



Social Predictors of Food Insecurity: The Case of Yatta Constituency, Machakos County, Kenya

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Abstract

In the year 2009, it was indicated that 9.8 million Kenyans were food insecure. In 2018 Kenya ranked number 77 worldwide of countries where hunger is serious with a hunger index of 23.2. The specific objectives of the study were to determine the level of food security and the relationship between demographic variables and household food security. The study was purely analytical using a sample of 388 poor households. Data was collected using interview schedules. To test food security level, a modified Household Food Insecurity Access Scale (HFIAS) score was used. To find out if any relationship exists between demographic variables and household food security, Chi-square test was used. Findings indicated that 18.7 percent of the households were food secure and that 63.5 percent of the households experienced severe food insecurity. The other findings were that there is no relationship between food security and gender and that there is a relationship between food security and education, occupation, and the number of children. Since the major variables that are found to contribute to food insecurity are educational level, employment and family size of the household, key interventions could be one the introduction of Extension Education with a vibrant Functional Literacy, two actualizing the three pillars of the green revolution namely; maximization of space, maximization of time and use of high yielding varieties and three introduction of community programs meant to educate the community on family size and food security.



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Introduction

Since Kenya's independence (1963), the major National Development Goals have been eradication of Poverty; Hunger; Diseases and Illiteracy. In the year 2009, findings from the Kenya Food Security

Steering Group indicated that 9.8 million Kenyans were food insecure, meaning they could not afford enough food to meet their daily needs (European Commission for Humanitarian Assistance 2009). In this regard the World Food Program (WFP) predicted

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that 1.5 million people in Kenya were going to need food assistance through early 2015 (WFP 2016). In 2018 Kenya ranked number 77 of countries where hunger is serious with a hunger index of 23.2.¹ Tracing Kenya's food security from 1963 to date, shows that the ideology underlying the country's search for adequate food has continued to centre on improving the supply of basic foodstuffs, mainly grain crops (Omosa, 1998:51).

While Kenya's mainstay is agriculture, the country's 80 percent of land is classified as Arid and Semi-Arid (ASALs), and these areas are home to approximately 30 percent of Kenya's people, 50% of its livestock, and 75 percent of wildlife.² Yatta (the study area) falls within the ASALs and it has five main livelihood zones as indicated in table 1 below.

Table 1: Population of Livelihood Zones in Yatta

Livelihood Zone	Total Population	Percentage
Mixed Farming: irrigated horticulture	9,176	0.85
Mixed farming: coffee/ Dairy and horticulture	356,921	32.96
Mixed farming: livestock/food crop/horticulture	645,891	59.65
Formal/ informal employment: ranching	8,196	0.76
Formal employment/business/trade	62,597	5.78

Source: Machakos District draft report short rains assessment, 2008

Yatta receives a bimodal type of rainfall of which short rains (SR) come in October – Dec and long rains (LR) in March to May. Short rains are the most reliable here. The annual rainfall on the average is between 250-1000mm with the highest masses receiving above 850mm. The main threats to food security are interrupted patterns of rainfall, low adoption rate of drought tolerant crops, none use of high yielding variety seeds and low access to farm inputs especially in the low lands. It is argued that 80 percent of households across Yatta consume food from their own produce with a few purchasing food from the market (Nkanya, 2000).

Whereas there are several claims on the predictors of food security, the major ones are; that gender equality (Asian Development Bank, 2013), age where food insecurity is more likely with young age as compared to old age (Strichouser *et al.*: 2015), number of household members (Harvest Help: 2013), head of the household with an argument that female headed have a lower probability of being food insecure (Adepoju and Adejare, 2013), and education with a claim that that households whose heads have no formal education have the highest food insecurity incidence (*ibid*). For this study the major question paused was whether all households with these characteristics experience food crisis

and if so what are the appropriate interventions to alleviate this crisis?

It is with this background that this study was designed to assess the factors contributing to the persistent food insecurity in Yatta. The specific objectives of the study were to determine the level of food security in the Yatta and determine the relationship between demographic variables and household food security.

Methods

The study was purely analytical using a sample of 388 derived from a population of 19,349 poor households in Yatta. The sampling technique was cross sectional. Demographic data was collected using interview schedules for household heads. To test food security level, a modified Household Food Insecurity Access Scale (HFIAS) score was used. HFIAS test is used to generally indicate whether a given group is Food secure, Food Insecure without Hunger, or Food Insecure with Hunger. For specificity, those indicators that have been mentioned variously as sources of food insecurity (gender of the household head, age of the household head, education level of the household head, occupation of the household head and number of children in a household) were tested using Chi-square. Chi-Square independent test was

used to find out if any relationship exists between these variables and household food security.

