



# Prospective Impetus of Agriculture Services Post Devolution on Household Food Security among Smallholder Farmers in Eastern Kenya

Fridah Kanana<sup>1</sup>, Florence Kaumi Kirimi<sup>1</sup>, Charles Onyari<sup>2</sup>, Judith Wafula<sup>1</sup>, Raphael Wambua Kithome<sup>1</sup>, Moses Muchangi Njiru<sup>1</sup>

## ABSTRACT

**Background:** Food and nutrition security is a major challenge worldwide. Food insecurity ranges from moderate to severe and Kenya's expanding population coupled with challenges in agricultural extension service provision exacerbates the problem. Food insecurity and malnutrition remain common in the country, despite the administration's various efforts to address these challenges.

**Methods:** This study aimed at assessing the effect of changes of agriculture services post devolution on household food security. Using a cross-sectional survey design, 428 respondents were selected through multistage stratified sampling. Data were analyzed using descriptive and inferential statistics. Food security was calculated using food consumption score index while ordered probit was used to model the relationship between the changes post devolution and household food security. The study also used an ordered probit model to assess how changes in agricultural services under devolution affect household food security.

**Result:** The analysis of food consumption scores indicates that 57% of farm households achieved an adequate level of dietary diversity, while 39% fell into the borderline category and 4% were classified as poor. The results show that reliable extension services, subsidized inputs, market links and higher farm profitability had a positive impact while access to superior animal breeds and interruptions in input availability had a negative impact on food security. The findings underscore the importance of dependable and economically priced agricultural services supported by enabling systems for long-term food security improvement.

**Key words:** Agriculture services, Changes, Food security, Post devolution, Smallholder farmer.

## INTRODUCTION

Hunger is still a major impediment to development to most nations globally, necessitating the need for production of adequate and sustainable food for eradicating it (Akpabio *et al.*, 2024). Without urgent attention, the problem could worsen further owing to the recurrent climate change effects such as prolonged droughts linked to acute levels of food insecurity (Mogaka *et al.*, 2025). Additionally, the hunger problem accelerates due to rapid population growth with a projection of about 600 million people experiencing chronic under-nourishment by the year 2030 (WHO, 2023). The surge in population increases the demand for food, hence necessitating a corresponding adjustment in agricultural production systems to yield enough food (Ighodaro *et al.*, 2021). Most countries have advanced the agriculture sector to curb the issues of chronic food shortages and malnutrition but still a lot needs to be done. For instance, the situation in Africa seems to be overwhelming due to high dependence on rainfed agriculture. Studies reveal that Africa remains one of the world's most food-insecure regions, with larger proportion of people failing to put required diet on the table (Otegunrin, 2025). The FAO (2024) report highlighted that roughly 2.4 billion people faced severe food insecurity. Earlier, the FAO (2021), indicated that approximately 298 million people in Africa are undernourished, representing over 20% of the continent's population (Tsakok, 2025). Due to the

<sup>1</sup>Department of Agricultural Economics and Extension, University of Embu, P.O Box 6-60100, Embu, Kenya.

<sup>2</sup>Department of Water and Agricultural Resource Management, University of Embu, P.O Box 6-60100, Embu, Kenya.

**Corresponding Author:** Fridah Kanana, Department of Agricultural Economics and Extension, University of Embu, P.O Box 6-60100, Embu, Kenya. Email: [kananamwenda13@gmail.com](mailto:kananamwenda13@gmail.com)  
ORCID: 0009-0007-0314-6629, 0000-0001-5117-667X, 0000-0002-20049579, 0000-0001-9028-8447, 0000-0002-4949-6719, 0009-0006-7108-9980

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widespread and persistent issue of food insecurity, it is clear that a number of developing countries are yet to achieve favorable standards of food security.

