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Research Application Summary

Gender based impacts of climate change and adaptation strategies in Raya Azebo District, Tigray Region, Ethiopia

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Abstract

Climate change is a global phenomenon whose negative impacts are more severely felt by poor people in developing countries who rely heavily on the natural resource base for their livelihoods. The objective of this study was to analyze the impact of climate change on gender assets and adaptation strategies in Tigray region, Ethiopia. Data were collected from 75 male and 75 female headed households. Content analysis was used to analyze the impact of climate change on gender asset and their choice of adaptation strategies whilst separate probit model was used to analyze the determinant factors that influence farmers' adoption of adaptation strategies to climate change. Results show that climate change affects both households' types, but poses more threat to female headed households. This is due to lack of access and control over resources by these households. The choice of adaptation strategies was also different between female and male headed households. As compared to female headed households, male headed households adopted more adaptation strategies. Those strategies include livelihood diversification, crop diversification and use of drought resistant and short growing crop varieties, adjusting and shifting of planting dates, temporary migration and planting trees. In addition, probit model results showed age, sex, education, family size, farm size, access extension service, participation in social organization, participation in off farm activity, livestock holding, farming experience and distance to the nearest market as major determinants that significantly affect farmers' choice of adaptation of different strategies to climate change.

Key words: Adaptation strategies, asset, climate change, gender

Résumé

Le changement climatique est un phénomène mondial dont les effets négatifs sont plus fortement ressentis par les populations pauvres des pays en développement qui dépendent largement de la base des ressources naturelles pour leurs moyens de subsistance. L'objectif de cette étude était d'analyser l'impact du changement climatique sur les atouts du genre et les stratégies d'adaptation dans la région du Tigray, en Éthiopie. Les données ont été collectées auprès de 75 mâles et 75 femmes chefs de ménage. L'analyse du contenu a été utilisée pour analyser l'impact du changement climatique sur l'atout de genre et leur choix de stratégies d'adaptation, tandis que le modèle probit séparé a été utilisé pour analyser les facteurs déterminants qui influencent l'adoption par les agriculteurs de stratégies d'adaptation au changement climatique. Les résultats montrent que le changement climatique affecte les types de ménages, mais pose plus de menaces pour les ménages

dirigés par des femmes. Ceci est dû au manque d'accès et de contrôle sur les ressources par ces ménages. Le choix des stratégies d'adaptation différait également entre les ménages dirigés par les femmes et ceux dirigés par les hommes. Par rapport aux ménages dirigés par des femmes, les ménages dirigés par des hommes ont adopté davantage de stratégies d'adaptation. Ces stratégies comprennent la diversification des moyens de subsistance, la diversification des cultures et l'utilisation de variétés de cultures résistantes à la sécheresse et à croissance courte, l'ajustement et le déplacement des dates de plantation, la migration temporaire et la plantation d'arbres. En outre, les résultats du modèle probit ont révélé l'âge, le sexe, l'éducation, la taille de la famille, la taille de l'exploitation, l'accès au service de vulgarisation, la participation à l'organisation sociale, la participation à l'activité hors ferme, l'élevage, l'expérience agricole et la distance au marché le plus proche comme des déterminants majeurs qui affectent significativement le choix des agriculteurs des différentes stratégies d'adaptation aux changements climatiques.

Mots clés: Stratégies d'adaptation, atout, changement climatique, genre

Introduction

As Demetriades and Esplen (2008) stated, climate change poses different challenges for rural men and women as there is a gender inequality in different roles, relations and responsibilities, opportunities and constraints, and uneven access and control over resources. The capacity and choice of adaptation to climate change is unequal across and within societies. There are individuals and groups within all societies that have insufficient capacity to adapt to climate change (Adger *et al.*, 2003). Further, Demetriades and Esplen (2008) asserted that compared to men, women are more dependent on natural resource for their livelihood that is threatened by climate change. As such women are more vulnerable to the impacts of climate change because they are more prone to the adverse impacts of climate change. Their limited adaptive capacity arises from prevailing social inequalities and ascribed social and economic roles that manifest itself in differences in property rights, access to information and unequal access to resources. Hence, adaptation to or choice of adaptation strategies to climate change is dependent on issues such as wealth, technological power, access to information, all of which are major problem areas for women (UNDP, 2002). In line with this, Demetriades and Esplen (2008) indicated that changes in climate change usually impact on sectors that are traditionally associated with women.

