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# The Relative Importance of Per Capita Expenditure on Animal Protein by Different Income Categories in Egypt's Urban and Rural Sectors

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## ABSTRACT

Animal protein is one of the important elements for human body after water. It is responsible for carrying out several functions like the construction of cells, tissues, and muscles, in addition to growth. The amount of protein an average human body needs per day is estimated at 0.6-0.8 grams per each kilogram of weight. It is worth noting that a continuous lack of protein leads to underweight, There for The study aims to identify the current state of individual expenditure on animal protein sources and the main influencing factors at the level of urban and rural sectors in Egypt, in order to provide economic policy makers with information on the main reasons for the declining per capita expenditure on these commodities, which helps them make proper decisions to raise per capita share of such important food commodities while formulating economic policies. The study proved that Average production of red meat amounted to 980.8 thousand tons, whereas average consumption amounted to 1186.2 thousand tons, and average per capita share of red meat reached 12.3 kg/year. The decline in per capita share of red meat from 16.6 kg/year to 9.7 kg/year can be explained by the increase in consumer prices ,and poultry, average production amounted to 948.6 thousand tons, whereas average consumption amounted to 964 thousand tons, and average per capita share of poultry reached 10.4 kg/year. The decline in per capita share from 11.1 kg/year to 9.1 kg/year despite the increase in production from 879 to 1068 thousand , The percent of males and females under each work category. It is clear that the highest percent has been recorded by the category (unemployed with no previous work record), which amounted to 16.1% for males and 17.3% for females, whereas the lowest percents have been recorded by males under the category (self-employed), and females under the category (unemployed with previous work record), where they reached 10.5% and 7.8% at the level of the urban sector, respectively, Thus the study recommended increase the expenditure rat on animal protein sources

## KEY WORDS
Individual Expenditure- Income Categories- animal protein sources - economic policies

## INTRODUCTION

Animal protein is one of the important elements for human body after water. It is responsible for carrying out several functions like the construction of cells, tissues, and muscles, in addition to growth. The amount of protein an average human body needs per day is estimated at 0.6-0.8 grams per each kilogram of weight. It is worth noting that a continuous lack of protein leads to underweight, destruction of muscle cells, in addition to hair weakness, brittleness, and loss, and skin dryness. The main sources of animal protein include red and white meats, and fish. Eggs and milk are also protein-rich foods, and milk contains the calcium required for the building of body bones. Fish is also of the most important and best sources of animal protein, where it is rich in high-value proteins, and unlike the rest of protein-rich animal food it contains low amount of fat. In addition, the type of fat found in fish is of the healthy fats. Furthermore, poultry is of the richest foods in protein and essential

amino acids. Populations' standard of living is usually measured by the importance of expenditure on these goods relative to expenditure on the rest of food commodities ,Thus the study investigates the problem of low per capita expenditure on different sources of animal protein, which led to low per capita consumption of such food commodities, especially red and white meats, fish, fresh milk, and eggs, over the period 2010-2012. There for The study aims to identify the current state of individual expenditure on animal protein sources and the main influencing factors at the level of urban and rural sectors in Egypt, in order to provide economic policy makers with information on the main reasons for the declining per capita expenditure on these commodities, which helps them make proper decisions to raise per capita share of such important food commodities while formulating economic policies.

## MATERIALS AND METHODS

To achieve its objectives, the study applied descriptive and analytical statistical methods, like percentages, arithmetic means, simple regression, and analysis of variance, on secondary data published by the Central Agency for Public Mobilization and Statistics (CAPMAS) including: Household Income, Expenditure, and Consumption (HIEC) Survey of 2010/2011, in addition to some other electronic Websites and relevant studies.

*Results:*

*Per Capita Share of Animal Protein:*

Data in Table (1) present average production, consumption, and per capita share of main animal protein sources over the period 2008-2012. It is clear that production of all animal protein sources is relatively stable, whereas consumption is increasing due to the increase in population number that jumped from 78.7 to 82.55 million during the study period. Per capita share declined despite the increase in imported quantities of such commodities.