Among the solutions that can be tailored to improve food production is revitalizing agriculture services. Such services are crucial for enhancing land productivity and thereby improving agricultural production efficiency (Chen *et al.*, 2022). For better food production, farmers must have access to knowledge on adoption of modern

technologies which is only possible through services like agricultural extension (Kaligainidis and Syndoukas, 2024). Regions that have received extension services have shown better production and great resilience in farming compared to zones without the services (Raji *et al.*, 2024). Similarly, the value of agriculture has been upheld where these services have been promoted (Kitole *et al.*, 2024). Governments have deliberate ways of delivering agriculture services to develop the agriculture sector in the quest of fighting food insecurity.

One of the initiatives implemented to deliver agriculture services to fight food insecurity in most countries like Kenya is devolution (Resnick, 2022). Devolution is the most comprehensive form of decentralization, whose key agenda is to foster accountability and service provision (Freeman, 2022). Transferring agricultural policymaking authority to county governments after the promulgation of the new constitution (Lumumba and Mbonenyi, 2011) was a game-changer. More reliable food supply, improved service delivery and a better match with community needs were all expected outcomes of decentralizing these responsibilities (Ohene-Manu, 2022). However, several operational and institutional issues have surfaced during the implementation of the devolution agenda. Lack of resources (both financial and in terms of technical expertise at the county level), poor lines of communication between national and county governments and inadequate physical space are all contributing factors (Burlakoti and Nettle, 2024). These problems have made it more difficult for counties to assist smallholder farmers and implement agricultural plans effectively (Vamba, 2024).

Despite the fact that devolution has been in place for more than a decade in Kenya (Mwonge *et al.*, 2022), there is a scarcity of empirical evidence to show whether changes in the delivery of agricultural services have improved or harmed household food security. The goal of devolution was to bring services closer to the people. However, it is unclear how much progress has been made in local food systems as a result of decentralization. Failure to appropriately assess the impact of devolution on agricultural services and food security may lead to ineffective or incorrect policy decisions. This study looks into how changes in agricultural service delivery after devolution have affected Kenyan households' food security.

## MATERIALS AND METHODS

### Study area

This study was carried out in two counties located in Mt. Kenya region, specifically Tharaka-Nithi and Embu Counties. Tharaka-Nithi covers a total area of 2,609 square kilometers and has a population of 393,177 people (KNBS, 2019). Temperatures in the region range between 14 to 30 degrees Celsius, with the dry season experiencing a peak temperature of 40 degrees in the lowland areas. Rainfall in this region varies from 500 to 2,200 millimeters.

Green grams, cowpeas, pigeon peas and maize are the principal crops for human consumption. Embu County, on the other hand, has a population of about 600,000 people and the area stretches up to 2,555 square kilometers. Agriculture is the main economic activity in the region because it hosts favorable soils and ecological conditions that enable the county to cultivate various crops. Crops grown in the county include maize, beans, green grams, sorghum, millet, cow peas and pigeon peas. Despite improvement in crop and livestock production, these areas were selected since they are among the Kenyan ASAL's which have been categorized as the most food insecure (Nyakundi *et al.*, 2024). This work was carried out in the University of Embu, Kenya, in 2025.

### Research design and sample size

A cross-sectional survey design was employed to capture a snapshot of the current state of agricultural practices, extension services and food security among smallholder farmers at a single point in time. This design enabled the identification of correlations and trends on food security within the data, providing a comprehensive overview of the impact of devolution on agricultural functions. The target population proportionately consisted 112,812 and 78,401 smallholder farming households from Embu and Tharaka-Nithi Counties respectively. The sample size based on Cochran formula, was 428 distributed with 252 (Embu) and 175 (Tharaka-Nithi) respondents.

### Sampling procedures and data collection

A multi-stage cluster sampling technique was used to sample the farming households in the two Counties. Sub-counties were set as the clusters based on their agricultural zones. In Tharaka-Nithi County, the two clusters selected were Meru South and Igambang'ombe Sub-Counties while for Embu County, Embu East and Mbeere North sub-counties formed the clusters. Further, one ward in each of the clusters was selected. Farming households were chosen randomly from each of the clusters to attain the desired sample size. The study used a semi-structured questionnaire programmed in Kobo toolbox to collect data from smallholder household head.

