

**ROLE OF LIVESTOCK PROJECTS
IN EMPOWERING WOMEN SMALLHOLDER FARMERS FOR
SUSTAINABLE FOOD SECURITY IN RURAL KENYA**

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ABSTRACT

Women are a major human resource and assure adequate nutrition, health and cognitive development of their households and children in their formative years. However, women are over-represented among the poor, suffer heavy workloads and have little control over resources for family care. Poverty and food insecurity are enhanced by lack of access to, and control over assets, and lack of access to institutions that provide opportunities and buffer from shocks and crises. The need to improve household food security and empower women in households has seen the implementation of agricultural projects, particularly livestock projects that target women smallholder farmers. These projects are used as one of the major strategies to expand agricultural output in rural areas. Livestock contributes a higher share of income to rural households, improves food security and possibly enhances women's participation in civic activities. Livestock development projects seek to empower women through increased household incomes, improve household incomes of women and nutritional status of women and other members of the households. This paper sought to establish a link between participation in livestock projects, socio-economic status and nutritional status of index women. A cross-sectional survey with a case-control model was conducted to establish the link between participation in a livestock project. Socio-economic and nutritional status of women from beneficiary and non-beneficiary households of livestock projects in Vihiga District, Kenya was assessed using both the Body Mass and the Brokas Index. A total of 300 beneficiary and non-beneficiary women were interviewed and their heights and weights measured during the study. Results revealed better incomes, education levels and nutritional status among the beneficiary women. Development projects can attain their objectives when there is deliberate effort to ensure that the project goals are understood by all stakeholders, to create commitment to resource re-direction and embrace the purpose of the project. There has to be proper understanding of the familial and community cultures and practices if the course of women is to be addressed profitably, with full support of their husbands and the entire household for the success of the project.

Key words: Food security, women, livestock projects

INTRODUCTION

Women are a major human resource and assure adequate nutrition, health and cognitive development of their households and children in their formative years. However, women are over-represented among the poor, suffer heavy workloads and have little control over resources for family care. Women farmers are involved in slow cash generating activities than men [1, 2], and remain overrepresented among the poor. Poverty and food insecurity are enhanced by lack of access to, and control over assets, lack of access to institutions that provide opportunities and buffer from shocks and crises. Malnutrition increases morbidity and mortality and, reduces education attainment and livelihood skills and options. This has spiral effects on future generation's work capacity and general development. Households' ability to resist societal challenges and shocks is thus compromised and human capital decreases. There is increased awareness of the need to empower women through measures to increase economic, social and political equity, and improvements in nutrition, health and education. The need to improve household food security and empower women in households has seen the implementation of agricultural projects, particularly livestock projects that target women smallholder farmers [3, 4, 5, 6]. These projects are used as one of the major strategies to expand agricultural output in rural areas. Livestock provide over half of the value of global agricultural output and one third in developing countries. Livestock contributes to rural livelihoods, employment and poverty relief [7].

A wide range of programmes have been initiated including agriculture and rural development projects that seek sustainable and equal development for all. The contribution to poverty reduction and food security is through promotion of food security, agro-industrial development, trade, water supply, rural employment and sustainable utilization of natural resources. The National Agriculture and Livestock Extension Programme (NALEP) as a poverty reduction and food security strategy are spread in forty two local areas and covers 1 600 farmers in Vihiga District, Kenya. The objectives are to facilitate local farmers identify their problems, design activities to solve them with a view to improving productivity, besides enhanced generation of farm incomes and sustainable resource use. This programme also seeks to establish proper working linkages between farmers while contributing to the national goal of poverty eradication and wealth creation through improved productivity.

The Livestock Development strategy covers twenty women groups in the District, and seeks to promote dairy development so as to improve nutritional status of populations and empower women socially and economically, so that they can participate in decision making and overall community development. Women in agriculture need sustainable economic empowerment whose first pillar is sustainable food production. Many women work as farmers, farm workers and natural resource managers and hence contribute to national agriculture output.