Average production of red meat amounted to 980.8 thousand tons, whereas average consumption amounted to 1186.2 thousand tons, and average per capita share of red meat reached 12.3 kg/year. The decline in per capita share of red meat from 16.6 kg/year to 9.7 kg/year can be explained by the increase in consumer prices ( Ministry of Agriculture and Land Reclamation,2012)

As for poultry, average production amounted to 948.6 thousand tons, whereas average consumption amounted to 964 thousand tons, and average per capita share of poultry reached 10.4 kg/year. The decline in per capita share from 11.1 kg/year to 9.1 kg/year despite the increase in production from 879 to 1068 thousand tons can be explained by the fact that the increase in production has been lower than the increase in the number of population, where production increased by 18%, whereas population increased by 33%.

Average production of fresh fish amounted to 1240 thousand tons, whereas average consumption amounted to 1405 thousand tons, and average per capita share of fish reached 13.76 kg/year. The decline in per capita share of fish from 15.3 kg/year to 12.6 kg/year can be explained by the increase in population at a rate higher the increase in production, and fish imports fell short of covering the population's total demand required to maintain the same level of per capita consumption. (CAPMS, Food Balance Sheet, 2013)

It is also clear Table (1) that average production of table eggs amounted to 395.5 thousand tons, whereas average consumption amounted to 373.8 thousand tons, and average per capita share of table eggs reached 4.1 kg/year.

*Relative Importance of Expenditure on Food and Drinks:*

Expenditure on food and drinks often absorbs the highest percent of annual household expenditure at the level of urban and rural Egypt. It is worth mentioning that expenditure on food and drinks relative to total annual household expenditure at the country level accounted for 35.4% in 2010/2011 (CAPMS' Survey of 2010/2011) compared with 44.1% in 2008/2009, which is 8.7% lower. At the level of Egypt's urban and rural sectors, the relative importance of annual household expenditure on food and drinks accounted for 31% and 40.1% in 2010/2011 compared with 39.7% and 48.9% in 2008/2009(CAPMS' Survey of 2008/2009) , respectively, indicating a 7.8% and 8.8% decline in the percent of expenditure on food and drinks at the level of Egypt's urban and rural sectors, respectively, which in turn means lower standard of living due to higher prices.

**Table 1:** Evolution of Production, Consumption, and Average Per Capita Share of Main Animal Protein Sources in Egypt Over the Period 2008-2012 (Thousand Tons)

| Items | Production | Consumption | Per capita kg/year |
|---|---|---|---|
| Average period for Red meat | 980.8 | 1186.2 | 12.32 |
| Average period for poultry | 948.6 | 964 | 10.04 |
| Average period for fish | 1240 | 1405.6 | 13.76 |
| Average period for Milk | 5806 | 6054.3 | 73.6 |

| | | | |
|---|---|---|---|
| Average period for Eggs | 395.5 | 373.8 | 4.1 |

*Source:* - Ministry of Agriculture and Land Reclamation, the Central Administration for Agricultural Economics and Statistics, Bulletin of Agricultural Economics, 2012. [1]

*Relative Importance of Per Capita Expenditure on Different Sources of Animal Protein According to Household Expenditure Categories:*

Results of studying the relative importance of per capita expenditure on different sources of animal protein according to household expenditure categories at the level of urban and rural sectors are listed in Table (2). It is clear that the lowest percent of expenditure has been recorded by the expenditure categories (LE 8000 and LE 17000), where it ranged between 3.5% and 3.9% at the country level, whilst ranged between 3.6% and 4.1% at the level of urban sector, and ranged between 3.5% and 4% at the level of rural sector. On the other hand, the highest percent of expenditure on animal protein at the country level has been recorded by the expenditure category (LE 10000), where it reached 11.7%, whilst reached 11.5% at the level of the urban sector. Finally, the highest percent of expenditure on animal protein at the level of the rural sector has been recorded by the expenditure category (less than LE 2000), where it reached 9.4%.