Literature Review

Climate change will affect all countries, in all parts of the globe but its impacts will be distributed differently among regions, generations, age, classes, income groups, occupations and gender (McCarthy, 2001). Climate change can have disproportionate impacts on women's wellbeing compared to men. For example, women and girls in developing countries are often the primary collectors, users and managers of water. Decreases in water availability will jeopardize their families' livelihoods and increase their workloads, and may have secondary effects such as lower school enrolment figures

for girls or less opportunity for women to engage in income-generating activities (Aguilar, 2009). Buechler (2009) argue that climate change affect women's financial capital and found that women are less able to earn and control income from processing certain fruits and vegetables such as plums, apricots, figs, and olives due to warmer temperatures and water scarcity, also eroding their social connections as they become less able to exchange food products as gifts, a practice used to secure women's status in important social networks that act as safety nets and important social capital. A survey by Babugura (2010) indicated that men who migrated to seek for alternative sources of income often returned with HIV/AIDS and infected their wives. As a result of the death of men and women from HIV/AIDS, many orphans were left in the community surveyed. Similar studies by Goh (2012) also claimed that women are forced to take their daughters away from school to assist them with work on the farm or in the household, which has long term detrimental effects on the empowerment of these girls. MacGregor (2010) argues that the differentiated power relation between men and women and unequal access to and control over assets means that men and women do not have the same adaptive capacity; women have distinct vulnerability, exposure to risk, and limited coping capacity and ability to recover from climate change impacts. The author concludes that although women are generally more vulnerable to the impacts of climate change, they play an active role in adapting to its impacts to secure food and a livelihood for their household. The general objective of this study was to assess gender based impacts of climate change and adaptation strategies in Raya Azebo district, Ethiopia.

Study Description

The study was conducted in Raya Azebo district of Tigray region, Ethiopia, approximately 662 km away from the capital city of Ethiopia (Addis Ababa) along Addis-Mekele main road, 128km away from the regional capital, Mekele and 18 km from zonal capital Maychew. The district has total land coverage of 176,867 hectares, 85% of which is midland, while the remaining 15% is lowland. In general, the altitude of the District ranges from 1400 to 2300 m.a.s.l. The total population size of the district is estimated to be 150,162 (2011), out of these 94,810 are males and 75,352 are females (63.1% and 37.9%, respectively).

Result and Discussions

Impacts of climate change on gender assets. The study area has for long been facing different impacts of climate change and variability, aithough these impacts are becoming more serious. Frequent drought is the major hazard in the study area and it affects the key livelihood assets (natural, physical, financial, social and human assets), which the farming households depend on for their survival. Drought is a common phenomenon in the study area; it has become more frequent and intense in recent years, its reoccurrence interval has become shorter. This results in crop failure, decreased availability of pasture and water, declined livestock productivity, high school dropout and migration. Drought is folowed by extreme heat and health problems. Female headed households are most affected by impacts of climate change and variability in the study area. This is due to the fact that female

headed households carry out the routine household activities. The hazards create additional burdens making women even more vulnerable to the impacts of climate change. Lack of access and control over resources were responsibe for making them more vulnerable to the impacts of climate change.

Gender choice of adaptation strategy to climate change. The results of the study showed that both male and female headed households use multiple adaptation strategies to reduce the impact of climate change (Table 1). The strategies included livelihood diversification, crop diversification and use of drought resistant and early maturing crop varieties, adjusting and shifting of planting dates, changing consumption type, food storage, temporary migration, planting trees and selling assets. The study found adaptation strategies to be different among female and male headed households. Female headed households do not use many adaptation strategies as compared to male headed households. This was due to their limited access and control over resources, in adition to other cultural barriers. Compared to female headed households, male headed household participate in all types of adaptation strategies, whereas females mostly participate in changing consumption type and number, food storage and selling asset (Table 1).

