



Research Article

PROBLEMS OF FOOD SECURITY IN TERMS OF NUTRIENT INTAKE OF SAMPLE HOUSEHOLDS OF ENTERPRISE-CULTIVATION OF AGRICULTURE (AS PRIMARY SOURCE OF INCOME) IN BANKURA DISTRICT OF WEST BENGAL OF INDIA

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Abstract: The specific objectives of the study are to analyze the existing status and impediments, and to suggest the pertinent policy measures in order to improve the status of the food security in terms of calorie, protein and fat intake of sample households. Fifty sample respondents have been selected from the enterprises-cultivation of agriculture, on the basis of Simple Random Sampling without Replacement. The reference year of the study is 2015-16. The overall calorie intake is higher than the recommended daily allowance of 2425 kcal/day/CU. But amongst the various groups, the calorie intake of Group-2 is lower than the recommended calorie intake. The overall protein intake is higher than the recommended daily allowance of 60 gm/day/CU. But amongst the various groups, the protein intake of Group-4 and Group-5 is much higher than the recommended protein intake. The sample households from Group-2 need to be made aware of the concept of balanced diet and more intakes of fruits, vegetables, eggs and chicken. The sample households from Group-4 and Group-5 need to practice diet control and made aware of fewer intakes of rice, wheat, potato, sugar, vegetables etc.

Keywords: Food Security, Nutrient intake

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Introduction

There are three dimensions to food security, namely, availability, it implies that sufficient quantities of appropriate food for the concerned population should be physically available, access, it means that households have sufficient purchasing power of other resources to obtain adequate and appropriate food and utilization, it indicates that food is properly used through appropriate food processing and storage practices for preserving its nutrient contents; sharing food with in the household to provide adequate nutrient to each members of the household for maintaining health and an active life. The present study intends to analyze the food security problems in sample area of the enterprise – cultivation of agriculture in Bankura District of West Bengal [1-5].

Research Methodology:

Household is the unit of observation. For the primary data, a pre-ordained questionnaire was used to collect data from the sample households. Enterprises have been selected purposively from the underdeveloped district of West Bengal, namely, Bankura. For the Enterprise-Cultivation of agriculture, Sonamukhi Block from Bishnupur sub division has been selected purposively. A cluster of three adjacent Villages (Radhamohanpur, Nityanandapur and Amrita para) have been selected from Radhamohanpur gram panchayet of Sonamukhi Block under Bishnupur Sub-division of Bankura District of West Bengal. For each cluster, complete list of households of concerned enterprises is prepared. Then for each cluster, 50 sample respondents for each enterprise have been finally selected on the basis of Simple Random Sampling without Replacement Method [6-11].

Data Collection

Data have been collected following the Survey Method. At first, a primary schedule

has been prepared on the basis of existing literature concerned and a pilot survey has been made randomly by personally interrogating some members of the sample size in order to examine the module of the Household Livelihood Security schedule. On the basis of primary investigation, addition and alteration has been made in primary schedule and in this way, preparation of schedule was finalized. Final data collection have been made by personally interviewing and interrogating the head of the households by visiting door to door strictly with the help of pre-tested survey schedule in the study area. The secondary information has been obtained both from the village development and block development board. Informal interviews were carried out with the persons from the Villages, Gram Panchayat Samities and block offices on the way to gain their view and knowledge on different aspects of livelihood security. For the present study, the data collected have been compiled and tabulated using simple tabular analysis. This technique of analysis is deemed to be a greater utility and is intensively used for its inherent quality of purporting the true picture of the study area in the simplest form.

Calculation of Consumer Unit

Taking the calorie requirement of an average male in the age group of 20-39 doing sedentary work as the norm, the average calorie requirements of male and female of other ages are expressed as a ratio to this norm. The standard table of the formation of consumer unit is given below

Calculation of calorie, protein and fat intake

The quantities of food recorded as consumed by the sample households have been converted into the equivalent amounts of calorie, protein and fat on the basis of Nutrition Chart largely based on an ICMR publication [2] which gives the calorie.