### Food security determination

The pattern of food consumption was captured by recording particular food groups taken by a household over a period of one week and used to compute the food consumption score (FCS). When using this technique, food consumed are assigned weights based on their importance (Rizwan *et al.*, 2023). Therefore, FCS was evaluated by obtaining a product of assigned weights and the frequency of consumption. The recently established food score classifies food profiles into three categories: a score of 0 to 21 denotes poor food consumption, 21.5 to 35 indicates borderline food consumption and a score above 35 represents acceptable consumption of food, (Otar, 2023). The weights allocated to meat/fish and

milk is 4, pulses are 3, staples 2, vegetables and fruits is 1, sugar and oil is 0.5.

### Empirical model

The nature of the dependent variable is always critical when selecting an appropriate econometric model for analysis. Most studies bearing binary dependent variables apply logit and probit models. In this study, such models were not considered appropriate since the dependent variable is categorical. Previous studies suggest the use of ordered probit model for ordered and categorical dependent variables and this can be proven by its successful application by (Cele *et al.*, 2024; Atsiaya *et al.*, 2023). The model can be expressed as:

$$Y_i^* = \beta' X_i + \varepsilon_i \quad \dots(1)$$

Where,

$Y_i^*$  = The household food security with three categories.

1= Poor.

2= Borderline.

3= Acceptable.

$\beta$  = A vector of parameters that need to be estimated.

$X_i$  = A vector of explanatory variables.

$\varepsilon_i$  = The disturbance term with zero mean and 1 variance.

The observed variable  $Y_i$  is evaluated based on the household selection between the available options (1,2,3,...,j) in response to multiple threshold levels  $\mu_1$  ( $\mu_0 = -\infty$  y  $\mu_j = \infty$ ) as:

$Y_i = 0$  if  $-\infty \leq Y_i^* \leq \mu_1$

$Y_i = 1$  if  $\mu_1 < Y_i^* \leq \mu_2$

$Y_i = 2$  if  $\mu_2 < Y_i^* \leq \mu_3$

$Y_i = 3$  if  $\mu_3 < Y_i^* \leq \infty$

$\mu$  = Threshold to be determined within the ordered categories.

Therefore, the empirical model of this study was specified as:

$$\text{Food security}_{FCS} = \text{Constant} + \beta_1 \text{ reliability of extension services} + \beta_2 \text{ farming practices} + \beta_3 \text{ provision of subsidized inputs} + \beta_4 \text{ formal agricultural training} + \beta_5 \text{ access to farm inputs} + \beta_6 \text{ improved market linkages} + \beta_7 \text{ livestock breeds} + \beta_8 \text{ increased farm income} + \text{error term} \quad \dots(2)$$

## RESULTS AND DISCUSSION

### Farmer and farm statistics

Results in Table 1 show the chi-square and t-test statistics of the farm and farmer features with respect to access to extension services. Findings reveal that gender, level of education, the primary crop, access to inputs, resource constraints, ability to access food security programs, household and livestock sizes influenced the decision to access extension services. Based on gender, results show that if the decision maker of a household is male, they are better off in accessing extension services, due to their availability and power to control family resources. Farmers who are more educated individuals may be in a better position to access extension programs because they can