Livestock contributes a higher share of income to rural households, improves food security and possibly enhances women's participation in civic activities. Gender

equality is good for nutritional status improvement [8]. In unequal conditions women and girls have poorer nutrition outcomes throughout the lifecycle, high rates of mortality, less access to health care and greater household food insecurity [9-12]. With increasing male out-migration and feminization of rural poverty, there is even a greater need to improve women's income levels and household food security situation. Projects that target women seek to empower them for their economic independence and enhancement of their participation in social and economic development of their communities. Despite the intense efforts of many development projects and programmes, there has been little success due to cultural and familial beliefs and practices that influence the decision-making environment.

Livestock projects that target women smallholder farmers can achieve greater success with careful planning, targeting and implementation. Distributing livestock to women may not necessarily benefit them in the household because it increases their workload and drudgery. Benefits accruing from dairying may not be commensurate with women's labour and time contribution.

Women need better access to credit, labor-saving technologies, agricultural and nutrition extension information, and a greater access to and control over income. Livestock project is a holistic service program that integrates training in primary production, marketing and other tertiary activities. The activities of livestock projects are upgrading cattle herds, supporting womens' groups, fodder production, milk marketing, monitoring and evaluation. In-calf heifers are 'loaned' to selected women groups, and members fitting specified criteria. A written contract with recipients "to repay loan" through "passing on the gift" is made. This involves giving the first female offspring (or heifer) from the dairy cow to the next family in the group. The payback is essential for active participation in group-training and other activities. Beneficiaries of livestock projects must have an established Napier grass (*Pennisetum purpureum*) plot, a standard zero-grazing unit and basic facilities for disease. This mode of targeting excludes the very poor who may be food insecure and in real need of intervention. Once a womens' group is selected, its officials are trained in dairy management, accounts and record keeping. Workload easing appliances such as roof catchments, cement tanks, chuff-cutters, wheelbarrows, and energy-cookers are also given to these women on a cost-sharing basis to motivate them to participate in the project.

The Livestock development projects sought to empower women through increased household incomes, improved women's incomes and nutritional status of women and other members of the households. Improving both the incomes of women and household food situation enhances their social image and empowers them in decision making at the household and community level. This paper sought to establish a link between participation in livestock projects, socio-economic status and nutritional status of index women.

METHODOLOGY

The Study Site: Vihiga District in Western Province of Kenya lies at an altitude of 1300-1500m above sea level, sloping gently from the East to the West, with undulating hills and valleys. Average rainfall is 1900mm per annum and ranges between 1800-2000mm with a temperature range of 14⁰-32⁰C averaging at 23⁰C. Vihiga is composed of two agro-ecological zones. The Upper Midland zone has well drained fertile soils for crops like tea, coffee, maize and beans. The Lower Midland Zone is composed of red loamy soils from sediments and basement rocks with crops like sugarcane, maize, beans and sorghum. The district covers an area of 563 square kilometers with a total populations of 550 800 people living in 105 701 households, and an average population density of 978 persons per square kilometer. The average household size is 4.5 with an average of 37 691 female headed households, a fertility rate of 5.5% and a population growth rate of 3.3% that is higher than the national average of 2.4%.

The Study Design and Sampling: The study was carried out using a cross-sectional survey design with a case-control model. An overall sample was 300 households, where 150 beneficiary and 150 non-beneficiary households were randomly selected for the study. A list of women beneficiaries of the LDP was obtained from the Divisional Livestock Extension Office. This list was used to randomly select women beneficiaries of the LDP for participation in the study. The criterion for selection of women beneficiaries for the purpose of this study was membership in a dairy programme for not less than three consecutive years. Women non-beneficiaries of the LDP were purposely selected and matched with the beneficiaries of the LDP for locality, age group range and socio-economic status.

Data Collection: Pre-tested interview schedules were used to collect data on socio-demographic and agro-economic characteristics of index households. Anthropometric measurements of women were taken using standardized techniques. Body Mass Index (BMI) and Brokas Index were used to classify women in their levels of nutritional status. Body Mass Index [BMI] was used as an indicator of nutritional status for women and grouped to reflect different degrees of Chronic Energy Deficiency [CED] and obesity [13]. Women falling below 18.5 were considered malnourished, while those below 16 were classified as severely malnourished.

Data analysis: The mean and standard deviation of scores were calculated and Z-test was used to assess the significant differences between the two groups. Correlation coefficient between the sets of scores was found out to identify the degree of association. The socio-demographic and agro-economic data were analyzed using chi-square, Z-test and ANOVA. Correlation of these variables with indices of nutritional status was carried out to find the associated variables.

