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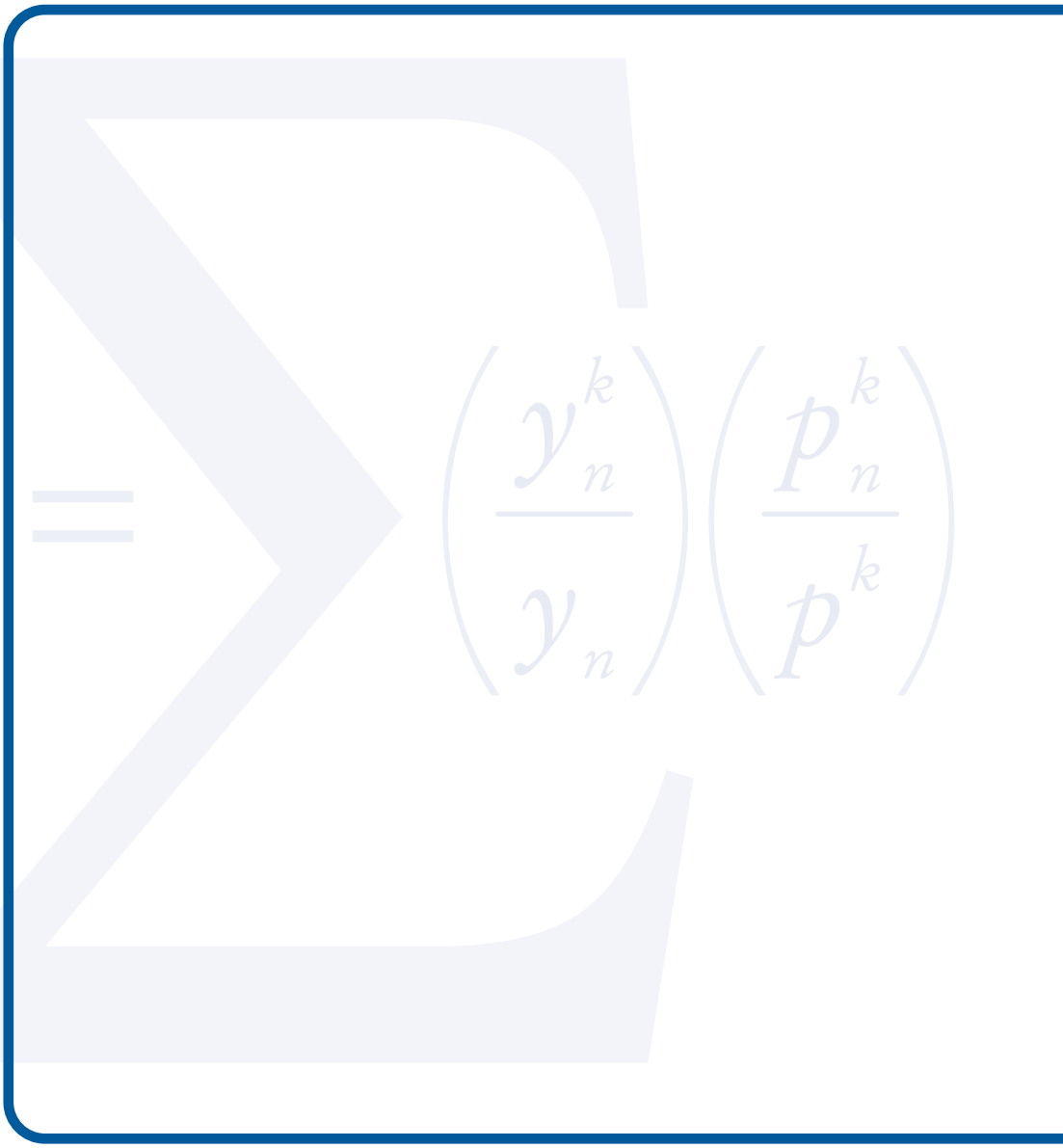

