FOOD SECURITY — AN UPDATE FOR HEALTH PROFESSIONALS

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Objective. To compare data from 1998/99 food balance sheets with data obtained from dietary surveys in order to compare national and individual food security.
Methods. Consumption data were derived by taking total production of a specific food item in the country and by subtracting the total amount used for animal feed as well as the total amount of imports and exports of the specific food item. This amount was then divided by the total population in the country, thus obtaining the per capita availability of each food item. All the per capita food items were then added and average available energy, carbohydrate, protein and fat consumption were calculated. The available per capita consumption data thus obtained were also compared with the actual nutrient intakes from published dietary surveys.
Results. Both wheat and maize production have decreased in the 1990s compared with levels produced in the 1980s. Chicken and egg production have shown a consistent increase, whereas red meat production has steadily declined. South Africans, on average, eat primarily maize, followed by wheat, vegetables, milk, potatoes and sugar. For 1998/99, per capita available energy was 10 791 kJ compared with 9 772 kJ in 1993/94. Available protein was 71.5 g, fat 67.2 g and carbohydrate 419.6 g. The data compared favourably with those of 1993 except that available fat had increased by 27%. Comparison with dietary surveys revealed that black and coloured children had mean energy intakes less than the per capita available, indicating poor food security in these sectors of the population.
Conclusion. Both food balance sheets and dietary surveys indicate that large sectors of the South African population are food insecure.

One of the primary outcomes of poor household food security is poor growth in children, which can be measured using anthropometrical measurements.[1] A high prevalence of stunting and underweight in the preschool population could also be an indication of national food insecurity as well as other inequalities. While there is a relative paucity of national data in southern Africa, available statistics indicate that the prevalence of stunting ranges from 23% to 30%, and underweight from 9% to 26%.[2] Although South Africa has the lowest prevalence of underweight among preschool children (9%) compared with other African countries, stunting remains unacceptably high (23%).[3]

The main issues affecting future growth trends in South Africa are thought to be population growth and food supply. Annual population growth in the country was estimated to be 2.4% in 1995.[4] Africa is the only continent where population growth rates (3.1%) have not yet started to decline.[5] Consequently it has been predicted that in the next decade per capita food supplies will be about 12 600 kJ (3 000 Kcals) per day in North African countries, and at the relatively low level of 9 114 kJ (2 170 Kcals) per day in sub-Saharan Africa (SSA). Recent statistics indicated that the per capita energy available in South Africa was 9 772 kJ (2 326 Kcals) per day.[6]

The objective of this study was to update an earlier publication,[6] which reported on the available per capita data for 1993/94, in order to determine any changes in food security at national and household levels. This article presents data from food balance sheets for the 1998/99 period.

METHODS

The authors obtained data from food balance sheets published by the National Department of Agriculture's Directorate of Statistical Information on the food supply in South Africa for the 1998/99 period. Consumption data were derived by taking total production of a specific food item in the country and by subtracting the total amount used for animal feed as well as the total amount of imports and exports; the remainder reflects net human consumption of that specific food item. This amount was then divided by the total population count (1996 Census), and the final amount was assumed to represent the individual (per capita) consumption of a given food.[7] The latter represents 'available' consumption of a given food, which is known to be a very crude estimate since it does not take into consideration wastage, losses as a result of storage, urban/rural distribution differences, or distribution within households.

By adding together all the various foods consumed, it was possible to calculate the average energy, protein, fat and carbohydrate available per person in South Africa, thus deriving an indirect measure of national food security. The available consumption data thus obtained were then compared with the actual food consumption and nutrient intakes derived from dietary surveys in the literature.[8-11] The latter was used as an indirect measure of individual food security in the population. Because of the paucity of data on adults of all ethnic groups, as derived from a national food consumption

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survey, such a comparison was not possible for all groups of South African adults. The per capita data were also compared with the recommended dietary allowances (RDA).[12] The RDA values for 11 - 14-year-olds were used as this is one of the most demanding groups in terms of nutrient requirements.