Protein and fat contents of different foods in the Indian diet (Annexure-III). Estimates of calorie intake in the present study have been given in terms of 'per consumer unit'. Expressing calorie intake per consumer unit is aimed at adjusting for difference in calorie requirements among persons on account of age and sex differences, and thereby obtaining a sharper indicator of adequacy of intake than the per capita figures.

Table-1 Number of Consumer Unit Assigned to a Person

Age in completed years	Consumer unit	
	Male	Female
Below 1	0.43	0.43
1-3 yrs	0.54	0.54
4-6 yrs	0.72	0.72
7-9 yrs	0.87	0.87
10-12 yrs	1.03	0.93
13-15 yrs	0.97	0.8
16-19 yrs	1.02	0.75
20-39 yrs	1	0.71
40-49 yrs	0.95	0.68
50-59 yrs	0.9	0.64
60-69 yrs	0.8	0.51
Above 70	0.7	0.5

Source: NSS Report No. 540: Nutritional intake in India

Table-2 Calorie, Protein and Fat Contents of Some Important Food Items Considered in the Study

Item code	Item	Unit	Calories per unit (Kcal)	Protein per unit (gm)	Fat per unit (gm)
(1)	(2)	(3)	(4)	(5)	(6)
1	Rice – other sources	Kg	3460	75	5
2	Wheat/atta– other sources	Kg	3410	121	17
3	Maida	Kg	3480	110	9
4	Moong	Kg	3480	245	12
5	Masur	Kg	3430	251	7
6	Urd	Kg	3470	240	14
8	Milk: condensed/ powder	Kg	4960	258	267
9	Sugar: other sources	Kg	3980	1	0
10	Edible oil: others	Kg	9000	-	1000
11	Eggs	no.	100	8	8
12	Fish, prawn	Kg	1050	140	20
13	Beef/ buffalo meat	Kg	1140	226	26
14	Pork	Kg	1140	187	44
15	Chicken	Kg	1090	259	6
16	Potato	Kg	970	16	1
17	Onion	Kg	550	15	1
18	Cauliflower	Kg	300	26	4
19	Cabbage	kg	270	18	1
20	Brinjal	kg	240	14	3
21	Lady's finger	kg	350	19	2
22	Palak/other leafy vegetables	kg	260	20	7
23	Tomato	kg	200	9	2
24	Peas	kg	930	72	1
25	Chillis: green	kg	290	29	6
26	Guava	kg	510	9	3
27	Orange, mausami	no.	50	1	1
28	Mango	kg	740	6	4
29	Pears (naspati)	kg	520	6	2
30	Apple	kg	590	2	5
31	Grapes	kg	710	5	3
32	Garlic	gm	1.45	0.06	0
33	Ginger	gm	0.67	0.02	0.01
34	Turmeric	gm	3.49	0.06	0.05
35	Black pepper	gm	3.04	0.11	0.07
36	Dry chillies	gm	2.46	0.16	0.06

Recommended Doses Amounts of Calorie, Protein and Fat on the Basis of Nutrition Chart Largely Based on an ICMR Publication

The quantities of food recorded as consumed by the sample households have been converted into the equivalent amounts of calorie, protein and fat on the basis of Nutrition Chart largely based on an ICMR publication [2] which gives the calorie, protein and fat contents of different foods in the Indian diet.