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

HOUSEHOLD FOOD WASTAGE IN TURKEY

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SUMMARY

Household Budget Surveys, Household Income and Expenditure Surveys and Food Balance Sheets provide useful data for epidemiological research and for developing National Food and Nutrition Policies. Findings from these sources need to be interpreted in the light of other data regarding food consumption and factors that may affect consumption, energy and nutrient intake need to be taken into account. For example, in the case of household food wastage, food waste occurs between acquisition (house-gate) and food preparation; between food preparation and food serving; and after food serving (plate waste). The purpose of this study was to estimate household food wastage using a sample of 500 households (1 736 individuals) in Ankara, Turkey, grouped according to socio-economic status. The study was carried out during the summer of 2005. Mean (± SEM) energy intake levels per consumption unit and per person were found to be 2 692.6± 58.96 and 2 207.9 ± 48.35 kcals/day, respectively. Mean daily energy loss from acquisition to plate waste was 481.7 kcal by the average household and 215.7 kcal/person, which amounts to 8.9% of daily per person dietary energy consumption (DEC). Wastage accounted on average for 9.8% of the daily energy intake per person. The average daily discards per household and per person were 816.4g and 318.8g respectively.

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Abbreviations and Acronyms

CU	Consumption Unit
DEC	Dietary Energy Consumption
FBS	Food Balance Sheet
g	gram
HBS	Household Budget Survey
HIES	Household Income and Expenditure Survey
kcal	kilocalorie
SD	standard deviation
SEM	standard error of mean
YTL	New Turkish Lira

HOUSEHOLD FOOD WASTAGE IN TURKEY

I. INTRODUCTION

1. Household Budget Surveys (HBS), Household Income and Expenditure Surveys (HIES) and Food Balance Sheets (FBS) provide useful data for epidemiological research and for developing National Food and Nutrition Policies. Findings from these sources need to be interpreted in the light of other data regarding food consumption and factors that may affect consumption, energy and nutrient intake need to be taken into account. For example, in the case of household food wastage, food waste occurs between acquisition (house-gate) and food preparation; between food preparation and food serving; and after food serving (plate waste). The purpose of this study was to estimate household food wastage using a sample of 500 households (1 736 individuals) in Ankara, Turkey, grouped according to socio-economic status. The study was carried out during the summer of 2005.[1]

2. The most relevant purposes for which food consumption data are collected are related to: (i) food and nutrition planning (adequacy of the food supply, food production, food distribution, food regulations, food fortification and nutrition education); (ii) nutritional studies (estimation of the adequacy of dietary intake of population groups, investigation of the relationship between diet and health and nutritional status, evaluation of nutrition education, nutrition intervention and food fortification programmes); and (iii) toxicological aspects of the food supply (estimation of food additives and contaminants and estimation of habitual high and low levels of consumption of foods containing fortification nutrients and food additives) (Cameron and van Staveren, 1988).

3. Not all dietary assessment tools are equal. The decision regarding which dietary assessment method to use for a single purpose needs to fit the goals of the assessment.

4. The food data used for international comparisons most often derive from: (i) FBS, providing information on food supply for human consumption at the national level; (ii) HBS/HIES, which collect data on food availability; and (iii) specifically designed Individual Nutrition Surveys which take place over a short time period. These data allow determining what information can be compared over time at national level. Household survey methods provide a quick way of estimating the food consumption and nutrient intake of countries, although these measure uptake and not actual intake. The method used by many countries to calculate food availability per capita per day is to divide product availability in the household by mean household size and the time period (DAFNE III, 2000).

Food Balance Sheets

5. The most common and widely used datasets in the field of food consumption statistics are obtained through FBSs. They provide estimates of quantities available for human consumption in a country during a specified period. The per caput supply of each food item available for human consumption is obtained and data on per caput food supplies are expressed in terms of quantity, caloric value, protein and fat content. It is important to note that the quantities of food available for human consumption, as estimated in the FBSs, relate simply to the quantities reaching the consumer in private households, as well as in the non-household sector, i.e., catering establishments, boarding schools, hospitals, prisons, armed forces' bases and other communities. The amount of food actually consumed may be lower than the quantity shown in the FBS. The difference reflects waste occurring between retail level and the kitchen, as losses of edible food and nutrients in households and institutions, e.g., during storage, in preparation and cooking (which has a greater effect on vitamins and minerals than on calories, protein and fat), as plate-waste, or as quantities fed to domestic animals and pets, or that thrown away (FAO, 2000).