RESULTS

Socio-demographic Characteristics:

The total population under 15 years was 38% and 39% males from households of beneficiary and non-beneficiary women, respectively, and 36.6% females in beneficiary and 43% females in the non-beneficiary households. There were more females in the households of non-beneficiary women than males, unlike the households of beneficiary women. The mean age was 24.01 (± 18.02) and 22.87 (± 17.22) in households of beneficiary and non-beneficiary women respectively among males. The mean age among females was 23.01 years and 20.35 years from households of beneficiary and non-beneficiary women, respectively. While there was no significant difference in the mean age of males between beneficiary and non-beneficiary groups, a significant difference ($P < 0.01$) between the two groups with respect to mean age of females was found.

Females from households with beneficiary women tended to be older than those from households with non-beneficiary women. About 14.7% households of beneficiary and 18.5% households of non-beneficiary women had small families (less than 5 members). While 27.3% households of beneficiary women had medium family (5-6 members), about 35.8% households of non-beneficiary women had medium families. Large families (over 6 members) were observed in 58% of households of beneficiary women and 45.7% in households of non-beneficiary women. The mean family size was 7.04 in among households of beneficiary women and 6.54 in households of non-beneficiary women. Dependency ratio was 1.1.68 in the households of beneficiary women and 1:1.37 in the non-beneficiary women.

Only 37.7% male heads of households in the beneficiary group had up to primary level education compared to 58.8% male heads of households from the non-participant group. Thus more than half of the male heads of households in the non-beneficiary group had low level of education. Among the female heads of households 57.4% and 76.8% women from the beneficiary and non-beneficiary households, respectively had low education. Employment structure of female heads revealed a statistically significant difference ($P < 0.01$) between the two groups. More females from the beneficiary group (57.3%) were employed compared to only 38.4% women from the non-beneficiary group. Significant differences were observed between the two groups concerning employment as primary school teachers ($P < 0.001$) and high school teachers ($P < 0.05$), with more beneficiary women highly represented in both teaching professions.

Factors of Productivity of the Livestock Enterprise

Factors of productivity included livestock herd size, income, animal feeding, consumption and marketing. Change in livestock herd size was significantly different between the households of beneficiary women and those of non-beneficiary women regarding increase ($P < 0.001$), decrease ($P < 0.001$), and no change ($P < 0.001$) in herd size. Households of beneficiary women had both higher rates of change of herd size,

while there was no change in herd size in most of the households of non-beneficiary women. Details of source, type of animal feed, and mean expenditure on animal feed by beneficiary and non-beneficiary households was different between the two groups. There was a statistically significant difference between the two groups regarding source and type of feed ($P < 0.00001$). Households of beneficiary women spent more money income on Napier grass (*Pennisetum purpureum*) from other farms, and on dairy supplements and concentrates than the households of non-beneficiary women.

Mean milk production was significantly higher ($P < 0.00001$) in the households of beneficiary women over those of non-beneficiary women. The mean milk production was 268.14 litres/month and 89.7 litres/month in households of beneficiary and non-beneficiary women respectively. Mean *per capita* milk consumption by preschool children was higher ($P < 0.001$) in the beneficiary group (170 grams/day) compared with the non-beneficiary group (30 grams/day). The dairy programme had a significant impact in improving amount of milk consumed by preschool children in the beneficiary group. Mean *per capita* milk consumption by family members was significantly higher ($P < 0.001$) in the beneficiary group (240.9 grams/day) compared with non-beneficiary households (79 grams/day).

Marketed surplus of milk was different between the two groups. The significant difference between the two groups with respect to marketed surplus of milk ($P < 0.001$) was very high. The mean marketed surplus milk was 7.43 litres/day and 2.48 litres/day in households of beneficiary and non-beneficiary women, respectively.