Table-3 Recommended Doses amounts of calorie, protein and fat on the basis of

Energy (kcal)	Protein (gm)	Fat (gm)
2425	60	20

Results and Discussion

The [Table-4] demonstrates the food item-wise annual per consumer unit consumption of food of the sample households of enterprise -- cultivation of agriculture (as primary source of income) in Bankura District of West Bengal of INDIA (2015-16). The table reveals that among the various food items, the percentage share in terms of weight for rice is the highest for all sample households from agriculture as primary source accounting for 45.75 percent. Rice is followed milk (15.93 percent), vegetables (5.76 percent), spices (5.71 percent), wheat (5.41 percent), potato (5.22 percent), pulses (3.08 percent), edible oil (2.38 percent), puffed rice (2.15 percent), fish (2.11 percent), fruits (1.95 percent), sugar (1.81 percent), salt (1.44 percent), chicken (0.84 percent), tea (0.24 percent) and meat (0.23 percent). The egg consumption per consumer unit is 49.34 nos for sample households from agriculture as primary source. The consumption pattern shows that rice constitutes the highest percentage of food quantity consumed by sample households from agriculture as primary source. The overall total quantity of food consumed per consumer unit per annum is found to be 296.92.kg for sample households from agriculture as primary source, excepting eggs. The total quantity of food consumed is highest in Group-4 (312.35kg) and lowest in Group-1 (235.22 kg). The Table.5 presents food item-wise calorie intake per day per consumer unit for sample households of enterprise -- cultivation of agriculture (as primary source of income) in Bankura District of West Bengal of INDIA (2015-16). The table reveals that rice provide the highest energy (kcal/day/CU) to the sample respondents (1,214.77), followed by milk (642.66), edible oil (164.51), wheat (141.68), pulses (81.88), fruits (80.49), puffed rice (57.17), sugar (55.43), egg (42.88), fish (17.03), meat(13.52), potato (12.79) and vegetables (8.25). The corresponding percentage share of these food items are in the order of 47.29 percent, 25.02 percent, 6.40 percent, 5.52 percent, 3.19 percent, 2.23 percent, 2.16 percent, 1.67 percent, 0.66 percent, 0.53 percent and 0.50 percent respectively. The overall total calorie intake per consumer unit for Agriculture households is the highest in Group-5 (2,688.43) and the lowest in Group-2 (2,040.52). The percentage of calorie intake among the food items is the highest for rice (47.29 percent). There is a positive correspondence between calorie intake per day per consumer unit for sample households and income group. The Table.6 depicts the food item-wise protein intake per day per consumer unit of sample households of enterprise-cultivation of agriculture (as primary source of income) in Bankura District of West Bengal of INDIA (2015-16). The table reveals that milk provide the highest protein (gm/day/CU) to the sample respondents (31.54), followed by rice (26.33), pulses (5.81), wheat (5.03), fish (2.27), chicken (1.73), puffed rice (1.24), egg (1.02), vegetables (0.85), potato (0.64) and meat (0.36). The corresponding percentage share of these food items are in the order of 41.06 %, 24.28 %, 7.56 %, 6.55 %, 2.96 %, 2.26 %, 1.61 %, 1.33 %, 1.11 %, 0.83 % and 0.36 % respectively. The overall total protein nutrient intake per consumer unit for Agriculture households is the highest in Group-5 (88.45) and the lowest in Group-2 (62.54). The percentage of protein intake among the food items is the highest for milk (41.06 percent). There is a positive correspondence between protein intake per day per consumer unit for sample households and income group. The Table.7 reveals the food item-wise fat intake per day per consumer unit of sample households of enterprise-cultivation of agriculture (as primary source of income) in Bankura District of West Bengal of India (2015-16). The table reveals that milk provide the highest fat (gm/day/CU) to the sample respondents (32.64), followed by edible oil (18.28), rice (1.76), egg (1.02), wheat (0.71), fish (0.32), pulses (0.26), vegetables (0.12) and fruits (0.09). The corresponding percentage share of these food items are in the order of 58.91 percent, 32.99 percent, 3.17 percent, 1.84 percent, 1.27 percent, 0.59 percent, .47 percent, 0.22 percent and 0.16 percent respectively. The overall fat derived from the consumption of all food items is higher for Agriculture households (55.40 gm/day/CU). The overall total fat intake per consumer unit for Agriculture households is the highest in Group-4 (67.09) and the lowest in Group-2 (33.13).