easily comprehend a new technology and integrate it in their farming systems. Additionally, farmers who concentrate on producing specific essential crops had access to extension services since they might be fully depending on the crop to sustain living, hence willing to acquire technologies that will improve productivity. Access to food security programs influenced the choice of accessing extension services. These programs might be accompanied by training on production of more food which prompt the intervention of extension agents post donor projects to enhance sustainability. Some of the programs would provide relief assistance in the lean season, making farmers more willing to partner with them. Resource constraints faced by a household was critical in accessing extension services, hence extension officers may be needed to help in linking farmers with available credit or input providers. The extension service providers will also train on appropriate technologies that align with farmers' needs, hence the desire to access related inputs. Although input access was not strongly significant, this show that there may be need for extension services to help in selecting suitable input combinations that maximize yields. Results on the negative significance of a household size suggests that, high number of family members depending on a household may require generation of more food to sustain the needs, leaving less time for engaging in extension services. The family members would likely prioritize the immediate needs of the family members that could offset the extension messages that enhance the food security status. Scaling production will require support of extension officers to provide the right guidance to the farming household. Enhanced production plays a key role in addressing food insecurity among the smallholder farmers. The number of livestock owned by a household was negatively significant showing that the higher the number, the lower the need for extension services. Ideally, farmers who keep large number of livestock might have harbored considerable technical experience in managing their animals and in this case, they may have designed their own mechanisms that reduce dependence on extension officers. Extension officers might be only called when extreme conditions are experienced. The area, being largely ASAL, makes livestock keeping a priority and any effort to improve this farming agribusiness is welcome among the famers.

### Food consumption score categories

Table 2 presents the findings of food consumption scores. Results show that majority (57%) of the households demonstrated an adequate level of food intake and dietary diversity, as indicated by the distribution of food consumption scores falling within the acceptable range. About 39% fall into the borderline category, suggesting that, although their consumption levels are modest, they might not be obtaining sufficient quality or quantity consistently over time and therefore they might be at risk of being food insecure. Only 4% of households were within poor category

implying that this group is especially vulnerable to food insecurity, as they have limited food consumption and may be experiencing ongoing food insecurity. This is also an indication that there is much to be done to totally address the problems of food insecurity.

### Perceptions on impact of extension post devolution

Results in Fig 1 show the perceptions of respondents on the impact of agricultural services post devolution. The findings reveal that 68% of the respondents agreed that services received match with the current needs of the farmers. Most (51%) of the respondents agree with the fact that they receive the services they require on time. This points to the importance of increased platforms for providing support services to farmers. About 68% of the respondents agreed that the current provision of extension services especially from the government is given via farmer's groups. The aim of targeting groups is to minimize the cost and perhaps to reach more farmers whose association also provides opportunities of sharing experiences and skills. Concerning the quality of farm produce, more than half of the farmers (53%) agree that it has declined because of reduced contact with extension services. This can be attributed to farmers using platforms that offer generic services; hence they might be picking information that is not contextualized to their local needs. Regarding feeding of livestock, 46% of the farmers agree that they are forced to compromise the feeding pattern to suit what is available to them. This means that there is an imbalance between government extension providers and farmers, which necessitates delays in provision of the required services with respect to animal feeds. Only a few

who can afford private services on the available sources of feeds escape such inconveniences.

Further, 52% of the respondents are in agreement that access to food by households has reduced owing to agricultural services offered post devolution. This prompts the questioning of the efficacy of decentralized systems in solving farmers' needs regarding food security aspects. However, the services might be provided but the national scale and approach might still be used by extension agents to render services, hence limiting to close the gap of localized needs. Half of the respondents agree that they rarely receive information on emerging technologies. This means that farmer education especially on emerging technologies has reduced and instead top-down approach might still be a hindrance since farmers are given what has already been decided by senior officials. Some farmers noted that the government (public) extension providers have declined over the years, further compounding the problem. Majority of the smallholder farmers (54%) indicated that they are not guided on alternative and cost-effective techniques and this merge the previous claim that most responds seldom receive information about new technologies. In relation with the level of infrastructure, 41% of the respondents agreed that road networks have deteriorated hence creating a hindrance to sources of food especially markets. This could be true because most of the farmers located in marginalized areas like arid and semi-arid areas are given less attention exposing them to risk of food insecurity. About 41% of the respondents disagree with the fact that crop and livestock production have increased since devolution. This can be attributed to the fact that service provision has been affected by