In order to evaluate household food security, the respondents were provided with questions which generated data on whether they had experienced certain situations over the last 12 months, which were indicators of household food security. The questions focused on four kinds of situations:

- Anxiety or perception that the household food budget or food supply was inadequate
- Perceptions that the food eaten by adults or children was inadequate in quality
- Reported instances of reduced food intake, or consequences of reduced intake, for adults; and
- Reported instances of reduced food intake or its consequences for children.

To conduct the analysis, it was first necessary to code the response to each question as either "affirmative" or "negative." The events had three response categories: "often true," "sometimes true," and "never true." For these events, both "often" and "sometimes" were considered affirmative responses because they indicate that the condition occurred in the household at some point during the year. "Never true" was considered negative.

According to Bickel *et al.*, (2000), each of these four groups of questions measures a cluster of central conditions or components of the experience of food insecurity and hunger as these are expressed at each of the successive stages, or ranges, of severity in the scale provided below.

	Up to 2.32	Up to 4.56	Up to 6.53	Up to 10
Food Insecure				
Food Secure	Food Insecure Without Hunger	Food Insecure with Hunger		
		(Less Severe)	(More Severe)	
		"Moderate"	"Severe"	

Source: Bickel *et al.*, (2000)

Results

Despite the emergence of cottage industries still agriculture is considered to be the mainstay of the rural economy in Kenya. It is assumed that majority of rural Kenyans are engaged in farming as their main occupation. To confirm this household heads were asked to indicate their main occupation which by extension is an indication of main pillar of the households' economy and the findings were that there is a slight shift from this line of thinking. The results of this study indicate 56 percent of the households reporting that farming is their main occupation. Others had taken into business (18 %), Formal employment including Teaching and clerical work in cooperatives (10%), Casual labor (9%), skilled labor such as driving and hair dressing (6%) and 1 percent working as landless laborers.

At the same time the study sought to establish the main source of food consumed in the household.

This was necessary in order to shed light on the sustainability of the source of food. It was established that majority (53.3%) of the households purchased food from the market. A significant proportion (44.8%) harvested their food from their farms and 1.9 percent relied on donations as their main source of food.

The respondents were further asked if they have been having enough food to consume at household level. This was meant to establish whether the households had adequate supply of food. The results were that 36.5 percent of the households sometimes did not have enough food to eat in the house, 19.7 percent had enough but not the kind they wanted to eat, 17.8 percent regularly experienced food shortage, 15.2 percent were unable to tell whether they had enough food or not. Only a small portion of the population (10.8%) reportedly having enough of the kinds of food they wanted to eat.

Majority of the households (89.2%) experience instances of food shortage. These findings are indicative of low purchasing power for those households that depended on the market for food supplies, poor performance of farming activities for the households that depended on their farms for food and low supply of food aid for the households that depended on food donations.

Households Experience With Events Indicative of Food Insecurity

The findings were that over 75 percent of the households experienced situation one of food insecurity namely, anxiety that the household food budget or food supply was inadequate. The same percentage of households reported to have experienced situation two where they perceived that the food eaten by adults or children was inadequate in quality. On the other hand, almost all (91.4%) of the adults in the households reported to have skipped meals in within the period of recall (one year). A significant percentage (67.6%) had skipped meals three months before the study was conducted. The same events were also reported in households with children.

A HFIAS score variable was calculated for each household by summing the codes for each frequency-of-occurrence question. All the questions (18) on food security were coded either as 1-for affirmative response and 0-for a negative response. The maximum score for a household was therefore 18 (the household responded in the affirmative to all the

items) and the minimum score was 0 (the household responded in the negative to all occurrence questions). Findings indicated that a substantial number of the households, 116 households (36.8%), had a score of eighteen. These were households prone to extreme hunger. Subsequently, the average Household Food Insecurity Access Scale score was calculated as follows:

$$\frac{\text{Sum of HFIAS Scores in the sample}}{\text{Number of households in the sample}} = \frac{3947}{315}$$

Average HFIAS = 12.53.