Table-4 Food Item-wise Annual per Consumer Unit Consumption of Food of the Sample Households of Enterprise Cultivation of Agriculture (as Primary Source of Income) in Bankura District of West Bengal of INDIA (2015-16)

Food items	Group-1 (n=0)	Group-2 (n=6)	Group-3 (n=17)	Group-4 (n=20)	Group-5 (n=7)	Overall (n=50)
Rice(kg)	-	111.53(47.41)	132.30(44.91)	137.98(44.18)	159.14(51.11)	135.84(45.75)
Puffed rice(kg)	-	4.16(1.77)	5.98(2.03)	7.77(2.49)	5.38(1.73)	6.39(2.15)
Wheat(kg)	-	32.77(13.93)	21.74(7.38)	7.20(2.30)	13.37(4.29)	16.08(5.41)
Pulses(kg)	-	7.79(3.31)	8.70(2.95)	9.94(3.18)	9.19(2.95)	9.16(3.08)
Edible oil(kg)	-	3.54(1.50)	8.59(2.92)	6.83(2.19)	7.10(2.28)	7.07(2.38)
Spices(kg)	-	15.70(6.67)	17.22(5.85)	17.54(5.61)	15.64(5.02)	16.94(5.71)
Tea(kg)	-	0.66(0.28)	0.74(0.25)	0.71(0.23)	0.66(0.21)	0.71(0.24)
Sugar(kg)	-	6.00(2.55)	5.14(1.74)	5.56(1.78)	4.99(1.60)	5.39(1.81)
Milk(kg)	-	25.82(10.98)	53.06(18.01)	58.41(18.70)	19.94(6.40)	47.29(15.93)
Fish(kg)	-	3.78(1.61)	6.41(2.18)	6.88(2.20)	6.36(2.04)	6.28(2.11)
Salt(kg)	-	4.65(1.98)	4.39(1.49)	4.20(1.35)	3.80(1.22)	4.27(1.44)
Chicken(kg)	-	1.56(0.67)	2.52(0.86)	2.63(0.84)	2.47(0.79)	2.44(0.84)
Meat(kg)	-	0.42(0.18)	0.73(0.25)	0.73(0.23)	0.62(0.20)	0.68(0.23)
Potato(kg)	-	6.27(2.67)	10.86(3.69)	19.99(6.40)	21.83(7.01)	15.50(5.22)
Vegetables(kg)	-	9.03(3.84)	12.72(4.32)	20.71(6.63)	24.36(7.82)	17.10(5.76)
Fruits(kg)	-	1.53(0.65)	3.50(1.19)	5.27(1.69)	16.50(5.30)	5.79(1.95)
Total	-	235.22(100.00)	294.60(100.00)	312.35(100.00)	311.35(100.00)	296.92(100.00)
Egg(no.)	-	37.87	42.57	53.01	65.14	49.34

Figures in parentheses indicate the percentages to the total (column-wise), n= number of the sample households

Table-5 Food Item-wise Calorie Intake per Day per Consumer Unit of Sample Households of Enterprise-Cultivation of Agriculture (as Primary Source of Income) in Bankura District of West Bengal of INDIA (2015-16), (kcal/day/CU)

