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Review on Determinants of Rural Household Food Security Status in Ethiopia

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Abstract

This review was focused on the determinants of rural household food security status and coping strategies in Ethiopia. The similarities and variation among different findings in different area were reviewed. Some of variation reviewed in the methodology part was some authors have used binary logistic model and others have used probit model. The model findings were also varied i.e. in some areas significantly positive effect variables also showed that significantly negative effect in the other areas.

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Probit; Logistic; Food; Security

Introduction

Nearly a quarter of the population in Ethiopia is malnourished where the largest proportion suffers from chronic hunger. Some assessments indicate that the probability of crop failure in certain parts of Ethiopia could reach 10 per cent (FAO, 2006).

This can be much worse where policies in attaining food security are underemphasized and the gap between per capita food production and consumption is induced by the slowdown of the agricultural production growth rates (FDRE, 2001). Researchers, planners, donors and international development agencies have given high priority to the study of food system and the problem of food security due to deepening food crises. Despite the available resources and the efforts made by governments in different times, food insecurity remained one of the most crucial challenges to economic development and has been aggravated by recurring rainfall shocks and wars (WHITE, 2005).

The smallholder peasant sector is the most important agricultural sub-sector in the country. Its emphasis is on food crops as well as animal husbandry where considerable improvements of cultivation practices, management and marketing need to be realized.

The production volume of food crops as well as the per capita food production has shown tremendous fluctuations throughout the 1980s thus resulting in severe food shortage in the country. The main reasons for these are stochastic shocks such as recurrent drought, lack of market incentives for the small-scale food producers and poor extension services (Dercon and Krishnan, 2000).

Adverse changes in climate, combined with long-term factors (technology, environmental, institutional) led to a decline of landholding, soil degradation and a decline in yield per hectare (Anley *et al.*, 2007). Having peaked at about 26.2 % in 1984/85, food aid imports amounted to a significant proportion of domestic production of food crops, often, about 10% or more. The food insecurity

situation in the west ShewaZone of Ethiopia shares similar features with that of the other regions (WVE, 2007).

Empirical findings

Determinants of rural household food security status

Age of the household head was significant at less than 10% probability level and showed positive relationship in explaining the household food security status. Which means, as the age of the household head increases by a single year, keeping other factors remain the same, the likelihood of the households being food secure increases by a factor of 1.07. This finding supports the assumption that when the heads age advances, they were expected to have stable economy, accumulate wealth, experience and food secure than younger heads. This shows that the household heads who are at adulthood age engage in different off farm activities and get income to be invested to improve their household food security status. The educational attainment of the head of the household was important in explaining the variations in household food security and it was found significant at less than 10% level. As a result, education does help much to improve the food security status of households. Keeping other factor constant, an increase in a year of schooling of the household head improves the likelihood of the households being food secure by a factor of 0.171.

Household size measured in number of household members was found to negatively and significantly influence household food security status at less than 1 % probability level. The presence of relatively more number of household members in a household demanding a minimum of 2100 Kilo Calories on the face of small degraded physical and natural farm resources could be the justification for family size to affect food security negatively. If all other things are held constant, the odds ratio in favor of being food insecure (\exp^{β}), shows that an increase in the size of family by one person, increases food insecurity by a factor of 0.4 unit. It was prior hypothesized that family size has negative impact on the state of food security, in such a way that households with large family size are food insecure than those with small numbers of family members. So, the finding favors the prior hypothesis. Tshediso also reported larger household sizes are associated with a negative food security status as larger household sizes require increase food expenditure and competition for limited resources Tshediso Joseph Sekhampu (2013).

Cultivated land has positive impact on the probability of food security status of farm households in the study area and was found significant at 10% probability level. In this sense, ownership of the larger cultivated land, the higher the probability of being food secure to the farm households. This means, the farm households due to ownership of larger size of cultivated land would have higher the probability to produce more food and sources of cash products than households with smaller size of cultivated land. As a result of using this resource, the farm households would have probability of acquiring capital which might enable them to invest on other production resources and inputs that contributes to food security of the households. In this study, all other factors kept constant, as the size of cultivated land increased by one hectare, the odds ratio in favor of being food secure increases by a factor of 3.298 implying the size of cultivated land positive influence on food security status.