Accordingly, households with a score of up to 2.32 are categorized as food secure, those with a score of up to 4.56 are classified as food insecure without hunger, a score of up to 6.53 are categorized as moderately food insecure with hunger and a score of 6.54 and above are classified as severely food insecure with hunger. An average HFIAS of 12.53 therefore, means that on average the households in Yatta have a score of $12.53 \times 10 / 18 = 6.96$ and falling in the class of severely food insecure with hunger based on the classification scale.

Based on the scale provided by Bickel *et al.*, (2000), the frequency of categories of household food insecurity is provided in table 2 below.

Table 2: Categories of household food insecurity in Yatta

Category	Frequency	Percent
Food Secure	59	18.7
Food Insecure Without Hunger	29	9.2
Moderately Food Insecure with Hunger	27	8.6
Severely Food Insecure with Hunger	200	63.5
Total	315	100.0

Social Predictors of Food Insecurity

A Chi-Square test was carried out to find out the relationship between gender of the household head, age of the household head, education level of the household head, occupation of the household

head & number of children in a household and Food Insecurity. In these variables the researchers proceeded with a null hypothesis that the two attributes namely the variables mentioned above (gender of the household head, age of the household

head, education level of the household head, occupation of the household head and number of children in a household) and Food Insecurity were independent of each other. In all the tests, where the calculated Value of X^2 was less than the table value at a given level of significance for a given degree of freedom, the conclusion is that the two attributes are independent or not associated. Meaning that the variable in question is not a predictor of Food Insecurity. On the other hand, where the calculated Value of X^2 was found to be more than the table value at a given level of significance for a given degree of

freedom, the conclusion was that the two attributes are associated. Meaning that the variable in question is a predictor of Food Insecurity.

The first test was that of finding out whether the gender of the household head was a factor in Food Insecurity and the results summarized in table 3. The assumption here is that if there is dependency on the part of women then male headed households could be Food Secure as compared to female headed households.

Table 3: Gender of household head and Food Insecurity

Level of food security		Male	Female	Total
Food secure without hunger	Observed	56	32	88
	Expected Count	49.2	38.8	88.0
	% within level of food security	63.6%	36.4%	100.0%
Food insecure with hunger	Observed	120	107	227
	Expected Count	126.8	100.2	227.0
	% within level of food security	52.9%	47.1%	100.0%
Total	Observed	176	139	315
	Expected Count	176.0	139.0	315.0
	% within level of food security	55.9%	44.1%	100.0%

Pearson Chi-Square = 2.985; df = 1 and p= 0.084

Data presented in table 3 shows that gender of household head and Food Security were not significantly related ($\chi^2= 2.985$; df = 1; and p= 0.084). The table value of Chi Square for 1 degree of freedom and at level of significance 0.05 is 3.84.

meaning that the table Chi Square value is higher than the computed Chi Square value. The conclusion therefore, is that gender is not a predictor of Food Insecurity.

Table 4: Age of household head and household Food Insecurity

Level of food security		Age of the family head		Total
		≤ 40	≥41 years	
Food secure without hunger	Observed	38	44	82
	Expected Count	34.8	47.2	82
	% within level of food security	46.3%	53.7%	100%
Food insecure with hunger	Observed	88	127	215
	Expected Count	91.2	123.8	215
	% within level of food security	40.9%	59.1%	100%
Total	Observed	126	171	297
	Expected Count	126.0	171.0	297
	% within level of food security	42.4%	57.6%	100%

Pearson Chi-Square = 0.712; df = 1 and p= 0.399

Age is said to be another predictor of Food Insecurity where young age is associated more with food insecurity as compared to old age (Strichouser *et al.*, 2015). A Chi Square test to find out whether age is a factor in Food Insecurity the results summarized in table 4.

Data above clearly indicate that age of household head and Food Insecurity were not significantly

related ($\chi^2 = 0.712$; $df = 1$ and $p = 0.399$). The calculated chi square (0.712) is less than the table value of 3.84 at 1 degree of freedom and at level of significance 0.05. Therefore, the conclusion is that the two attributes are independent and therefore, irrespective of whether the head of the household was young or old, the families were susceptible to Food Insecurity.