**Table 2:** Relative Importance of Average individual Expenditure on Different Animal Protein Sources According to Annual Household Expenditure Categories (LE)

| *individual Expenditure* | Country | | Urban sector | | Rural sector | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| 2000- | 1418.7 | 5.9 | 1065 | 4 | 2060.4 | 9.4 |
| -2000 | 1329.9 | 5.5 | 1724.6 | 6.5 | 1243 | 5.7 |
| -3000 | 872.9 | 3.6 | 663.1 | 2.5 | 1040.1 | 4.8 |
| -4000 | 1127.1 | 4.7 | 1144.4 | 4.3 | 1122.3 | 5.1 |
| -5000 | 1095.9 | 4.5 | 1349.3 | 5.1 | 969.1 | 4.4 |
| -6000 | 1029.4 | 4.3 | 1091.8 | 4.1 | 998.1 | 4.6 |
| -7000 | 959.5 | 4 | 1010.2 | 4 | 900.5 | 4.1 |
| -8000 | 940.7 | 3.9 | 1101.9 | 4.1 | 874.3 | 4 |
| -9000 | 895.8 | 3.7 | 1024.4 | 3.9 | 826.9 | 3.8 |
| -10000 | 854 | 3.5 | 965.8 | 3.6 | 810.3 | 3.7 |
| -11500 | 853.2 | 3.5 | 1052.5 | 4 | 767.1 | 3.5 |
| -13000 | 839.8 | 3.5 | 1003.8 | 3.8 | 771.5 | 3.5 |
| -15000 | 884.7 | 3.7 | 1005.4 | 3.8 | 827.3 | 3.8 |
| -17000 | 911.2 | 3.8 | 990.7 | 3.7 | 869.1 | 3.9 |
| -20000 | 972.3 | 4 | 1063.6 | 4 | 920.4 | 4.2 |
| -25000 | 1095.2 | 4.5 | 1218.7 | 4.6 | 1006.2 | 4.6 |
| -30000 | 1306.9 | 5.4 | 1472 | 5.5 | 1142.9 | 5.2 |
| -50000 | 1734.1 | 7.2 | 2090.3 | 7.9 | 1301.2 | 5.9 |
| -75000 | 2181.9 | 9.1 | 2420.6 | 9.1 | 1608 | 7.3 |
| 100000 | 2811.1 | 11.7 | 3060.6 | 11.5 | 1862.9 | 8.5 |
| Total | 24114.3 | 100 | 26588.7 | 100 | 21921.6 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency for Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011.[3]

The next part of the study shall focus on identifying the main social and economic factors believed to have impacts on per capita expenditure on animal protein sources.

*Household Head's Profession:*

Table (3) presents the results of studying the relationship between average per capita shares of annual expenditure on different animal protein sources, distributed according to household head's profession, which has been classified into eight categories as per HIEC's classifications. It is clear that the highest percents of expenditure on animal protein has been recorded by the category (unemployed with no previous work record) as they accounted for 15.6% and 18.4% of the total expenditure on food and drinks at the level of urban and rural sectors, respectively. The lowest percents have been recorded by the category (unpaid family work) at the level of the urban sector (6.3%), and by the category (unemployed with previous work record) at the level of the rural sector (9.8%). Annual per capita expenditure on different sources of animal protein at the level of urban and rural sectors accounted for 55.2% and 44.8% of the total annual expenditure, respectively.

Table (3) also shows the percent of males and females under each work category. It is clear that the highest percent has been recorded by the category (unemployed with no previous work record), which amounted to 16.1% for males and 17.3% for females, whereas the lowest percents have been recorded by males under the category (self-employed), and females under the category (unemployed with previous work record), where they reached 10.5% and 7.8% at the level of the urban sector, respectively.