[1] The authors are grateful to the students of Hacettepe University Department of Nutrition and Dietetics for their help in the collection of data. The authors would also like to acknowledge the support of the Statistics Division of the Food and Agriculture Organization of the United Nations (FAO); and the assistance of Mr Ricardo Sibrian, Senior Statistician and Ms Amanda Gordon, Statistician, of the Statistics Division, in finalising the report.

6. Information on food consumption or availability is also available from surveys of household consumption or expenditure (FAO, 2000). Due to differences in the concepts and definitions used and to measurement errors, the data from these two sources are not expected to be directly comparable.

Household Budget Surveys/Household Income and Expenditure Survey

7. The HBS or HIES collects data on food items as an integral part of its broader enquiry on household consumer expenditure and income and is undertaken on a more-or-less regular basis in many countries. These surveys attempt to measure household consumption through the expenditure approach, i.e., from the monetary value of the food (as well as other goods) acquired by households (FAO, 2000).

8. The food consumption data obtained from the household expenditure surveys generally reflect the food acquired by, or available to, the household during the reference period. Wastage or losses in the household, such as food fed to pets, leftovers, food thrown away, etc., are not normally accounted for. Information on food, whether purchased or otherwise acquired, is normally collected by interviewing household respondents (recall method) or by record-keeping.

9. Information on food eaten outside the household is usually collected in household expenditure surveys. However, the information collected refers to monetary values only. As such, the quantity data exclude the quantities of food eaten away from home. This omission has little effect on the national estimate of average per caput consumption figures for countries where eating outside the household is not a common practice. However, for countries where a significant proportion of food is eaten outside the home, consumption would be underestimated (FAO, 2000).

10. Recent research has expanded towards comparing patterns of food intake in a country or between countries. Food consumption surveys which are held at household and individual levels are used to estimate the adequacy of dietary intake, to investigate the relationship of diet to nutritional status or the development of disease, and to also obtain qualitative and/or quantitative information on the food actually eaten.

Household Food Consumption or Dietary Surveys

11. Household food consumption in a nutritional sense represents the food and beverages consumed by the household. This can be the sum of the food intake of the individual household members, or it can be the total amount of food consumed in the household, excluding that eaten away from home unless taken from home (Cameron ME, van Staveren WA, 1988).

12. The main objective of household food consumption or dietary surveys is to collect data on the quantities of food items consumed by a representative sample of households selected from the population. They provide detailed data on food consumed in the household as well as away from home, i.e., any food and beverages, meals and snacks eaten outside the home by members of the household.

13. Information on household food consumption is obtained by recording or recalling. Amounts of foods may be weighed or weights can be estimated by the household's measures, food models, and/or photographs. Energy and nutrient contents are calculated from food composition tables (Cameron ME, van Staveren WA, 1988).

14. Information on food consumed away from home is obtained by interviewing each member of the household. The food consumption data obtained from this type of survey represent an estimate of the quantities actually eaten. The enumerations normally are carried out for a period of 24-hours or three to seven consecutive days. This type of survey calls for very careful supervision by the interviewer and close cooperation by the respondents. In general, these surveys are rather complicated and costly to undertake and therefore are not always carried out frequently, or even at regular intervals (FAO, Cameron ME, van Staveren WA, 1988, Thomson FE, Byers T, 1994).

II. PURPOSE

15. The purpose of this study is to estimate the food wastage occurring between acquisition and food preparation; between food preparation and food serving to household members; and after food serving (plate waste) in the household.

III. METHODS AND MATERIALS

Sampling Design

16. The study was designed as a cross-sectional study and was held during 19-29 July 2005, in Ankara, which is the capital city of Turkey and the country's second largest city after İstanbul. The total number of households is 1 018 371 and the total household population is 3 887 844, giving an average household size of 3.82 (www.die.gov.tr).