RESULTS

Statistics on food production (staples and livestock) and population growth in South Africa (Table I) indicate that the production of maize, the major staple food, experienced a series of fluctuations between 1980 and 1999. The lowest production figures occurred in the 1995 and recent 1998/99 production seasons. Wheat production in 1999 decreased to the production levels of the 1980s, whereas barley production has increased consistently since that period. In contrast, a consistent decrease was noted in the production of sorghum and oats since 1980. In terms of livestock, the greatest increase in production was in chicken (62% from 1995 to 1999), with pork and egg production showing a similar but less marked trend. In contrast, the production of red meat has steadily decreased.

Table I. Comparison of livestock and crop production with population growth in South Africa from 1980 to 1999[7]

	1980	1990	1995	1999
Population (× 1 000)	29 156	37 067	39 799	43 054
Livestock (× 1 000)				
Beef and veal	711	609	508	518
Mutton, lamb and goat	182	168	95	104
Pork	88	126	119	123
Chicken	344	597	692	1 118
Eggs	144	219	251	334
Crops (× 1 000)				
Maize	11 039	9 180	4 866	7 928
Wheat	1 490	1 709	1 977	1 581
Sorghum	711	341	291	188
Oats	65	42	38	25
Barley	57	192	227	267
Rye	6	2	3	3

South Africans, on average, eat primarily maize, followed by wheat, vegetables, milk, potatoes and sugar (Table II). For 1998/99 the per capita available energy was 10 791 kJ (2 569) Kcals) compared with 9 772 kJ (2 326 Kcals) in 1993/94, a nearly 1 000 kJ (238 Kcals) increase. Per capita available protein was 71.5 g, fat 67.2 g and carbohydrate 419.6 g. These data are similar to those of the 1993 period (67, 49, and 400 g respectively), except for per capita available fat, which has shown a 27% increase. Grains provided 56.2% of the per capita energy available, which is similar to 1993 data (57.5%) (Table III).

The contribution from most food groups to the total per capita available energy intake has remained constant over the last 5 years, with three exceptions. There has been an increase in fat consumption (3.2%), and in meat and egg consumption (2.8%), and a decrease in sugar consumption (4.2%). The increase in meat consumption may be the result of the considerable increase in chicken consumption, which offsets the smaller decline in red meat consumption. Imports of rice have increased over the last few years, exceeding 450 000 tons annually. The per capita consumption of rice has been more than 10 kg/year since 1995. Rice is now the third most important cereal consumed by South Africans.

Available energy and macronutrients according to food balance sheets were compared with actual consumption from dietary surveys (Table IV).[8-11] The latter used primarily the 24-hour recall method. It is notable that black and coloured children had overall mean intakes less than the RDAs and less than the per capita available, indicating poor household food security in these sectors of the population. All groups, however, had lower mean carbohydrate intakes than the per capita available. Black and coloured children also had a lower mean protein and fat intake. More recent data on this age group and adults of all ethnic groups were not available.

DISCUSSION

Over the last 20 years some interesting trends in food consumption have taken place in South Africa. Red meat production has decreased, while chicken and egg production have nearly trebled. Maize production is considerably less than it was in 1980, while wheat production has remained stable, and rice consumption has increased significantly. Fats and oils have shown the greatest per capita increase over the last decade, increasing from 3.8% of energy intake in 1985 to 8.8% in 1998.

The type of analyses presented in this paper are known to have important limitations, mainly because they do not take inter- and intra-household distribution into account, and because they would underestimate food produced for own consumption (home production). Nevertheless, food balance sheets are used worldwide as a measure of national food security since they indicate important trends in food consumption patterns. Specifically, in terms of types and quantities of foods eaten, similar results were found in the National Food Consumption Survey (NFCS) of 1 - 9-year-old children.[13] In this regard, the percentage of energy derived from the various food groups as obtained by the food balance sheets and the national survey (Table V) indicates reasonable agreement as regards stable foods. However, fat and sugar intake as a contribution to energy intake are lower in the NFCS, while dairy and vegetable contributions are higher in the NFCS when compared with the data derived from the food balance sheets. The most likely explanation for these apparent differences is, among others, the fact that the NFCS population included only children.