**Table 3:** Average per capita spending on sources of protein according to the head of the family profession (LE)

| Household head's profession | Country | | | %Category to th | | Within category | |
|---|---|---|---|---|---|---|---|
| | Total | % urban | % rural | %males | % females | %males | % females |
| Paid work for others | 1090 | 11.9 | 10.8 | 11 | 15.3 | 40.5 | 59.5 |
| Employer and managed and used other | 1127 | 13.6 | 12 | 11.7 | 11.7 | 47.8 | 52.5 |
| **Work for his own** | 1022 | 11 | 10.7 | 10.5 | 10.8 | 48.3 | 51.7 |
| Working for unpaid family | 1058 | 6.3 | 13.5 | 11.2 | 10.3 | 50.7 | 49.3 |
| Loafers previously worked | 1054 | 11.2 | 9.8 | 11.1 | 7.8 | 57.7 | 42.3 |
| Loafers never work | 1609 | 15.6 | 18.4 | 16.1 | 17.3 | 47.1 | 52.9 |
| Outside labor force | 1253 | 13.9 | 12.1 | 13.7 | 12 | 52 | 48 |
| Outside manpower | 1437 | 16.5 | 12.7 | 14.7 | 14.8 | 49 | 51 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-2011.

Source: Collected

*Educational State:*

Table (4) presents the different percents of per capita expenditure on different animal protein sources, distributed according to educational state, which has been classified into seven categories for rural and urban sector as per HIEC's 2010/2011. It is clear that the highest percent of expenditure on animal protein have been recorded by the category (holders of university and post graduate degrees), where it accounted for 19.8% and 16.8% of the total expenditure at the level of urban and rural sectors, respectively. The category (holders of above-medium-level degree) ranked second with percents amounting to 15.4% and 14.8%, respectively; whereas the category (holders of medium-level degree) ranked third with percents amounting to 14.2 and 14.1%, respectively; and the category (holders of below-medium-level degree) ranked fourth with percents amounting to 13.1% and 13.6%, respectively. The category (holders of read and write certificates) ranked fifth with percents amounting to 13% and 14.4%, respectively, whereas the category (holders of literate certificates) ranked sixth with percents amounting to 12.2% and 13.2%, respectively.

The table also reflects the impact of educational state and gender on per capita expenditure on different animal protein sources. It can be inferred that female-headed households spend 57% of their income on animal protein sources, whereas males spend 43%, indicating that females are well aware of the importance animal protein represents in family nutrition and thus spend the largest part of income to ensure serving nutritious food for their families. Accordingly, it is important to recommend socio-economic policy makers to devote more attention to female-headed households as they are the base for building healthy families.

**Table 4:** Average per capita expenditure on animal protein sources according to educational status of H.H Head (LE).

| Educational status | Country | | | Country | | Country (Within category) | |
|---|---|---|---|---|---|---|---|
| | Value | Urban | Rural | Males | Females | Males | Females |
| Illiterate | 1070.1 | 12.2 | 13.2 | 11.8 | 11.1 | 45 | 55 |
| Read and write | 1066.8 | 13 | 14.4 | 13.3 | 14.6 | 41 | 59 |
| Literacy Certificate | 986.8 | 12.3 | 13.2 | 12.7 | 9.2 | 51 | 49 |
| Below Intermediate | 1061.7 | 13.1 | 13.6 | 13.3 | 13.3 | 44 | 56 |
| Intermediate certificate | 1108.6 | 14.2 | 14.1 | 13.9 | 14.3 | 43 | 57 |
| Above Intermediate | 1221.8 | 15.4 | 14.8 | 15.1 | 18.4 | 39 | 61 |
| University and over | 1568 | 19.8 | 16.8 | 19.9 | 19.1 | 54 | 46 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total | 8083.8 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

*Household Head's Age:*

Table (5) shows the different percents of per capita expenditure on animal protein according to household head's age, which has been classified into eleven categories. It can be observed that the category (less than 20 years of age) recorded the highest percent at the level of urban sector, which amounted to 14.3%. It then started to decline until reaching the category (40 years of age), with average percent amounting to 7.3%. After that it started to rise again until reaching 11.3%, recorded by the category (above 65 years of age). The same trend applies to rural sector, where the first category recorded the highest percent, amounting to 9.6%. Categories two to six followed with average percent amounting to 8.4%. After that it started to rise until reaching 10%, recorded by the category (above 65 years of age). Average per capita percent of expenditure at the level of urban and rural sectors amounted to 58.9% and 41.1%, respectively, which might be explained by the higher average family size in rural areas.