Sources of Household Income and Expenditure

The details of mean income and per capita income are indicated in Table 1. Monthly household income and mean income was significantly between households of beneficiary and non-beneficiary women ($P < 0.05$) and mean household income ($P < 0.001$), respectively. While 30.7% participant households earned over 5000 Kenya shillings (KShs.), 51.4% of households of non-beneficiary women earned less than KShs. 5000 a month. Mean income (\pm SD), without logarithmic transformation, of $7914 \sim 44 \pm 6402 \sim 76$ and $6165 \sim 09 \pm 4887 \sim 92$ for beneficiaries and non-beneficiaries respectively, was significantly different between F-value 6-55, $p = 0.110$.

The household *per capita* income was assessed. Only 25.6% households of beneficiary women had per capita income of KShs 600.00 compared to 35% households of non-beneficiary women. Though mean *per capita* income was higher in the beneficiary households than in the non-beneficiary group, the difference was not significant. Cash income derived from marketed surplus of milk per day significantly different was observed between the households of beneficiary women and households of non-beneficiary women with respect to money income and mean income from marketed surplus of milk per day. Mean income from marketed surplus of milk was KShs.181.40, KShs.56.19 in households of beneficiary and non-beneficiary women, respectively per day.

Mean *per capita* income (standard deviation) was kshs.1270.17 \pm 947.56 and 1249.99 \pm 1213.0 for households of beneficiary and non-beneficiary women, respectively and was not significantly different between the two groups. A significant difference was observed between the two groups in terms of total monthly income ($P < 0.05$) and mean household income ($p < 0.05$) after logarithmic transformations.

Effort was made to compare the income from selected sources and expenditure on household items (Table 2). Significant differences were observed in the income from selected source and expenditure. The income and expenditure was higher among the households of beneficiary women than those of the non-beneficiary group for most of the variables. Though there was no significant difference on the expenditure on purchase of staple, the expenditure was high in the beneficiary group. The dairy programmes have significant improvement in their income and hence improve both their socio-economic status and purchasing power.

Nutritional Status of Women

The age, weight and height of women was measured. Birth certificates, birth notifications and baptismal cards of the respondents were used to estimate the age of the respondents. Mean age was 38.42 \pm 8.0 for beneficiary and 37.71 \pm 7.77 for the non-beneficiary group. Beneficiary group was slightly older than the non-beneficiary households. Beneficiary group had significantly ($P < 0.001$) large family size than the non-beneficiary group, and also had higher dependency ratio 1.1.68 compared to 1.1.37. Mean weight was 60.86 \pm 12.44 and 59.23 \pm 10.61 for households with beneficiary and non-beneficiary women, respectively. Mean height was 1.61 \pm 0.08 and 1.61 \pm 0.07 among the beneficiary and non-beneficiary group, respectively.

Malnutrition must be considered in terms of under-and-over nutrition. Prevalence of obesity among women was 6% and 4.5% in beneficiary households (Table 3). There was no statistically significant difference in the nutritional status of women from the two groups.

The mean BMI values of 23.4 and 22.94 in households with beneficiary and non beneficiary women respectively were above the mean national BMI values of 21 for Kenya. There was no significant difference between the two groups with regard to body mass index as measured by age. Body mass index tended to be better among younger women (<40 years) than older women (Table 4). Only 6.7% and 7.3 % beneficiary and non-beneficiary, respectively below 18.5 and was better than the national average of 9% below cut -off of 16.0 for severe malnutrition. On the other hand prevalence of under nutrition was 7.4% and 8.6% among women beneficiaries and women non-beneficiaries, respectively.

Prevalence of severe malnutrition was 0.7% among women beneficiaries. Nutrition status was further classified by Broka's Index (Table 5). There was no significant difference in the nutrition status of women from the two groups as measured by Broka's index. Younger women tended to have better nutritional status than older women. Prevalence of malnutrition was higher with Broka's index than with BMI.

Broka's index can be useful for surveillance and nutritional intervention where undernourished cases are not missed out.

DISCUSSION

Education level of male and female heads of households was fairly low and with lack of reading practice most households are likely to recede into illiteracy. Level of education (57.4% and 76.8%) among women from households of beneficiary and non-beneficiary is disheartening. Increasing women education is a key ingredient for women's empowerment. Education is not only crucial for improving quality of life but it is a major factor in bringing about changes, which affect nutrition. There is a direct link between education and employment where the more educated one is, the higher and better the job opportunities and the better the income. Both factors have a resultant and determining effect on the occupation, and finally on the income earned in a household. The ability of women and girls to empower themselves economically and socially by going to school or by engaging in productive and civic activities outside the home is constrained by their responsibility for everyday tasks in the household division of labor.