17. A total of 500 households (1 736 persons) in different districts of Ankara agreed to participate in the study. They were recruited to be representative of the main socio-economic groups; namely high (126 households, 25.2%), middle (203 households, 40.6%) or low (171 households, 34.2%). Socio-economic status (SES) was classified according to the districts where the households were situated.

General Characteristics of Households

18. The age and sex of each member of the household was recorded, beginning with the household head, followed by the spouse and children. Household members were interviewed to acquire information on socio-demographic status, family size, educational and occupational status and income level. The income of the household members and household head was determined after the questionnaire was completed (Appendix 1).

Food Consumption

19. At household level food consumption data was collected by the 24-hour recall survey technique. The person responsible for meal preparation and cooking at home was interviewed for data referring to the previous day. All the data were collected by 50 third grade students of the Department of Nutrition and Dietetics at Hacettepe University, who have been educated in, and have experience on, nutritional assessment techniques. The students visited the households participating in the study under the supervision of the instructors (authors of this report), and were also trained on the questionnaire.

20. There are many studies showing that the foods are not distributed equally within family members. Adult men often receive more than the other family members. The adequacy of diet of particular age/sex groups within families may not be equal to the average for the family as a whole. This problem can be overcome by using factors to predict how nutrients are distributed within the household. Intake according to age and sex is expressed in relation to that of the adult male, whose intake is taken as standard. Values for other age and sex groups are calculated based on the Recommended Dietary Allowances (RDA) for an adult man (Cameron ME, van Staveren WA, 1988).

21. Turkey has been using Consumption Unit (CU) reference values for many years. The tables in Appendix 2 list daily CUs by age and gender and also by age, gender and meals. Average energy, nutrient and food intake are given per CU and per person.

Food Frequency

22. The food frequency approach asks respondents to report their usual frequency of consumption of each food from a list of foods for a specific period (Thomson, Byers, 1994). The food frequency questionnaire is used for the estimation of the consumption frequency of food items and also for food wastage. A guide form was developed in order to calculate the food losses in mixed dishes. This helped in accurately performing calculations and also aided the memory of the respondent (Appendix 1). Members of the households who were absent for any

reason (e.g. army service, work etc.) were not included in the survey. Visitors' intake was included in the total household intake whereas food eaten by household members outside the home was excluded. If a member of a family did not have a meal at home, the identified meal was subtracted from the total daily CU. If visitors shared the meal in a household, their CU values were added to total household CU.

23. Three of the supervisors (Dr Köksal, Res Ass. Küçükerdönmez and Dr Özel) performed the food coding and the data input using *ad hoc* BEBİS software and SPSS 10 programme. Food waste was estimated as: (i) waste occurring between acquisition and food preparation; (ii) waste occurring between food preparation and food serving to household members; and (iii) waste occurring after food serving (plate waste) (Appendix 1). Energy and nutrient intakes were calculated per CU and per person. According to the age and sex distribution of the surveyed population, 82 CUs were found to be equivalent to 100 persons. Therefore a conversion factor of 0.82 is used to convert values per CU to values per person (average amounts of energy, nutrient and food intake per CU were multiplied by 0.82 to give amounts per person).

24. Data are presented in distribution tables according to SES groups. The statistics given are mean ($\bar{x}$), median, standard deviation (SD) and standard error of mean (SEM).

IV. RESULTS

A. General Characteristics of the Households

Socio-economic Status

25. The distribution of households according to SES is given in Table 1. The percentage of families belonging to high, middle and low SES are 25.2, 40.6 and 34.2, respectively.

Table 1. Distribution of households by SES

SES	No. of households	%
High	126	25.2
Middle	203	40.6
Low	171	34.2
Total	500	100.0

26. The total number of subjects in the families was 1 736 of which 36.1% were adult men and 39.6% were adult women; and the number of subjects living in high, middle and low SES was 424, 683 and 629, respectively (Table 2).

Table 2. Distribution of subjects by SES and sex