The same Table also shows the changes in expenditure according to household head's age and gender. It is clear that the lowest expenditure on animal protein sources, which accounted for 7.5%, has been recorded by males under the category (less than 20 years of age), and by females under the category (25 years of age) whom expenditure accounted for 6.9%. It is also clear that average per capita expenditure on animal protein sources by males and females accounted for 46.5% and 53.5%, respectively, which is similar to the result regarding the impact of educational state on per capita expenditure on different sources of animal protein.

**Table 5:** Average annual per capita expenditure on animal protein according to household head's age

| Age | Country | %Urban | % Rural | %Males | % Females |
|---|---|---|---|---|---|
| <20 | 1068.9 | 14.3 | 9.6 | 34.5 | 65.5 |
| 20- | 991.3 | 6.9 | 8.8 | 48.5 | 51.5 |
| 25- | 1023 | 7.7 | 8.6 | 51.6 | 48.4 |
| 30- | 1018.7 | 7.8 | 8.4 | 48.5 | 51.5 |
| 35- | 991.8 | 7.6 | 8 | 50.1 | 49.9 |
| 40- | 993.2 | 7.3 | 8.2 | 45.3 | 54.8 |
| 45- | 1077.5 | 8.1 | 8.6 | 46.3 | 53.7 |
| 50- | 1145.4 | 8.5 | 9.2 | 45.1 | 54.9 |
| 55- | 1269.5 | 9.6 | 10.3 | 45.9 | 54.1 |
| 60- | 1358.8 | 10.9 | 10.3 | 48.4 | 51.6 |
| 65- | 1378.8 | 11.3 | 10 | 47.2 | 52.8 |

Source :Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

*Family Size:*

Family size is one of social factors that affect total expenditure in general, and expenditure on both food and non-food commodities in specific. Therefore, it is necessary to identify the impact family size has on per capita expenditure on animal protein sources at the level of both urban and rural sectors. According to HIEC (2010/2011), family sizes of the researched categories range between one and eight or more members.

Table (6) presents total per capita expenditure on animal protein sources per year, and the percents of per capita expenditure according to family size. It is clear that the percent of per capita expenditure declines as family size increases, where it reached 25.5% and 24% for the category (single member) at the level of urban and rural sectors, respectively, and declined to as low as 7.6% and 8.9% for the category (8 or more members) at the level of urban and rural sectors, respectively.

It can also be observed that the percent of per capita expenditure on animal protein sources at the level of urban sector is higher than that of the rural sector for the categories (one to 3 members), where it reached an average of 20% for the urban sector, and 18.9% for the rural sector. The situation then inverses starting from the category (4 members), the expenditure of which recorded an average of 9.9% at the level of the urban sector, and 10.8% at the level of the rural sector.

**Table 6:** Average per capita expenditure on animal protein sources per year according to family size.

| Members | Country | | Urban sector | | Rural sector | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| One | 2477.8 | 25.6 | 2824.9 | 25.5 | 1988.5 | 24 |
| Tow | 1808.7 | 18.7 | 2108.3 | 19 | 1484.4 | 17.9 |
| Three | 1467.3 | 15.1 | 1726.2 | 15.6 | 1227.4 | 14.8 |
| Four | 1227.9 | 12.7 | 1400.2 | 12.7 | 1066.3 | 12.9 |
| Fife | 1038.1 | 10.7 | 1166.8 | 10.5 | 936.7 | 11.3 |
| Six-Seven | 904.1 | 9.3 | 1011.3 | 9.1 | 847.3 | 10.2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Eight | 762.8 | 7.9 | 838.3 | 7.6 | 742 | 8.9 |
| Total | 9686.7 | 100 | 11076 | 100 | 8292.6 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

*Type of House, Number of Rooms, and Number of Individuals per Room:*

Type of house and number of rooms per house reflect the social and economic state for the family, and is one of the factors influencing expenditure on both food and non-food commodities. It is clear from Table (7) that expenditure on animal protein sources represents as high as 22% and 18.4% of the total expenditure on food and drinks by the category (villa owners) at the level of urban and rural sectors, respectively. In contrast, the lowest percents of expenditure, amounting to 10.3% and 8.5%, have been recorded by the categories (village house) and (other house) at the level of urban and rural sectors, respectively.