Use of improved seed has positive impact on the probability of being food secure among the farm households. In this study it is significant at 10% probability level. This implies that farm households who use improved seed properly have more chance to be food secure than those who do not use. The result of this study reveals that, all other factors are remaining constant, the odds ratio in favor of being food secure increases by a factor of 5.365 as a farm households improved seed use increases by one unit.

Livestock holding (in TLU) is significantly related at less than 5% probability level and the odds ratio in favor of being food secure increase by a factor of 3.783 when other factors remain constant. Livestock contribute to food security status of households in different ways such as by providing cash income, nutrition (meat, milk, etc.), draft power, manure, etc. Also livestock serve as savings of assets and used for coping food insecurity problems during food shortage. It was hypothesized that households who own larger size of livestock in TLU are less likely to be food insecure than households who own no or smaller size of livestock in TLU. According to this study, total size of livestock holding is positively and significantly associated with the probability of households' being food secure in the study area.

Development Agent (DA) contact has significant positive influence on food security status of households at 1% probability level. Increased contacts or visits of DAs to the farm households increases the probability of households to be food secure as a result of dissemination of agricultural extension and improved technologies to

the farm households by DAs that in turn increases production and productivity. Holding other variables constant, the odds ratio in favor of being food secure increases by a factor of 9.019 as a farm household's contacts/visits of DAs to increases by one round.

As expected absence of adequate rainfall influence household food security status negatively and significantly at 5%. The finding reveals that as the household perception changed from having adequate rainfall during cropping season to inadequate, the odds ratio in favor of food security decrease by a factor of 0.028.

Absence of plant disease, insect and pest damage also contribute to household food security status and its influence was significantly at 10% level. The variable is measured as dummy and the result implies that when the household status changed from absence of plant disease, insect and pest damage to experience incidence of plant disease, insect and pest damage the likelihood of food insecurity increase by a factor of 9.066.

Off-farm income per AE was hypothesized to have positive impact on food insecurity. It is an income of the households in cash or in kind. Households in the study area engaged in different off-farm activities, particularly when they face crop failure and food shortage as a source of food. So, it serves as one of the major coping strategies of food shortage/insecurity.

In this study, in agreement with the hypothesis, off-farm income per AE is positively and significantly associated with food security status of farm households at 5% probability level. The odds ratio, other factors held constant, in favor of food security increases by a factor of 1.007 as the off-farm income per AE of farm households increases by one unit.

According to Fekadu and Mequanent, 2010, the model reveals that age of the household head has positive and significant (at $p < 10\%$) relationship with household food security. The logit increases by a factor of 1.042 as the age of a household head increases by one year keeping the other variables constant. The possible explanation for such positive association is that an older household head devotes his/her time on farming activities compared to young farmers. Young people spend much time in towns and prefer urban life than the rural for a number of reasons. Moreover, as age increases, one can acquire more knowledge and experience becoming effective in exploiting these experiences.

Although we hypothesized that education of household head has positive impact on state of household food security, the model output revealed that it has negative association. The possible explanation for the unexpected output might be literate households might not have chance to apply their knowledge towards achievement of household food security. Similarly, GARRETT and RUEL (1999) found negative and significant association between educational level of a household head and with food security. Whereas, others found out that it is mother's attendance of primary education that positively contributes to food security (BIGSTEN *et al.*, 2002). In our sample, a greater proportion of female headed households are food insecure, in agreement with this finding.

Consistent with the hypothesis, household size (AE) has a negative significant (at $p < 5\%$) influence on household food security. The negative sign in the model output implies that family planning policies that will have an impact in reducing household size will increase the probability of a household to be food secure. The odds ratio in favor of food security decreases with increasing household size and was found to be 0.625. This implies, *ceteris paribus*, the odds ratio in favoring food security decreases by 0.625 as household size increases by one AE. This reaffirms the findings of others in which a household with large size, composed mainly of non-productive members is more likely to be food insecure due to high burden levied on active labor (BIGSTEN *et al.*, 2002).

The model also reveals the important role of off-farm/non-farm income in contributing to household food security as expected (at $p < 5\%$). In this circumstance, smallholders who solely depend on farm activities have inadequate income to purchase farm inputs and fulfill family needs and thus, they are found to be food insecure. The odds ratio in favor of food security increases by a factor of 1.004 when off-farm/non-farm income increases by one birr.