Food items	Group-1 (n=0)	Group-2 (n=6)	Group-3 (n=17)	Group-4 (n=20)	Group-5 (n=7)	Overall (n=50)
Rice	-	1,057.22 (51.81)	1,508.57(62.23)	1,254.10(46.91)	1,307.99(42.24)	1,214.77(47.29)
Puffed rice	-	39.46(1.93)	51.05(2.11)	56.65(2.12)	73.65(1.81)	57.17(2.23)
Wheat	-	306.17(15.00)	124.92(5.15)	203.10(7.60)	67.25(3.20)	141.68(5.52)
Pulses	-	73.88(3.62)	87.07(3.59)	82.46(3.08)	94.26(2.31)	81.88(3.19)
Edible oil	-	87.22(4.27)	175.11(7.22)	211.85(7.92)	168.42(9.66)	164.51(6.40)
Spices	-	0.10(0.005)	0.10(0.004)	0.10(0.004)	0.11(0.004)	0.10(0.004)
Sugar	-	65.45(3.21)	54.39(2.24)	56.04(2.10)	60.58(2.25)	55.43(2.16)
Milk	-	350.85(17.19)	270.92(11.18)	721.05(26.97)	793.68(29.52)	642.66(25.02)
Fish	-	10.86(0.53)	18.28(0.75)	18.44(0.69)	19.81(0.74)	17.03(0.66)
Chicken	-	4.67(0.23)	7.38(0.30)	7.54(0.28)	7.85(0.29)	2.12(0.08)
Meat	-	1.31(0.06)	1.94(0.08)	2.27(0.08)	2.29(0.09)	13.52(0.53)
Egg	-	10.38(0.51)	17.85(0.74)	11.66(0.44)	14.52(0.54)	42.88(1.67)
Potato	-	24.01(1.18)	64.74(2.67)	33.80(1.26)	55.04(2.05)	12.79(0.50)
Vegetables	-	6.75(0.33)	18.21(0.75)	9.51(0.36)	15.48(0.58)	8.25(1.54)
Fruits	-	2.18(0.11)	23.50(0.97)	4.98(0.19)	7.50(0.28)	80.49(0.32)
Total	-	2,040.52 (100.00)	2,424.02 (100.00)	2,673.57 (100.00)	2,688.43 (100.00)	2,568.61 (100.00)

Figures in parentheses indicate the percentages to the total (column-wise), n= No. of sample households

The percentage of fat intake among the food items is the highest for milk (58.91 percent). There is a positive correspondence between fat intake per day per consumer unit for sample households and income group except in Group-5. The Table.8 presents the difference between recommended doses and present intakes of calorie, protein and fat per day per consumer unit for the sample households of enterprise – cultivation of agriculture (as primary source of income) in Bankura District of West Bengal of India (2015-16). The present calorie and nutrient intake of each of the sample size groups is compared with the Recommended Dietary Allowance (RDA) as per the Indian Council of Medical Research (Chakma *et al.*, 2009 and Khandare *et al.*, 2008) and analyzed as to where the position of calorie and nutrient intake of the sample households stands. For sample Agriculture households, the overall present calorie intake is 2568.61 kcal/day/CU, which is higher than the RDA of 2425 kcal/day/CU. Amongst the various groups, the present calorie intake of all groups is higher than the recommended calorie intake except Group-2 and Group-5. In case of Group-2 (2040.52 kcal/day/CU) and Group-3 (2424.02 kcal/day/CU), present calorie intake is lower than the recommended calorie intake. The overall intake of protein in the study area is 76.81 gm/day/CU, which is higher than the RDA of 60 gm/day/CU. The total protein intake is the highest in Group-5 (88.45), followed by Group-4 (85.78) and Group-3 (66.96) and Group-2 (62.54). Similarly, the overall intake of fats in the study area is 55.40 gm/day/CU for sample households, which is higher than the RDA of 20 gm/day/CU. The total fat intake is the highest in Group-4 (67.09), followed by Group-5 (66.01), Group-3 (39.57) and Group-2 (33.13).

Impediments

The overall calorie intake is higher than the recommended daily allowance of 2425 kcal/day/CU. But amongst the various groups, the calorie intake of Group-2 is lower than the recommended calorie intake.

Policy implications

The sample households from Group-2 need to be made aware of the concept of balanced diet and more intakes of fruits, vegetables, eggs and chicken.

Impediments

The overall protein intake is higher than the recommended daily allowance of 60 gm/day/CU. But amongst the various groups, the protein intake of Group-4 and Group-5 is much higher than the recommended protein intake.