**Table 1:** Farmer and farm statistics based on access (325) and non-access (103) to extension services.

| Variable                         | Chi-square | Sig.        |
|----------------------------------|------------|-------------|
| <b>Categorical</b>               |            |             |
| Gender                           | 17.58      | 0.000       |
| Education                        | 16.22      | 0.006       |
| Main crop                        | 27.45      | 0.017       |
| Access to inputs                 | 3.63       | 0.057       |
| Resource constraints             | 4.98       | 0.026       |
| Access to food security programs | 12.84      | 0.000       |
| <b>Continuous</b>                |            |             |
|                                  | <b>t</b>   | <b>Sig.</b> |
| Age                              | -0.211     | 0.417       |
| Farming experience               | -0.300     | 0.382       |
| Farm size                        | -0.658     | 0.256       |
| Household size                   | -1.702     | 0.045       |
| Livestock unit                   | -3.679     | 0.000       |

**Table 2:** Food consumption score categories (n=428).

| Category     | FCS        | Freq. | Per cent |
|--------------|------------|-------|----------|
| 21 and below | Poor       | 16    | 4        |
| 21.5-35      | Borderline | 169   | 39       |
| Above 35     | Acceptable | 243   | 57       |

competing priorities in the devolved system and leadership that is prone to changes frequently.

### Post devolution changes on accessing extension services

Results in Fig 2 show the responses based on the selected changes post devolution among those who access

extension services. The results showed that 53% of respondents are of the view that extension services have become more reliable. This indicates that with devolution extension services have likely been customized to meet farmer's needs unlike when extension services are offered generically from a centralized government. Improvement of farming practices were echoed by more than three-

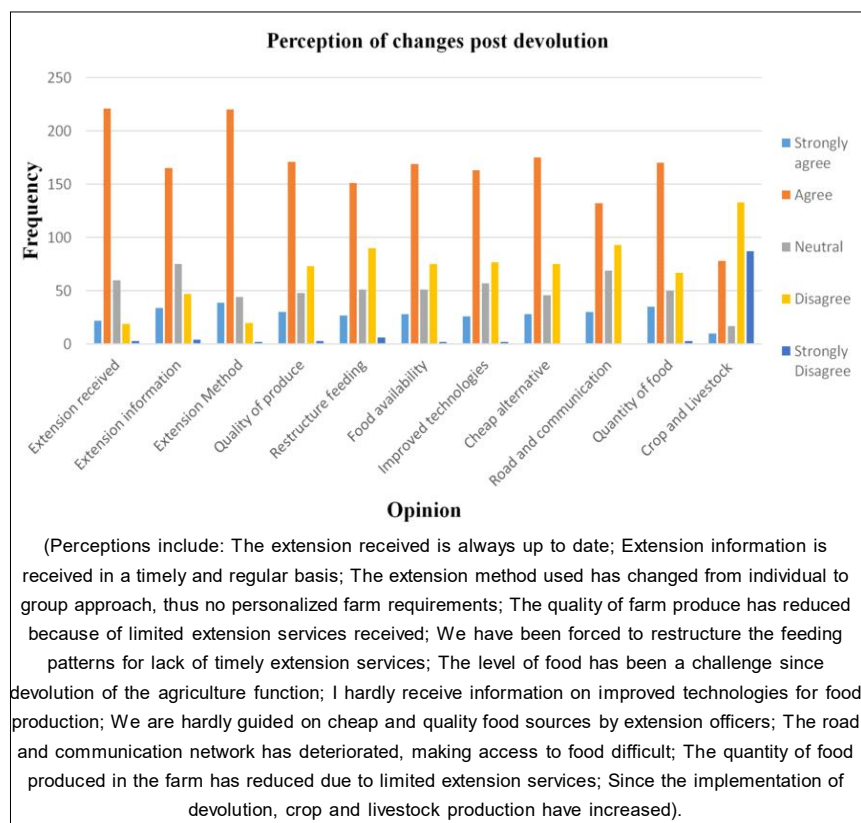


Fig 1: Perceptions of changes post devolution.