Households with heads who are more educated will more often than not have higher incomes and increased ability to purchase staples. Members of successful groups may have parents with higher levels of schooling, fewer siblings to compete with for parental time and family resources and have mothers who are less likely to work when young children are in households. Positive relationship between educational attainments across generations reflects intergenerational transmissions of human wealth. If parents have low levels of schooling and other forms of human capital then human capital of their children will be affected. The environment is also important as lower stocks of human capital will be converted into lower relative earnings and a higher incidence of poverty. One's socioeconomic background is a determining factor to one's present socioeconomic condition [14]. Education is one of the most important factors accounting for increased female labor force participation.

Employment opportunities for women are critical for empowerment and food security. More women from the beneficiary group were in employment than those from non-beneficiary group, though level of employment for women was generally very low. Education is one of the most important factors accounting for increased female labor force participation. Unemployment and occupational segregation are greater for poor women. Women's participation in the labor force lowers the disproportionate levels of poverty among women, raises household income and encourages economic development

Monthly income and mean income was higher in beneficiary household. Increasing women's earnings and share of family income empowers women by strengthening their bargaining power in the household. Where women have greater say in spending priorities, they would be far more likely to spend family and community resources for improving health, education, community infrastructure and eradication of poverty

[14]. Increasing women's earnings and share of family income empowers women by strengthening their bargaining power in the household. Where women have greater say in spending priorities, they would be far more likely to spend family and community resources for improving health, education, community infrastructure and eradication of poverty.

Women's participation in paid employment outside agriculture has increased while women's work continues to be characterized by a concentration in low status and low pay jobs, which are often temporary and informal. More women from the beneficiary group than the non-beneficiary group are in formal employment. These women bear a disproportionate share of responsibilities at home and in the livestock enterprise. Most of their work in the home is unpaid work. This further restricts their access to employment opportunities outside of the home. Increasing women's participation in paid employment is one of the most important strategies for poverty reduction, as is the promotion of women's entrepreneurship.

Livestock projects have played a key role towards empowerment of women and are key to their economic empowerment. Women's access to and control over productive and economic resources is central to their empowerment, if the cultural beliefs to ownership of large livestock in the home can change. Women are at the centre of sustainable social and economic development, poverty reduction and environmental protection. The role of women in employment and economic activities is often underestimated because most women work in the informal livestock sector with little or no social protection.

There are important factors at the social and cultural level there are important factors which serve to slow progress towards the achievement of women empowerment. Thus, traditional social structures may offer only limited incentives for changing the existing distribution of power between men and women, especially to those with a vested interest in maintaining the status quo. This may go some way to explaining why specific gender-related actions are not always regarded as high priority and why, in most country strategies, gender is a subsidiary issue.

The participation of women in livestock and other development projects enhances their decision-making for their empowerment and is also crucial for in building synergies across different sectors for total community development. Increased participation of women in decision-making may have a positive impact on development priorities and poverty reduction. Empowerment of women enables them to make decisions that are for general lifestyle improvement for the entire community. Culture of the community is a major impediment to the empowerment of women since men view women as any other property in their compounds in this rural community. Livestock projects seek to increase women's social status and security has within their families and communities as they become more independent and successful income earners. Rural women remain invisible despite their number, crucial role in family well-being and social welfare and general development that is imperative for community development.

CONCLUSION AND RECOMMENDATIONS

There were better education, incomes and nutritional status in the beneficiary group. Such projects could be adopted on a wider scale with careful consideration of the entire community. The LDP's failed to mainstream the cultural factors that impede the development of women and also lacked sensitization and community awareness of the potential benefits of the project.

For development projects to attain their objectives there has to be deliberate effort to ensure that the project goals are understood by all stakeholders, to create commitment to resource re-direction and embrace the purpose of the project. An understanding of the familial and community cultures and practices proves useful in enhancing the course of women with full support of their husbands and the entire household for the success of the project.