Policy implications

The sample households from Group-4 and Group-5 need to practice diet control. High protein intake may cause harm in people with constipation, diarrhoea, dehydration, kidney damage, increased uric acid, increased cancer risk, heart disease, calcium loss etc. The sample households need to be made aware of fewer intakes of rice, wheat, potato, sugar, vegetables etc.

Conclusion

The consumption pattern of food items of the sample households of enterprise – cultivation of agriculture (as primary source of income) shows that rice constitutes the highest percentage of food quantity consumed by sample households from the enterprise – cultivation of agriculture as primary source.

Table-6 Food Item-wise protein intake per Day per Consumer Unit for Sample Households of Enterprise, Cultivation of Agriculture (as Primary Source of Income) in Bankura District of West Bengal of INDIA (2015-16) (gm/day/CU)

Food items	Group-1 (n=0)	Group-2 (n=6)	Group-3 (n=17)	Group-4 (n=20)	Group-5 (n=7)	Overall (n=50)
Rice	-	22.92(36.64)	32.70(48.84)	27.18(31.36)	28.35(32.05)	26.33(24.28)
Puffed rice	-	0.86(1.37)	1.11(1.65)	1.23(1.43)	1.60(1.80)	1.24(1.61)
Wheat	-	10.86(17.37)	4.43(6.62)	7.21(8.40)	2.39(2.70)	5.03(6.55)
Pulses	-	5.24(8.38)	6.17(9.22)	5.85(6.82)	6.68(7.56)	5.81(7.56)
Sugar	-	0.02(0.03)	0.01(0.02)	0.01(0.02)	0.02(0.02)	0.01(0.02)
Milk	-	18.25(29.18)	14.09(21.05)	37.51(43.72)	41.28(46.67)	31.54(41.06)
Fish	-	1.45(2.32)	2.44(3.64)	2.46(2.87)	2.64(2.99)	2.27(2.96)
Chicken	-	1.11(1.78)	1.75(2.62)	1.79(2.09)	1.87(2.11)	1.73(2.26)
Meat	-	0.24(0.38)	0.35(0.53)	0.41 (0.48)	0.41(0.47)	0.36(0.47)
Egg	-	0.83(1.33)	1.43(2.13)	0.93(1.09)	1.16(1.31)	1.02(1.33)
Potato	-	0.28(0.44)	0.96(1.43)	0.48(0.55)	0.88(0.99)	0.64(0.83)
Veg	-	0.48(0.76)	1.29(1.92)	0.67(0.78)	1.09(1.24)	0.85(1.11)
Fruits	-	0.02(0.03)	0.22(0.33)	0.05(0.05)	0.07(0.08)	0.07(0.09)
Total	-	62.54(100.00)	66.96(100.00)	85.78(100.00)	88.45(100.00)	76.81(100.00)

Figures in parentheses indicate the percentages to the total (column-wise), n= No. of sample households

Table-7 Food Item-wise Fat intake per Day per Consumer Unit for Sample Households of Enterprise, Cultivation of Agriculture (as Primary Source of Income) in Bankura District of West Bengal of INDIA (2015-16)