Moreover, it indicates that the size of land cultivated, as a basic input in farming, is significantly associated with food security status of a household. Land in this district serves as means of coping mechanism during serious food shortage and collateral to receive credit service. This means households with large cultivated land produce more for household consumption and for sale and have better chance to be food secure than those having relatively small size of cultivated land. The odds ratio for this variable is 1.356. This indicates that

maintaining other determinants constant, additional hectare of cultivated land will enhance food security status of the household by factor of 1.356 and vice versa.

Use of fertilizer is another variable which was found to have a positive and significant impact on household food security (at $p < 5\%$). The odds ratio for this variable was found to be much higher 6.084 where the odds ratio from the use of chemical fertilizer favors attaining food security with a factor of 6.084. Most households in the rural communities in Ethiopia accumulate their wealth in terms of livestock. Results here support such a practice where households with relatively large livestock size (larger TLU) were found to be less vulnerable to food insecurity. In this case, the odds ratio in favor of food security increases by factor of 1.273 for a unit increment in TLU.

Oxen are the main source of traction power among rural households of the district.

This is clearly indicated in the model where oxen ownership was positively and significantly associated with household food security.

The odds ratio in favor of household food security increases by a factor of 1.934 for each additional ox owned. Among poor households, having even a single ox enables them to tie with others having same status to cultivate their plots of land.

The sign for the soil conservation measure in the model is also consistent with the hypothesis in which the odds ratio is in favor of being food secure for adoption of certain soil conservation measures.

This result conforms to the findings of the studies conducted elsewhere which have also shown a positive relationship between food insecurity and natural resource degradation that stand to be a prominent challenge to developing countries (HOLDEN and SHIFERAW, 2004).

In some countries, poor farmers may practice a biomass transfer from hedges which can increase yield enormously in the short-term other than the use of other expensive soil conserving technologies whose effects are observed in the long-term (SANCHEZ, 2000). A similar practice could be adopted in Ethiopia when farmers cannot afford to pay for fertilizer since its price has increased enormously subsequent to the removal of input subsidies and due to other reasons.

Household coping strategies

According to Most households in Marekowedra are affected by chronic food insecurity for many years. The level of the food shortage problem varies from household to household. Food insecure households use different strategies to cope with the food shortage Debebe Habtewold *et al.*, (1998). Various coping strategies are practices that a household take as a decision to mitigate and escape during shortfall of food availability and access. So, there are about 10 strategies being practiced by the households at early stage of food shortfall. Accordingly at initial stage of food insecurity 60% and 73.5% of food secure and food insecure households were reducing the number of meals, respectively. Reducing size of meal also was employed as coping strategy by 60% and 72.5% of food secure and food insecure households, respectively. Borrowing grain and cash was used as third coping mechanism was employed by 42% of food secure and 62.5% of food insecure households. About 38% and 45% of food secure and food insecure households, respectively practiced receiving food aid as the fourth coping mechanism. Sale of small livestock was used as fifth coping mechanism by 36% and 42.5% of food secure and insecure households, respectively. Participation in food for work programs, which is ranked sixth, was practiced by 38% and 37.5% of food secure and insecure households. Wage from daily paid laborer was equally used as coping mechanism by 26% of food secure and insecure households. Renting out and mortgaging of land was the eighth and ninth coping mechanism. Renting out land was practiced by 10% and 16.25% of food secure and insecure households whereas mortgaging land by 4% and 11.25% of food secure and insecure households, respectively. Pity trade was used as the tenth coping mechanism by 10% and 3.7% of food secure and insecure households, respectively.

At sever stage of food shortage households in the study area practiced set of coping mechanisms more or less corresponding to that of the initial stage. However, the orders of importance of the activities and coping mechanisms were different. About 50% and 76.2% of food secure and food insecure households respectively used renting land out as the first coping mechanisms. On the other hand 46% and 70% of food secure and insecure households respectively were using mortgaging land as the second coping mechanisms. Close to 46% and 70% of food secure and insecure households was receiving food aid to cope food shortage. About 22% and 31.2% of food secure and insecure households respectively were borrowing cash or grain from friends and relatives as

means of coping food insecurity. Off-farm income (income from agricultural wage) was also used in the study area as coping strategy by households to cope food insecurity. As the severity of the problem continued some of the members of the households forced to migrate in search of employment ranging from nearby areas to furthest towns. Close to 16% and 32.2% of food secure and insecure households respectively used seasonal migration for coping mechanisms. Sale of livestock, especially cow and ox, was used by 22% and 22.5% of food secure and insecure households, respectively.

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