isham J. The effect of social capital on fertilizer adoption: Evidence from rural Tanzania. *Journal of African Economies*. 2002;11(1):39-60.
3. Mathenge M, Smale M, Tchirley D. Off-farm employment and Input Intensification among Small holder Maize Farmers in Kenya. *Journal of Agricultural Economics*. 2015;66(2):519-530.
4. Mombo F, Speelman S, Huylenbroeck G, Hella J, Munishi P, Moe S. Ratification of the Ramsar convention and sustainable wetlands management: Situation analysis of the Kilombero Valley Wetlands in Tanzania. *Journal of Agricultural Extension and Rural Development*. 2011;3(9):153-164.
5. Minot N. Fertilizer policy and use in Tanzania. Presented at the Fertilizer Policy Symposium of the COMESA African Agricultural Markets Programme (AAMP) Livingstone, Zambia 15 June 2009; Available:[http://fsg.afre.msu.edu/aamp/seminar\\_2/seminar\\_3\\_tanzania](http://fsg.afre.msu.edu/aamp/seminar_2/seminar_3_tanzania)  
(site visited on 13/01/2016)
6. McCartney M, Rebelo L, Sellamuttu S, de Silva S. Wetlands, Agriculture and Poverty Reduction. International Water Management Institute (IWMI), Colombo Sri Lanka. 2010;18.
7. United Republic of Tanzania (URT). Tanzania Public expenditure review. National agriculture voucher scheme (NAIVS), February; 2014.  
Available:<http://www.mof.go.tz/mofdocs/PER/PER%20reports>  
(Site visited on 8/07/2015)



8. Lin N. Social capital: A theory of social structure and action. Cambridge University Press, Cambridge, UK; 2001.
9. Kangalawe R, Liwenga E. Livelihoods in the Wetlands of Kilombero Valley in Tanzania: Opportunities and Challenges to Integrated Water resource Management. *Physics and Chemistry of the Earth*. 2005; 30:968–975.
10. Woolcock M. The place of social capital in Understanding Social and Economic Outcomes. *Canadian Journal of Policy Research*. 2001;2(1):11-17.
11. Lyon F. Trust, networks and norms: the creation of social capital in agricultural economies in Ghana. *World Development*. 2000;28(4):663-681.
12. Sangida P, Kamugisha R, Adrienne M. Conflict management, social capital, and adoption of agroforestry technologies: empirical findings from the highlands of southwestern Uganda. *Agroforestry Systems*. 2007;69(1):67-76.
13. Njuki J, Mapila M, Zingore S, Delve R. The dynamics of social capital in influencing use of soil management options in the chinyanja triangle of Southern Africa. *Ecology and Society*. 2011;13(2):9.
14. Narayan D, Pritchett L. Cents and sociability: Household income and social capital in rural Tanzania. *Economic Development and Cultural Change*. 1997; 47:71–97.
15. Putnam RD. *Bowling alone: The collapse and revival of American community*, University Press, Princeton; 2000.
16. Portes A. The two meanings of social capital. *Sociological Forum*. 2000;15(1):1–12.
17. Jamaat JG. Social cohesion as real-life phenomenon: Assessing the explanatory power of the universalist and particularist perspectives. *Social Indicators Research*. 2011;100:61–83. Available:<http://dx.doi.org/10.1007/s11205-010-9604-9>
18. Cloete A. Social cohesion and social capital: Possible implications for the common good. *Verbum et Ecclesia*. 2014; 35(3)
19. Cramb RA. The role of social capital in the promotion of conservation farming: The case of land care in the South Philippines. School of Natural and Rural Systems management, The University of Queensland, Queensland, Australia; 2004.
20. Munasib A, Jordan J. The effect of social capital on the choice to use sustainable agricultural practices. *Journal of Agricultural and Applied Economics*. 2011; 43 2:213–227.
21. Katungi E. Social capital and technology adoption on small farms: The case of banana production technology in Uganda. PhD thesis, University of Pretoria; 2006.
22. Coleman JS. Social capital in the creating of human capital. *American Journal of Sociology*. 1988;94:95–120.
23. Kato F. Development of a major rice cultivation area in Kilombero Valley, Tanzania. *African Study Monography, Supplement*. 2007;36:3-18.
24. Msinde J, Urassa J, Nathan I. Off-farm employment and income poverty in favourable agro-climatic areas of Tanzania: Evidence from Kilombero Valley. *Developing Country Studies*. 2016;6(6):47-3.
25. Grootaert C, Van Bastelaer T. The role of social capital in development. An empirical assessment. Cambridge University Press, Cambridge, UK; 2002.
26. Grootaert C, Narayan D, Jones V, Woolcock C. Measuring social capital. An intergrated questionnaire. World Bank working paper no 8. The World Bank, Washington D.C. 2004;32 & 37.
27. Ha NV, Kant S, Maclaren VW. The contribution of social capital to household welfare in a paper-recycling craft village in Vietnam. *Journal of Environment and Development*. 2004; 13(4):371-399.
28. Msinde J. What role for social capital on crop income shocks? A case of paddy farming Households in Kilombero Valley, Tanzania. *International Journal of Arts and Humanities*. 2017;9(1):813-829.
29. Lanjouw P, Quizon J, Sparrow R. Non-agricultural earnings in peri-urban areas of Tanzania: evidence from household survey data. *Food Policy*. 2001; 26:385–403.
30. Haggblade S, Hazell P, Reardon T. Introduction. In: *Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World* (Edited by Haggblade, S., Hazell, P. and Reardon, T.) JohnsHopkins University Press and IFPRI, Baltimore. 2007;3-25.

31. Wooldridge J. Introductory econometrics. A Modern Approach, 4<sup>th</sup> Edition. South-Western Cengage Learning, United States; 2009.
32. National Bureau of Statistics (NBS). Tanzania Household Budget Survey 2011/12. Dar es Salaam, Tanzania; 2014.
33. Katega I, Lifuliro S. Rural non-farm activities and poverty alleviation in Tanzania: A case of selected Villages in Chamwino and Bahi Districts in Dodoma Region. Research Report 14/7. REPOA. Dar es Salaam. 2014;34.
34. Husein A, Loos T, Khalid, Siddig HA. Social capital and agricultural technology adoption among Ethiopian farmers. American Journal of Rural Development. 2017;5(3):65-72.
35. Edillon RG. Social capital and the decision to adopt new technology among rice farmers in the Philippines. Philippine Journal of Development. 2012;37(1).

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