Table 1: Per capita and Mean Income (Kshs per month) in beneficiary and non-beneficiary households in a livestock Development project area in Vihiga District

| Per capita Income level | Beneficiaries | | Non Beneficiary | |
|--|---------------|--------|-----------------|--------|
| | No | (%) | No. | (%) |
| <800 | 45 | (40.2) | 70 | (50) |
| 800 – 1200 | 31 | (22.6) | 24 | (17.1) |
| 1200 – 2000 | 31 | (26.6) | 35 | (25.1) |
| 2000 – 2800 | 14 | (10.2) | 9 | (6.4) |
| >2800 | 7 | (5.1) | 7 | (5.0) |
| Total | 137 | (100) | 140 | (100) |
| Mean Income (Kshs) | | | | |
| < 4999 | 42 | 30.7 | 72 | 51.4 |
| 500 – 9999 | 53 | 38.7 | 43 | 30.7 |
| 1000 – 14999 | 28 | 20.4 | 13 | 9.3 |
| 15000 – 19999 | 9 | 6.6 | 6 | 4.3 |
| 20000 – 24999 | 4 | 2.9 | 5 | 3.6 |
| 30000 – 34999 | 0 | 0.0 | 1 | 0.7 |
| 60000 – 64000 | 1 | 0.7 | 0 | 0.0 |
| Note: Chi-square (df) = 17.10 (6) P<0.01 | | | | |

Table 2: Mean (\pm SD) income from household sources and expenditure on selected items among the beneficiary and non-beneficiary group of a Livestock Project

| SOURCE | BENEFICIARY | NON-BENEFICIARY | F-VALUE | SIGN LEVEL |
|------------------------------|--|--|------------------------------|----------------------|
| MEAN INCOME | | | | |
| Sale of crops Harvested | 9.305-15 \pm 13250.65 (3.69 \pm 0.51) | 760-83 \pm 6904-63 (3.66 \pm 0.51) | 0.3306 (0.05) | NS |
| Household income | 7914-44 \pm 6402-76 (3-81 \pm 0.28) | 6165-09 \pm 4887.92 (3-68 \pm 0.31) | 6.55 13.27 | 0.01 0.003 |
| Calve disposal | 7311.11 \pm 5797.76 (3.74 \pm 0.34) | 3000.00 \pm 1969.96 (3.41 \pm 0.24) | 14.81 (23.30) | <0.001 <0.00001 |
| EXPENDITURE | | | | |
| <i>Purchase of staple</i> | | | | |
| Maize | 7644-72 \pm 8082-35 (3-71 \pm 0-39) | 6049-89 \pm 5518-49 (3-62 \pm 0.42) | 3.39 (3.19) | NS |
| Beans | 4494.73 \pm 8123.42 (3.38 \pm 0.46) | 3833 \pm 729.69 (3.25 \pm 0.50) | 0.26 (2.52) | NS |
| Hired labour | 285.93 \pm 525.95 | 10.26 \pm 72.87 | 40.45 | <0.0001 |
| <i>Veterinary Service</i> | | | | |
| Government services | 693.57 \pm 1407.94 (2.58 \pm 0.39) | 320.00 \pm 168.08 (2.46 \pm 0.22) | 0.35 (0.49) | NS |
| Private Service | 631.53 \pm 770.75 (2.57 \pm 0.04) | 474.50 \pm 485.00 (2.44 \pm 0.55) | 0.38 (0.65) | NS |
| Self Treatment | 324.69 \pm 530.61 (2.10 \pm 0.58) | 180.0 \pm 51.96 (2.24 \pm 0.12) | 0.21 (0.18) | NS |
| Repay loan | 2700.00 \pm 3187.48 3.23 \pm 0.44) | 0.0 \pm 0.0 (0.0 \pm 0.0) | Z. value 10.37 (90.50) | 0.000001 0.000001 |
| Agricultural improvement | 8000.00 \pm 12140.72 (3.42 \pm 0.69) | 0.0 \pm 0.0 0.0 \pm 0.0 | 8.07 (19.26) | <0.001 0.00001 |
| Increase in dairy size | 1511.46 \pm 1736.48 (3.03 \pm 0.34) | 1380.00 \pm 828.35 (3.06 \pm 0.28) | F. value 0.06 (0.09) | NS |
| Non-food purpose | 2297.88 \pm 2327.46 (3.16 \pm 0.44) | 1010.00 \pm 1164.26 (2.71 \pm 0.65) | 1.48 (4.33) | NS <0.05 |
| Income from marketed surplus | 183.40 \pm 156.50 (2.15 \pm 0.32) | 56.19 \pm 41.42 (1.65 \pm 0.31) | 16.85 (54.62) | <0.001 <0.00001 |

NOTE: NS – Not significant
 Figures in parentheses are logarithmic transformation value.