Table II. Consumption of macronutrients in South Africa (1998/99) from food balance sheets[7]

Commodity	Net consumption (× 1 000 ton)	Kg per year	g per day	Protein (g)	Fat (g)	Carbohydrate (g)	Energy (kJ)
Dairy products							
Milk	1 630	38.69	106.0	3.5	3.6	5.1	279.8
Powder and condensed	385	9.14	25.0	0.9	0.9	1.1	68.1
Cheese	38	0.91	2.5	0.6	0.8	0.1	40.5
Meat and eggs							
Beef and veal	574	13.63	37.3	6.4	8.2	0.0	430.1
Mutton and goat	165	3.91	10.7	1.3	2.3	0.0	108.2
Pork	127	3.01	8.3	0.8	3.1	0.0	129.9
Chicken*	1 091	25.34	69.4	8.3	6.0	0.0	375.0
Eggs*	313	7.27	19.9	2.4	2.2	0.0	131.6
Legumes and nuts							
Peanuts*	50	1.15	3.2	0.8	1.5	0.4	76.9
Dry beans*	103	2.40	6.6	1.5	0.1	3.9	94.5
Dried peas and lentils	22	0.52	1.4	0.3	0.0	0.9	20.1
Fats and oils							
Peanut oil	8	0.20	0.5	0.0	0.5	0.0	10.0
Sunflower oil	316	7.33	20.1	0.0	20.1	0.0	743.7
Other oil	88	2.09	5.7	0.0	4.6	0.0	172.9
Butter	1 300	0.31	0.9	0.0	0.7	0.0	25.4
Grains							
Maize*	3 694	85.80	235.1	18.8	8.7	156.1	3 267.4
Wheat*	2 155	51.16	140.2	17.9	2.9	19.7	2 000.9
Sorghum*	66	1.53	4.2	0.4	0.1	3.1	62.4
Barley	220	5.23	14.3	1.2	0.1	11.1	209.5
Oats	7.4	0.17	0.5	0.1	0.1	0.3	10.8
Rice	526	12.50	34.2	2.3	0.6	27.1	515.8
Vegetables and fruit							
Potatoes*	1 321	30.68	84.0	1.3	0.1	13.1	246.2
Sweet potatoes*	48	1.11	3.0	0.0	0.0	0.5	8.4
Other vegetables*	1 739	40.39	110.7	1.3	0.3	4.4	107.6
Citrus	651	15.46	42.4	0.3	0.1	3.5	67.0
Other fruit	1 026	24.35	66.7	0.6	1.0	7.6	174.8
Dried fruit and nuts	20	0.47	1.3	0.0	0.0	0.2	15.3
Other							
Sugar	1 220	28.96	79.3	0.0	0.0	76.5	1 285.5
Cocoa	9	0.22	0.6	0.1	0.1	0.1	8.7
Sorghum beer	870	20.65	56.6	0.4	0.1	5.6	104.3
Total				71.5	67.2	419.6	10 791.3

*Preliminary statistics for 1999.

In line with the rest of SSA, the population of South Africa is rapidly urbanising. It is predicted that 41% of SSA will be urbanised by the end of the next decade.[5] Urbanisation will result in a corresponding shift in the demand for foods, with greater emphasis on convenience foods and a shift in the composition of dietary staples. This has already been reported to have occurred in West Africa where there has been a shift from locally produced coarse grains such as millet and sorghum to imported wheat and rice.[14] In South Africa, urbanisation is also expected to lead to increased intake of energy and fat. Indeed, it has been reported that the black population of Cape Town which spent an increased amount of time in the city showed a decreased consumption of cereals and an increase in the consumption of dairy produce, meat, fruit and vegetables, fat and non-basic food items.[15] More recently, it was also reported that urban black female students consumed significantly more sugar and confectionary, and significantly less legumes and maize meal than their rural counterparts.[16] Furthermore, and in keeping with the reported trend in the literature, the food balance sheets indicate that for South Africa as a whole, the per capita available fat

Table III. Contribution of major food groups to total available kilojoules per day for 1998/1999