Table 5: Level of Education of household head and household Food Insecurity

Level of food security		Level of education of family head		Total
		Up to Primary	Secondary and above	
Food secure without hunger	Observed	20	62	82
	Expected Count	39.0	43.0	82.0
	% within level of food security	24.4%	75.6%	100.0%
	% within Level of education of family head	14.3%	40.3%	27.9%
Food insecure with hunger	Observed	120	92	212
	Expected Count	101.0	111.0	212.0
	% within level of food security	56.6%	43.4%	100.0%
	% within Level of education of family head	85.7%	59.7%	72.1%
Total	Observed	140	154	294
	Expected Count	140.0	154.0	294.0
	% within level of food security	47.6%	52.4%	100.0%
	% within Level of education of family head	100.0%	100.0%	100.0%

Pearson Chi-Square = 24.599; $df = 1$ and $p = 0.000$

The other factor said to influence Food Insecurity is education with an argument that there is a correlation between the education level of the household head and food insecurity (Adepoju and Adejare (2013). A Chi Square test was done and the results summarized in table 5.

Data presented in table 5 above indicate that the level of education of household head and Food Security were significantly related ($\chi^2 = 24.599$; $df = 1$ and $p = 0.000$). The calculated Chi Square value of 24.599 is more than the critical value of 3.84 at 1 degree of freedom and at level of significance 0.05. It is therefore, concluded that there is a significant relationship between the level of education of household head and Food Insecurity.

It is also argued that household heads who are employed are able to alleviate their food crisis by supplementing the food from their farms with food bought using income from employment. Results for a Chi Square test on this are presented in table 6.

Data presented in table 6 show that occupation of household head and Food Insecurity were significantly related ($\chi^2 = 59.75$; $df = 1$ and $p = 0.000$). The calculated Chi Square value of 59.75 is more than the critical value of 3.84 at 1 degree of freedom and at level of significance 0.05 confirming that, the two attributes are related. Majority (68.3%) of the households who reported to be food secure without hunger did not engage in farming. The findings

suggest therefore, that there is need to improve existing agricultural practices among farmers considering that majority of the households engage in farming.

Table 6: Occupation of household head and household Food Insecurity

Level of food security		Occupation of Family head		Total
		Farming only	Others	
Food secure without hunger	Count	26	56	82
	Expected Count	54.2	27.8	82.0
	% within level of food security	31.7%	68.3%	100.0%
	% within Occupation of the family head	13.2%	55.4%	27.5%
Food insecure with hunger	Count	171	45	216
	Expected Count	142.8	73.2	216.0
	% within level of food security	79.2%	20.8%	100.0%
	% within Occupation of the family head	86.8%	44.6%	72.5%
Total	Count	197	101	298
	Expected Count	197.0	101.0	298.0
	% within level of food security	66.1%	33.9%	100.0%
	% within Occupation of the family head	100.0%	100.0%	100.0%

Pearson Chi-Square = 59.75; df = 1 and p= 0.000

Table 7: Number of children and household Food Insecurity

Level of food security		Number of children		Total
		Up to 2	3 or more	
Food secure without hunger	Count	11	11	22
	Expected Count	5.6	16.4	22.0
	% within level of food security	50.0%	50.0%	100.0%
	% within Number of children	52.4%	18.0%	26.8%
Food insecure with hunger	Count	10	50	60
	Expected Count	15.4	44.6	60.0
	% within level of food security	16.7%	83.3%	100.0%
	% within Number of children	47.6%	82.0%	73.2%
Total	Count	21	61	82
	Expected Count	21.0	61.0	82.0
	% within level of food security	25.6%	74.4%	100.0%
	% within Number of children	100.0%	100.0%	100.0%

Pearson Chi-Square 9.388; df = 1 and p= 0.002

The final test of the social predictors of Food Insecurity was family size. It is argued for example, that poor African have the highest growth rate in the world which putting them at high risk of food insecurity. It is estimated that if the current growth rate continues, Africa will produce enough food

for only about a quarter of its population by 2025. (Harvest Help, 2013). A Chi Square test was done and the results summarized in table 7.

Data above indicate that there was a relationship between the number of children and level of household Food Insecurity ($\chi^2 = 9.388$; $df = 1$ and $p = 0.002$). The value of Chi Square for 1 degree of freedom and at level of significance 0.05 is 9.388. The calculated Chi Square value of 9.388 is more than the critical value of 3.84 at 1 degree of freedom and at level of significance 0.05 confirming that, the two attributes are related

Discussion

The findings in this study shows a counter relation between Agriculture as the mainstay of the rural population and individual farm products serving as the main source of food consumed at household levels. For this case although agriculture is the mainstay of the Yatta people, individual farms do not serve as the main source of food consumed in the household. This argument is supported by findings by Davis *et al.*, (2017) who points out that families in rural Africa depend mostly agriculture simply because most of these households draw about two-thirds of their income from on-farm agriculture. Meaning that such households' income is complemented by other activities such as small scale businesses, permanent or casual labour and cottage industries. For the Yatta case it is obvious that farming cannot sustain families in terms of economic needs and Food Security for two main reason: One, on average household farm sizes are small with low or no technological support to boost productivity and two the area is semi-arid with farmers relying on the little available rain for their farming. Davis *et al.*, (ibid) argue that most off-farm income in Africa comes from informal self-employment, with rural households more involved in nonfarm household enterprises (often closely related to agriculture) than in wage employment (agricultural and non-agricultural).