**Table 7:** Average per capita expenditure on animal protein sources per year according to Type of House (LE).

| Type of House | Country | | Rural | | Urban | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| Apartment | 1212.3 | 16.5 | 1366.5 | 15 | 1042.8 | 16.9 |
| More than one Apartment | 1072.3 | 14.6 | 1254.1 | 14 | 999 | 16.2 |
| Villa | 1350.4 | 18.4 | 1962.2 | 22 | 1131 | 18.4 |
| Rural House | 862.6 | 11.7 | 915.2 | 10 | 857.6 | 13.9 |
| Room or more in a dwelling | 853.4 | 11.6 | 994.3 | 11 | 807.5 | 13.1 |
| Separated room or more | 1018.5 | 13.9 | 1123.2 | 13 | 801.9 | 13 |
| Other | 973.5 | 13.3 | 1299.3 | 15 | 525.2 | 8.5 |
| Total | 7343 | 100 | 8914.8 | 100 | 6165 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

Table (8), which shows the relative importance of expenditure on animal protein sources according to the number of rooms per house, and equations (1 to 3) in Table (9) indicate that a positive relationship exists between the number of rooms per house and expenditure on animal protein sources, where one extra room per house leads to increasing per capita expenditure on animal protein sources by 73.81, 104.44, and 60.1 monetary units at the level of the country, the urban sector, and the rural sector, respectively, all of which proved statistically significant.

**Table 8:** Average per capita expenditure on animal protein sources per year according to Number of Rooms (LE).

| Number of Rooms | Country | | Rural | | Urban | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| One Room | 978.9 | 23.5 | 1080 | 22.7 | 840.6 | 23 |
| Two Rooms | 921.9 | 22.2 | 1078 | 22.6 | 827.5 | 23 |
| Three Rooms | 1077.4 | 26 | 1237 | 26 | 923 | 26 |
| Four Rooms Or More | 1173.1 | 28.3 | 1365 | 28.7 | 1009 | 28 |
| Total | 4151.3 | 100 | 4759 | 100 | 3600 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

**Table 9:** indicate equations that a positive relationship exists between the number of rooms per house and expenditure on animal protein sources.

| No. equation | statement | $R^2$ | Equation |
|---|---|---|---|
| 1 | Country Level | 0.79 | $\hat{y} = 853.3 + 73.81\ x_{1t}$ <br> $t = (2.05)^{**}$ |
| 2 | Urban Sector | 0.89 | $\hat{y} = 933.85 + 104.44\ x_1 t$ <br> $t = (3.79)^{**}$ |
| 3 | Rural Sector | 0.85 | $\hat{y} = 749.7 + 60.1\ x_{1t}$ <br> $t = (3.10)^{**}$ |

Where, $\hat{y}$ = the estimated value of per capita expenditure on animal protein sources in year t, $x_{1t}$ = number of rooms per house in year t, $x_{1t}$ = number of individuals per room in year t.

As for Table (10), indicates the relative importance of expenditure on animal protein sources according to number of individuals per room. Table (11) is cleared from equations (4 to 6) that a negative relationship exists between the number of individuals per room and expenditure on animal protein sources, where one extra individual per room leads to reductions in expenditure on animal protein sources. It is also clear that the highest percents of per capita expenditure on animal protein, amounting to 35.5% and 31.5%, have been recorded by the

first category under the urban and rural sectors, respectively, whereas the lowest percents of per capita expenditure on animal protein, which amounted to 14% and 13.7 % have been recorded by the last category under the urban and rural sectors, respectively. Table (11) is also clear from the equations that one extra individual per room leads to reducing per capita expenditure on animal protein sources by 236.6, 297.2, and 135.9 monetary units at the level of the country, the urban sector, and the rural sector, respectively, all of which proved statistically significant due to the fact that the number of individuals per room often reflects the economic standard of the family, where a higher family size usually leads to lower economic standard for the family.