Food items	Group-1 (n=0)	Group-2 (n=6)	Group-3 (n=17)	Group-4 (n=20)	Group-5 (n=7)	Overall (n=50)
Rice	-	1.53(4.61)	2.47(5.51)	1.81(2.70)	1.89(2.86)	1.76(3.17)
Puffed rice	-	0.06(0.17)	0.07(0.19)	0.08(0.12)	0.11(0.16)	0.08(0.15)
Wheat	-	1.53(4.61)	0.62(1.57)	1.01(1.51)	0.34(0.51)	0.71(1.27)
Pulses	-	0.23(0.71)	0.28(0.70)	0.26(0.39)	0.30(0.45)	0.26(0.47)
Edible oil	-	9.69(29.25)	19.46(49.17)	23.54(35.09)	18.71(28.35)	18.28(32.99)
Milk	-	18.89(57.01)	14.58(36.86)	38.81(57.85)	42.72(64.72)	32.64(58.91)
Fish	-	0.21(0.62)	0.35(0.88)	0.35(0.52)	0.38(0.57)	0.32(0.59)
Chicken	-	0.03(0.08)	0.04(0.10)	0.04(0.06)	0.04(0.07)	0.04(0.07)
Meat	-	0.03(0.09)	0.04(0.11)	0.05 (0.08)	0.05(0.08)	0.05(0.08)
Egg	-	0.83(2.51)	1.43(3.61)	0.93(1.39)	1.16(1.76)	1.02(1.84)
Potato	-	0.02(0.05)	0.06(0.15)	0.03(0.04)	0.05(0.08)	0.04(0.07)
Veg	-	0.07(0.21)	0.19(0.47)	0.10(0.15)	0.16(0.24)	0.12(0.22)
Fruits	-	0.03(0.08)	0.27(0.69)	0.06(0.09)	0.09(0.13)	0.09(0.16)
Total	-	33.13(100.00)	39.57(100.00)	67.09(100.00)	66.01(100.00)	55.40(100.00)

Figures in parentheses indicate the percentages to the total (column-wise), n= No. of sample households

Table-8 Difference between Recommended Doses and Present Intakes of Calorie, Protein and Fat per Day per Consumer Unit for the Sample Households of Enterprise, Cultivation of Agriculture (as Primary Source of Income) in Bankura District of West Bengal of INDIA (2015-16), (unit/day/CU)

Income Group	Energy (kcal)	Protein (gm)	Fat (gm)
Recommended	2425	60	20
Group-1 (n= 0)	-	-	-
Group-2 (n= 6)	2040.52*	62.54	33.13
Group-3 (n= 17)	2424.02*	66.96	39.57
Group-4 (n= 20)	2673.57	85.78	67.09
Group-5 (n= 7)	2688.43	88.45	66.01
Overall (n= 50)	2568.61	76.81	55.40

* Less than RDA, ** Sufficiently higher than RDA

The overall calorie intake per consumer unit derived from the consumption of all food items is found to be higher than the Recommended Dietary Allowance (RDA) as per the ICMR. But amongst the various groups, the calorie intake of Group-2 is lower than the recommended calorie intake. There is a positive correspondence between calorie intake per day per consumer unit for sample households and income group. The percentage of calorie intake among all the food items is the highest for rice. The overall protein intake per consumer unit derived from the consumption of all food items is found to be higher than the Recommended Dietary Allowance (RDA). But amongst the various groups, the protein intake of Group-4 and Group-5 is much higher than the recommended protein intake. The percentage of protein intake among the food items is the highest for milk. There is a positive correspondence between protein intake per day per consumer unit for sample households and income group. The overall fat intake per consumer unit derived from the consumption of all food items is found to be higher than the Recommended Dietary Allowance (RDA). The percentage of fat intake among the food items is the highest for milk. There is a positive correspondence between fat intake per day per consumer unit for sample households and income group except in Group-5. The sample households from Group-2 need to be made aware of the

concept of balanced diet and more intakes of fruits, vegetables, eggs and chicken. The sample households from Group-4 and Group-5 need to practice diet control. High protein intake may cause harm in people with constipation, diarrhoea, dehydration, kidney damage, increased uric acid, increased cancer risk, heart disease, calcium loss etc. The sample households need to be made aware of fewer intakes of rice, wheat, potato, sugar, vegetables etc.

Application of research: To measure food security to improve the status of the food security in terms of calorie, protein and fat intake of sample households. It is very useful for measurement of food intake.

Research Category: Applied Social Sciences

Abbreviations: RDA: Recommended Dietary Allowance

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Study area / Sample Collection: Sonamukhi Block under Bishnupur Sub-division of Bankura District of West Bengal, India

Cultivar / Variety / Breed name: Nil

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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