One explanation therefore, why 53.3 percent of the households had the market as their main source of food is that that produce from their individual farms was not enough to sustain their food needs. This only indicates that these household have to engage in off-farm activities to be able to meet their food needs. This could be one of the reasons why Davis

et al., (ibid) suggest that for effective policy design there is need for inclusive growth with improvements in agricultural productivity. This they say needs an appreciation of the interplay between spatial issues such as agricultural pull factors from urban and households' endowments and incentives.

Evidently, both adults and children in the study area were vulnerable to Food Insecurity in Yatta. Findings similar to the ones in this study where there is lack of any significant relationship between age of the family head and food insecurity were reported by Faridi and Wadood (2010). It can be argued therefore, that relying entirely on farming does not provide any advantage for both young and old. And that crop failure does not discriminate based on age of the household head. It can be argued that where there is majority of young people faced with insecurity that could be implying absence of diversified sources of livelihoods within young families. This adding to low education standards in Yatta can easily lead to cyclic poverty for families relying on entirely on agriculture. This may also be compounded by rising levels of unemployment even after acquiring education.

The question is what could be contributing to this? As stated earlier, there are arguments that gender is a factor in Food Insecurity (Adepoju and Adejare:2013). Going by strict African traditions and values, Food Insecurity could be directly attributed to male failing to manage their household activities. The advancement of this argument has been based on the fact that in strict African Traditional Setting, several homesteads with a common claim to an immediate ancestor formed independent units each unit being under the leadership of the oldest male person in that unit. These oldest male played key specialized roles in maintaining the structures and organization of the unit they were in charge of in the form of authority figure, adjudicator, property allocation and management of property to ensure family welfare. This arrangement for a long time relegated female headship and female authority in homesteads and by extension households. Adding to that most farms and farming activities in the rural areas have been for a long time managed and directed by the male. Contrary to this believe, findings of this study indicate that there is no relationship between gender and food insecurity. The finding therefore, negates the old school of

thought that female headed households having a lower probability of being Food Security. With the emergency of gender empowerment and gender equality women are now empowered and are better household managers.

In regard to the findings that there is a relationship between the education level of the household head and food insecurity, the finding concurs with Haile *et al.*, (2005). who reported that a probability of household food security increasing with improved education. In the case like this where there is food insecurity with hunger immediate recommendation will be to enhance levels of education alongside a vibrant Extension Education with emphasis of functional literacy. Food security can also be achieved by empowering and encouraging households to move from traditional farming methods to modern methods that can guarantee adequate food production in the households. There is also need to encourage households to compliment farming with other income generating activities. Key to this diversification is the improvement on the level of participation and achievement in education of the children in the households in order to break the cyclic nature of poverty. Improved participation and achievement in education is associated with improved life chances and earnings.

Haile *et al.*, (2005) is of the view that size of the household has an impact food security and that an extra member in the household reduces food security by five percent. Based on the data obtained from the study, households with 3 or more children was

an indication of food insecurity. Thus, households need to plan their families to manageable numbers.

Conclusions

It is evident that over 75 percent of the households in Yatta experienced food insecurity anxiety. Yatta has an average HFIAS of 12.53 translating to a mean score of 6.96 therefore, falling into the class of severely food insecure with hunger. Yatta has only 18.7 percent of the households who are food secure. Majority (63.5%) of the households are severely food insecure with hunger. Since the major variables that are found to contribute to food insecurity are educational level of household heads, employment of the household heads and family size of the household, key interventions could be first a vibrant Extension Education with emphasis on Functional Literacy. There is also need to introduce community programs meant to educate the community on family size and food security. In addition to that for arid and semi-arid areas like Yatta whose residents rely on agriculture an actualization of the three pillars of the green revolution namely; maximization of space, maximization of time and use of high yielding varieties could be an additional value in as far as food security is concern.

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Conflict of Interest

The authors do not have any conflict of interest.

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