Table1: Adaptation strategies of female and male headed householdsin Tigray, Ethiopia

Adaptation practices	Sex of the household heads				Total	%
	Female		**Male**			
	Frequency	%	Frequency	%		
Livelihood diversification	27	36.00	44	58.67	71	47.33
Crop Diversification and use of drought resistant and short growing crop varieties	26	34.67	74	98.67	100	66.67
Adjusting and shifting of planting dates	28	37.33	75	100.00	103	68.67
Changing consumption type and number	74	98.67	75	100.00	149	99.33
Food storage	74	98.67	75	100.00	149	99.33
Temporary migration	2	2.67	50	66.66	52	34.66
Planting trees	15	20.00	74	98.67	89	59.33
Selling asset	75	100.00	75	100.00	150	100.00

Source, Own data survey, 2016

Determinants of adoption of adaptation strategies to climate change. Separate probit analysis was employed to determine the factors that influence farming households' choice of adaptation strategies to climate change. The result of the analysis shows that sex, age, education level, family size, farm size, access to credit, extension service and participation in social organization have a significant impact on choice of adaptation strategy to climate change. By using the separate probit model, the study found that participation in off-farm activities, and participation in social organization/support

Table 2. Separate probit for adoption of adaptation strategies (n=150)

Variables	Livelihood diversification		Crop diversification		Adjusting and shifting of planting		Planting trees		Temporary migration	
	Coef.	P>Z	Coef.	P>Z	Coef.	P>Z	Coef.	P>Z	Coef.	P>Z
Sex	.1140004	.788	2.892244	.000***	.031789	.775	5.523636	.000***	.605654	.027**
Education	-.0539692	.540	.0667445	.610	-.0487868	.764	-.0086665	.945	.3495254	.093*
Age	-.0204648	.304	.0401097	.084*	.048935	.039**	.0073868	.791	-.0463887	.116
Family size	.012251	.854	0779652	.415	.3093807	.013**	-.1292082	.310	.220745	.008***
Farm size	.1406634	.512	-.3731193	.262	-.0916032	.777	-.9702889	.084*	-.4993899	.029**
Livestock holding (TLU)	-.212432	.638	.0496821	.519	-.0119861	.901	.0380585	.704	-.1059376	.093*
Credit	-.1602664	.575	.3880683	.230	.0020741	.995	1.157644	.313	.1692644	.603
Information to climate change	.5691469	.420	-.4688119	.413	1.150133	1.106	-.6356277	.297	.3412833	.542
Participation in off farm activity	3.232858	.000***	.8141848	.100*	1.151666	.014**	-1.037306	.086*	1.641727	.000***
Extension	-.1642765	.722	-.0028715	.995	.3527206	.530	1.369235	.019**	.182456	.426
Training	-.0205786	.966	.6108811	.219	.1258601	.810	.0186119	.976	.625487	.324
Distance to nearest market	-.0672844	.269	.1709227	.019**	.072405	.312	-.0907323	.305	.156845	.245
Participation in social organization	-.6676387	.056*	.1464728	.713	1.287125	.010***	.2737708	.507	.014862	.156
Farm experience	.0370901	.117	-.0199637	.426	-.0258822	.347	.611683	.098*	.1557217	.321
_cons	-.2829205	.810	-3.575982	.020	-5.623162	.002	3.526323	.080	-3.584588	.001

Notes: ***, **, * = significant at 1%, 5%, and 10% probability level, respectively

were the main factors that affect the choice of livelihood diversification. Sex of the household head, age, participation in off farm activity, distance to the nearest market and availability of drought resistant and early maturing crop varieties influenced choice of crop diversification. Age of the household head, family size, and participation in off-farm activity, and participation in social organization/support were the factors that affected the choice of adjusting and shifting of planting dates as a major adaptation strategy to climate change. Sex of household heads, farm size, participation in off-farm activity, access to extension services and farm experience were found to be factors that affect the choice of planting dates as a major adaptation strategy. Finally, results showed that sex of the household head, level of education, family size, farm size, livestock holding (TLU) and participation in off-farm activity were found to be factors that affect the choice of temporary migration as a major adaptation strategy to climate change.

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