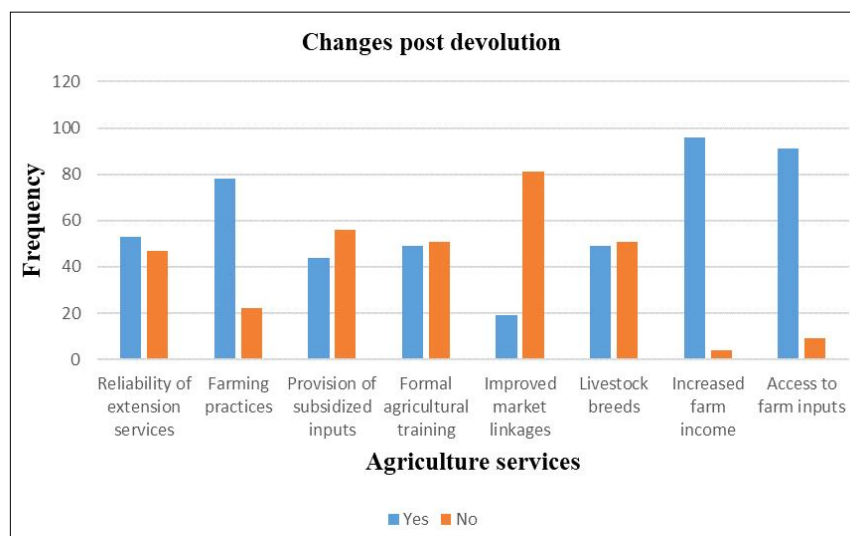


Fig 2: Changes post devolution (n=325).



quarter (78%) of the farmers which could be due to efforts of the decentralized government, of promoting use of improved technologies to revitalize agriculture. Provision of subsidized input is still low as reported by 44% of the respondents. This depicts a lag in agriculture sector due to small share of resources it gets from both the national and county governments. Less than half of the respondents (49%) reported that formal agriculture training has changed post devolution. This could be because the decentralized government focuses on a few and specific groups of farmers. Only 19% of the respondents felt that market linkages have improved. It is worrying that key sectors like marketing is still a challenge that is yet to be solved by the county. Farmers are likely working on their own or could be supported by private organizations to market produce. Even though livestock breed have improved through Artificial Insemination services especially in cattle, 51% of the respondents are yet to get such experience. Some farmers might be still in doubt and therefore remain averse to modern technologies in tandem with increased farming practices. A resounding majority (96%) of farmers reported that they have experienced improved farm income. The little efforts of orchestrated by the county through marketing strategies such as creation of aggregation centres is most likely bearing fruits. Such Government centers also help in supplying inputs as reported by 91% of the farmers. These inputs are often subsidized or the suppliers are enabled to avail them to such centres, making it easy for farmers to access them.

### Spatial status of food security

The Counties of Embu and Tharaka-Nithi had different status of household food security as indicated in Table 3. It was determined that 64% of households in Tharaka-Nithi County were within the acceptable level of food security, 30% were in the borderline while 6% were still poor. Based on this pattern, households in the Counties have a better level of food stability and can get enough food to meet their needs. In comparison, Embu County had a higher percentage of households (52%) classified to be within the acceptable level of food security, 46% were in the borderline while only 2% had poor food security status. This implies that there is an improved shift towards a stable food security level that may be credited to the initiatives made by the decentralized governments to make sure that instances of extreme food insecurity are fully engulfed. In the absence of such herculean efforts, the people in the borderline would be in danger of an unstable food security and even aggravate the conditions of people with poor food security.

### Changes in agriculture services on household food security

Ordered probit model was used to model the relationship between changes of agriculture services post devolution and household food security (Table 4). The results indicate that reliability of extension services was significant and positive in affecting food security (Coef. = 0.173,  $p = 0.021$ ).