Average expenditure on animal protein sources amounted to 58.5% and 41.5% at the level of urban and rural sectors, respectively.

**Table 10:** Average per capita expenditure on animal protein sources per year according to Average Number of Person per Room (LE).

| Average No. .of person per Room | Country | | Rural | | Urban | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| Less than 1 | 1704.8 | 33.9 | 2134.6 | 35.5 | 1357.4 | 31.8 |
| 1 Person | 1089.5 | 21.7 | 1261.6 | 20.9 | 966.1 | 22.6 |
| 2 person | 812.7 | 16.2 | 906.9 | 15.1 | 759 | 17.8 |
| 3person | 696.6 | 13.9 | 873.5 | 14.5 | 605 | 14.2 |
| 4 Person or more | 717.9 | 14.3 | 842.5 | 14 | 858.2 | 13.7 |
| Total | 5021.5 | 100 | 6019.1 | 100 | 4272.7 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

**Table 11:** clear equations that a negative relationship exists between the number of individuals per room and expenditure on animal protein sources.

| No. equation | statement | $R^2$ | Equation |
|---|---|---|---|
| 4 | Country Level | 0.79 | $\hat{y} = 1714.31 - 236.6\ x_{1t}$ <br> $t = (2.51)^{*}$ |
| 5 | Urban Sector | 0.74 | $\hat{y} = 2095.5 - 297.2\ x_{2t}$ <br> $t = (2.51)^{**}$ |
| 6 | Rural Sector | 0.57 | $\hat{y} = 1316.9 - 135.9\ x_{2t}$ <br> $t = (1.135)^{**}$ |

Where, $\hat{y}$ = the estimated value of per capita expenditure on animal protein sources in year t, $x_{1t}$ = number of rooms per house in year t, $x_{1t}$ = number of individuals per room in year t

*Marital State:*

Expenditure on animal protein sources has been classified into 6 different categories according to marital state. It is clear from Table (12) that the highest percent of expenditure on animal protein sources, amounting to 29%, has been recorded by the category (officially married) at the level of the urban sector. At the level of the rural sector, the highest percent of expenditure on animal protein sources, amounting to 23.7%, has been recorded by the category (under age).

When the gender factor was added to the marital state as a factor that influences expenditure on animal protein, it was found that the highest percent of expenditure on animal protein sources has been recorded by males under the category (officially married), whereas the highest percent of expenditure on animal protein sources for females has been recorded by the category (single), and amounted to 25.1%.

Total per capita expenditure on animal protein sources by males and females amounted to 53.7% and 45.3%, respectively.

**Table 12:** Average per capita expenditure on animal protein sources per year according to marital state (LE).

| Marital state | Country | | Rural | | Urban | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| Under age | 1320 | 14.8 | - | - | 1320 | 23.7 |
| Never married | 1495.9 | 16.7 | 1730.3 | 19.7 | 1113 | 20 |
| Officially married | 2250.5 | 25.2 | 2550.5 | 29 | - | - |
| Married | 1086.6 | 12.2 | 1286.9 | 14.7 | 952 | 17.1 |
| Divorced | 1442.3 | 16.1 | 1601.9 | 18.2 | 1083 | 19.4 |
| Widowed | 1339 | 15 | 1616.7 | 18.4 | 1102 | 19.8 |
| Total | 8934.3 | 100 | 8786.3 | 100 | 5570 | 100 |

Source: Collected and Calculated Based on Data Published by the Central Agency For Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure, and Consumption (HIEC), 2010-//2011. [3]

*Analysis Of Variance for the Relationship between Per Capita Expenditure on Animal Protein Sources at the Level of Urban and Rural Sectors:*