Food groups	1993/94 Energy (kJ)	1993/94 % of energy	1998/99 Energy (kJ)	1998/99 % of energy
Grains and rice	5 619	57.5	6 066.8	56.2
Dairy products	290	3.0	388.4	3.6
Meat and eggs	792	8.1	1 174.8	10.9
Legumes and nuts	170	1.7	191.5	1.7
Vegetables	360	3.7	362.2	3.3
Fruit	204	2.1	257.1	2.3
Fats and oils	551	5.6	952.0	8.8
Sugar	1 578	16.1	1 285.5	11.9
Other	209	2.1	113.0	0.9
Total	9 772		10 7 91.3	

Table IV. Comparison of available energy, protein, fat and carbohydrate with consumption levels from dietary surveys[8,9,11]

	White[8]		Black[9]		Coloured[8]		Indians[11]		Available per capita*	RDA†	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls		Boys	Girls
Energy (kJ)											
Urban	9 986	8 394	7 345	7 612	7 558	6 390	8 572	8 762	10 791	10 500	9 240
Rural	9 370	7 740	7 130	7 014	7 485	7 388	–				
Protein (g)											
Urban	86	67	53	54	61	53	68	68	71.5	45	46
Rural	81	58	57	56	57	55	–				
Fat (g)											
Urban	94	82	57	58	67	62	82	85	67.2		
Rural	89	87	45	47	57	58	–				
Carbohydrate											
Urban	286	239	253	246	225	178	261	266	419.6		
Rural	264	226	257	250	249	243	–				

* See Tables II and III.
† Recommended Dietary Allowances for 11 - 14-year-olds.

Table V. Contribution (%) of major food groups to total available kilojoules per day — comparison between data from the National Food Consumption Survey (NFCS)[13] and data from food balance sheets (1998/99)[7]

Food group	NFCS (% of energy) Consumers only*	NFCS (% of energy) Total sample†	Food balance sheets (RSA 1998/99) (% of energy)
Grains	54.52	34.62	56.2
Dairy products	8.28	8.22	3.6
Meat and eggs	12.30	11.09	10.9
Legumes and nuts	14.86	2.95	1.7
Vegetables	7.21	6.24	3.3
Fruit	8.59	2.93	2.3
Fats and oils	6.35	4.04	8.8
Sugar	6.42	8.47	11.9
Other	1.38	1.55	0.9

* Energy divided by children who consumed that item (excludes non-consumers).
† Energy divided by the total sample (N = 2 869).
NFCS = National Food Consumption Survey of 1 - 9-year-old children (N = 2 869).

consumption increased from 19% in 1993 to 24% in 1998, while cereal consumption decreased from 69% to 65% over the same period.

The annual population growth rate of South Africa is currently estimated at 2.4%, which is lower than in 1980.[4] This will lead to changes in available per capita consumption in the next decade, since more South Africans will have access to nutritional food than during the 1980s. Taking into account the various regional trade commitments, South Africa is expected to stay a net exporter of cereals to its Southern African Development Community (SADC) neighbour countries, a trend that is expected to increase during the next decade. In a fairly deregulated agricultural market environment, it is expected that farmers will have to stay abreast of certain defined influences on crop production. These include, *inter alia*, weather patterns, input and producer prices, risk management and stock levels. Additionally, a paradigm shift has taken place in South African agriculture. The focus is now on developing small-scale subsistence farmers in a manner that makes them sustainable and self-sufficient.

Three aspects need to be highlighted regarding the changing food consumption patterns currently being observed in South Africa: firstly, the relative contribution that animal and vegetable products make to the total intake of energy from carbohydrate, protein and fats; secondly, the extent of food diversification observed in different parts of the country; and thirdly, the importance of changing staple foods in aggregate food supplies.

In as much as food security is an agricultural policy directive in South Africa, its far-reaching implications cannot be over-emphasised. Therefore a collaborative approach is needed across several spheres of macro-economic policy, geared at employment creation (empowering the impoverished) in order to eliminate poverty and food insecurity among the majority of South Africans. In the implementation of these policies there are major contentious issues that will need to be addressed before most people not only have access to sufficient nutritious food, but also know how to eat for optimal health.

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