Underlying reliability of services could increase household food security by 17.3%. Change of subsidized inputs showed a positive significance in influencing household food security (Coef. = 0.318,  $p = 0.043$ ). Household food security can be augmented by farmers who have access to formal agricultural training by more than 31%. Improved market linkages post devolution was positively correlated with improvement of household food security (Coef. = 0.366,  $p = 0.029$ ). When farmers are linked to the markets for their produce, food security increase by 36.6%. Access to better breeds of livestock was negatively associated with improved food security (Coef. = -0.676,  $p < 0.001$ ). This means that when the smallholder farmers' access improved livestock breeds, their ability to be food secure decrease by 67.6%. This rather strange observation can be explained by the fact that the local livestock reared by the farmers are more adaptable to the marginal areas and farmers would be hesitant to start rearing improved breeds that will come with a host of other husbandry challenges. Farm income was positively associated with food security (Coef. = 0.295,  $p = 0.023$ ). Findings show that changes in farm income post devolution have increased household food security by 29.5%. Changes in access to agricultural inputs was negatively associated with food security (Coef. = -1.278,  $p < 0.001$ ). This indicates that if changes occur in access to extension services, food security attainment is lowered by 127.8%.

The measure of how devolved agriculture services have impacted on farmer's livelihoods could be through their ability to be food secure. Findings of this study show that reliable extension services can make it easier for farmers to implement new technologies, acquire timely information and adopt improved farming methods, all of which promote increased and sustained food production and consumption (Table 4). These findings concur with those of Verma *et al.* (2025) who noted that efficient technological breakthrough increased productivity of food grains and oil seed. However, they conflict those by Ogato and Mbataru (2023) who reported that extension services did not influence food security. Availability and access to agricultural inputs are known to increase productivity and extension services play a pivotal role in meeting this to farmers (Kyambo, 2023). Use of aggregation centres in marginal counties could reduce the distance both for

**Table 3:** Status of food security.

| County        | Category   | Percentage |
|---------------|------------|------------|
| Tharaka-nithi | Acceptable | 64         |
|               | Borderline | 30         |
|               | Poor       | 6          |
| Embu          | Acceptable | 52         |
|               | Borderline | 46         |
|               | Poor       | 2          |
| Overall       | Acceptable | 57         |
|               | Borderline | 39         |
|               | Poor       | 4          |

marketing their produce and also accessing the inputs, Akumu and Owuochi (2025), but counties are yet to bridge this gap. With the help of subsidized inputs, smallholder farmers can implement yield-enhancing technologies like better seed and fertilizer, which also reduce production costs and improve input use efficiency. The findings of this study corroborate with that of Akumu and Owuochi (2025) who found out that supply of inputs such as seeds and fertilizer have advanced farming practices in Trans-Nzoia county. Similarly, the findings by Ngetich *et al.* (2024) report that with devolution, farmers have benefited from subsidized inputs, free training, free soil testing and road development projects, which have increased productivity and opened up new market opportunities. This is important for increased food security in rural households. Agricultural production and the amount of food available to households is ultimately increased. Households with more market access are more likely to obtain better food security results (Table 4). The study also argues that significance of market links was based on the fact that it reduces transaction costs, increases access to a diverse range of food products and allow for the selling of agricultural produce at competitive prices. Work by Ma *et al.* (2024) revealed that extension services incorporate messages on marketing channels, current prices and produce or products supply and demand trends. This enables farmers to link with the market for their produce by taking advantage of such information. The available extension sources include digital platforms and person-to-person interactions with extension providers and other farmers. Increased household incomes as a result of stronger market activity contribute to better food access and a more diverse diet. These findings underline the need of including smallholder farmers in functioning market systems as part of a long-term food security strategy.