One-way Analysis of Variance (ANOVA) is used to discover the differences between a number of groups under a single dependent variable and a number of independent levels. Two-way ANOVA is a type of Analysis of Variance used to discover the differences between two means. Total variance is usually composed of variation within groups, and variation between groups. When the variation between groups is higher than the variation within groups, it indicates that there are true differences between groups due to variations in the treatments of explanatory variable. In case the calculated F value is lower than the value of table F, the null hypothesis that there is no difference between means is accepted at 0.05 level of significance.(Abdel Fattah Mustafa ,2015)

Table (13) presents the results of applying two-way ANOVA to expenditure on meat by different income categories at the level of urban and rural sectors. It is clear that a statistically significant difference exists between expenditure on meat by different income categories at the level of the urban and rural sectors, where the calculated F value amounted to 7.41, whereas the value of table F amounted to 2.16. In addition, results indicated that there are no significant differences between urban and rural sectors in terms of expenditure on meat, where the value of calculated F amounted to 1.73, whereas the value of table F amounted to 4.38.

Also it is clear from Table (13) that a statistically significant difference exists between urban and rural sectors in terms of expenditure on fish, where the value of calculated F amounted to 18.4, whereas the value of table F amounted to 4.3. The same table also indicates a statistically significant difference between expenditure on fish by different income categories at the level of urban and rural sectors, where the value of calculated F amounted to 6.8, whereas the value of table F amounted to 2.16.

As well Table (13) presents the results of applying two-way ANOVA to expenditure on milk by different income categories at the level of the urban and rural sectors. It is clear that there is no significant difference between expenditure on milk by different income categories at the level of the urban and rural sectors, where the value of calculated F amounted to 1.5, whereas the value of table F amounted to 2.16. In contrast, a statistically significant difference existed between urban and rural sectors in terms of expenditure on milk, where the value of calculated F amounted to 5.41, whereas the value of table F amounted to 4.38.

**Table 13:** Two-way ANOVA to expenditure on meat, fish and milk by different income categories at the level of urban and rural sectors

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| meat | *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| | Rows | 2482907 | 19 | 130679.3 | 7.4168 | 2.94E-05 | 2.16825 |
| | Columns | 30586.4 | 1 | 30586.43 | 1.7359 | 0.20332 | 4.38075 |
| | Error | 334770 | 19 | 17619.46 | | | |
| | Total | 2848263 | 39 | | | | |
| fish | *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| | Rows | 199491.7 | 19 | 10499.56 | 6.894 | 5.06E-05 | 2.16825 |
| | Columns | 28105.9 | 1 | 28105.9 | 18.46 | 0.00039 | 4.38075 |
| | Error | 28935.7 | 19 | 1522.932 | | | |
| | Total | 256533.3 | 39 | | | | |
| milk | Source of Variation | SS | df | MS | F | P-value | F crit |
| | Rows | 841531 | 19 | 44291.1 | 1.52079 | 0.18445 | 2.168252 |
| | Columns | 157578 | 1 | 157578 | 5.41063 | 0.03124 | 4.38075 |
| | Error | 553351 | 19 | 29123.7 | | | |
| | Total | 1552459 | 39 | | | | |

*Discussion:*

The study proved that Average production of red meat amounted to 980.8 thousand tons, whereas average consumption amounted to 1186.2 thousand tons, and average per capita share of red meat reached 12.3 kg/year. The decline in per capita share of red meat from 16.6 kg/year to 9.7 kg/year can be explained by the increase in consumer prices ,and poultry, average production amounted to 948.6 thousand tons, whereas average consumption amounted to 964 thousand tons, and average per capita share of poultry reached 10.4 kg/year. The decline in per capita share from 11.1 kg/year to 9.1 kg/year despite the increase in production from 879 to 1068 thousand , The percent of males and females under each work category. It is clear that the highest percent has been recorded by the category (unemployed with no previous work record), which amounted to 16.1% for males and 17.3% for females, whereas the lowest percents have been recorded by males under the category (self-employed), and females under the category (unemployed with previous work record), where they reached 10.5% and 7.8% at the level of the urban sector, respectively, Thus the study recommended increase the expenditure rat on animal protein sources.

## REFERENCES

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