Table 3: Nutritional status of women as measured by body mass index BMI

| Particulars | No | | % | | Z-value | Sign level |
|----------------------|----|-----|------|------|---------|------------|
| | BH | NBH | BH | NBH | | |
| <16CED 111 | 1 | 2 | 0.7 | 1.3 | 0.53 | NS |
| 16 – 17 CED 11 | 2 | 0 | 1.3 | 0.0 | 1.41 | NS |
| 17 – 18.5 CED 1 | 7 | 9 | 4.7 | 6.0 | 0.50 | NS |
| 18.5 – 20 Low weight | 17 | 10 | 11.3 | 6.6 | 1.42 | NS |
| 20 – 25 Normal | 84 | 98 | 56.0 | 65.6 | 1.60 | NS |
| 25 30 Obese I | 30 | 25 | 20.0 | 16.6 | 0.76 | NS |
| >30 Obese II | 9 | 7 | 6.0 | 4.5 | 0.58 | NS |

BH – Beneficiary household
 NBH- Non beneficiary household
 NS - Not significant

Table 4: Prevalence of malnutrition by age as measured by Body Mass Index (BMI)

| BMI | Age | | Years | | TOTAL |
|--------------|-----------|-------------|-------------|-------------|--------------|
| | <40 NB | NBH | >40 NB | NBH | |
| < 18.5 | 3 | 4 | 7 | 6 | 20 |
| Count | 15.0 | 20.0 | 35.0 | 30.0 | 6.6 |
| Row % | 3.5 | 4.2 | 11.3 | 10.7 | ? |
| Column % | | | | | |
| 18.5 – 25 | 63 | 75 | 41 | 34 | 213 |
| Count | 29.6 | 35 | 19.2 | 16.0 | 70.8 |
| Row % | 71.6 | 78.9 | 66.1 | 60.7 | ? |
| Column % | | | | | |
| 25 – 30 | 19 | 13 | 8 | 12 | 52 |
| Count | 36.5 | | 15.4 | 23.1 | 17.3 |
| Row % | | 25.0 | 12.9 | 21.4 | ? |
| Column % | 21.6 | 3.7 | | | |
| ≥ 30 | 3 | | 6 | 4 | 16 |
| Count | | | 37.5 | 25.0 | 5.3 |
| Row % | 18.8 | 18.8 | 9.7 | 7.1 | 5.3 |
| Column % | 3.4 | 3.2 | | | |
| TOTAL | 88 | 95 | 62 | 56 | 301 |
| | 89 | 31.6 | 20.6 | 18.6 | 100.0 |

Table 5: Prevalence of malnutrition by age among women by Brokers Index

| Brokas Index | Age (years) | | | | TOTAL |
|--------------|-------------|-------------|-------------|-------------|--------------|
| | NB | NBH | NB | NBH | |
| <80 | | | | | |
| Count | 6.0 | 7 | 8 | 5 | 26 |
| Row% | 23.1 | 26.9 | 30.8 | 19.2 | 8.6 |
| Column% | 6.8 | 7.4 | 12.9 | 8.9 | |
| 80 –120 | | | | | |
| count | 77 | 80 | 45 | 45 | 247 |
| Row % | 31.2 | 32.4 | 18.2 | 18.2 | 82.1 |
| Column % | 87.5 | 84.2 | 72.6 | 72.6 | |
| >120 | | | | | |
| Count | 5 | 8 | 9 | 6 | 28 |
| Row% | 17.9 | 28.6 | 32.1 | 21.4 | 9.3 |
| column | 5.9 | 8.4 | 14.5 | 10.7 | |
| Column | 88 | 8 | 62 | 56 | 301 |
| TOTAL | 29.2 | 31.6 | 20.6 | 18.6 | 100.0 |

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