It was observed that better livestock breeds can strain household budgets and reduce the amount available for

feeding demands because they typically necessitate more expensive veterinary care, high-quality feed and proper management (Table 4). These breeds may perform poorly or become more prone to illnesses in situations with insufficient markets, extension services, or veterinary care, jeopardizing farmers' food security (Kumar *et al.*, 2023). This study underlines that in order to improve family food security, access to superior livestock breeds must be facilitated by enabling conditions and associated services. The farmers' ability to afford food is an important measure of food security (Danso-Abbeam *et al.*, 2022; Mamasoliev, 2024). In the current study increased farm earnings were shown to improve households' purchasing power, allowing them to acquire food all year and diversify their diets. Furthermore, it makes it easier to reinvest in agricultural produce, resulting in continued productivity gains. This study showed that approaches for increasing profitability for farms are likely to lead to fairer patterns of food intake and it supports the link between agricultural commercialization, income for households and food security results (Table 4). The aim of devolving the agriculture function was to provide a more enabling environment for farming (Lumumba and Mbondenyei, 2011; Musyoki and Sande, 2024). This ultimately targets increasing farm productivity, household earnings and guarantee food security in the rural areas (Mupaso *et al.*, 2024). Farmers cannot plan and sustain consistent output when access varies, whether due to high costs, supply constraints, or regulatory changes (Yapp *et al.*, 2025). This leads to lower yields and less food accessible for households. This extreme effect demonstrates how crucial, continuous and reliable access to agricultural inputs is for ensuring food security and how disruptions in this access can have a negative impact on farming households and therefore, to ensure that the decentralized agriculture services are maximized, governments should improve financial commitment (Chelule *et al.*, 2022).

**Table 4:** Effect of changes of agriculture services post devolution on household food security.

| FCS_Categories                    | Coef.  | St.Err. | t-value              | p-value | [95% Conf | Interval] | Sig |
|-----------------------------------|--------|---------|----------------------|---------|-----------|-----------|-----|
| Reliability of extension services | .173   | .075    | 2.31                 | .021    | .026      | .32       | **  |
| Farming practices                 | .03    | .086    | 0.35                 | .728    | -.138     | .198      |     |
| Provision of subsidized inputs    | .318   | .157    | 2.03                 | .043    | .011      | .625      | **  |
| Formal agricultural training      | -.052  | .153    | -0.34                | .736    | -.351     | .248      |     |
| Improved market linkages          | .366   | .167    | 2.19                 | .029    | .038      | .694      | **  |
| Livestock breeds                  | -.676  | .155    | -4.36                | .001    | -.98      | -.371     | *** |
| Increased farm income             | .295   | .13     | 2.27                 | .023    | .04       | .549      | **  |
| Access to farm inputs             | -1.278 | .21     | -6.07                | 0       | -1.691    | -.866     | *** |
| cut1                              | -.014  | .413    | .b                   | .b      | -.824     | .795      |     |
| cut2                              | 1.862  | .459    | .b                   | .b      | .963      | 2.761     |     |
| Mean dependent var                |        | 1.483   | SD dependent var     |         | 0.580     |           |     |
| Pseudo r-squared                  |        | 0.149   | Number of obs        |         | 325       |           |     |
| Chi-square                        |        | 87.715  | Prob > chi²          |         | 0.000     |           |     |
| Akaike crit. (AIC)                |        | 477.460 | Bayesian crit. (BIC) |         | 515.298   |           |     |

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ .

## CONCLUSION

The study demonstrates that post-devolution changes in agricultural services have had a considerable, albeit uneven influence on family food security. Results show that through positive drivers of devolved services such as subsidized inputs, enhanced market connections, increased farm revenue and dependable extension services, food security outcomes have been improved. On the other hand, problems like reliance on improved animal breeds without enough support services and disruptions in the availability of agricultural inputs have worsened household food security by increasing prices, management demands and production hazards. These findings highlight the importance of providing agricultural services while also ensuring consistency, reasonable pricing and alignment with auxiliary systems such as strong input supply chain, veterinary care and extension help. Maintaining family food security in a decentralized agricultural system necessitates a comprehensive plan that addresses the hazards of input access and expensive animal breeds while strengthening extension, subsidy programs, markets and revenue potential.

## Conflict of interest

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