NATIONAL NUTRITION MONITORING BUREAU

K. [illegible]nnaswamy
K. [illegible]
J. [illegible]iah Shastry
D. [illegible]hunmatha Rao
G. N.V. Brahmam
G. Radhaiah
K. Kashinath
M. Vishnuvardha[illegible] Rao

NATIONAL INSTITUTE OF NUTRITION
Indian Council of Medical Research
Hyderabad-500 007, A.P.

25 YEARS OF NATIONAL NUTRITION MONITORING BUREAU

Kamala Krishnaswamy
K. Vijayaraghavan
J. Gowrinath Sastry
D. Hanumantha Rao
G.N.V. Brahmam
G. Radhaiah
K. Kashinath
M. Vishnuvardhan Rao

NATIONAL INSTITUTE OF NUTRITION
Indian Council of Medical Research
Hyderabad-500 007

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foreword

The formulation and implementation of our National Nutrition Policy must rest on sound scientific data. It is important for the policy-makers to be fully informed of the current nutritional status of populations in different regions of the country; of the possible factors contributing to malnutrition among them; and of the changing trends brought on by development and nutrition programmes. This will enable the administrator to determine his priorities for action.

Sound scientific data on current nutritional status and on changing trends are also important for the nutrition research scientist. Such data will provide many valuable leads for research, and will ensure that such research is action-oriented.

It is because of these considerations that the National Nutrition Monitoring Bureau (NNMB) was set up 25 years ago. A good beginning was made. As many as 9 States were covered in the initial phase of the operation. The sampling design and the statistical procedures needed for the survey operation were worked out in close collaboration with the noted Statistician Prof.C.R.Rao. The programme was launched by the ICMR with the cooperation of the concerned State governments.

It was hoped that NNMB will in due course, be further expanded to cover all the States of the country; and that it will be given a permanent status as an integral part of the National Institute of Nutrition.

During the years that followed, NNMB despite financial constraints, had done commendable work. The Annual Reports and the Five-Yearly Reports of the NNMB are the only authentic National data available today with regard to the current nutritional status of the population groups in the country. The National Institute of Nutrition and the ICMR could well be proud of NNMB's contributions.

Unfortunately, however, NNMB did not receive the type of financial support and encouragement which it ought to have received. It continued to operate on a shoe-string budget and on a year to year temporary basis. This must have greatly cramped its work.

It is possible that part of this was due to the mistaken belief that NNMB surveys were a 'routine service' and not part of 'scientific research. Unfortunately NNMB reports while providing useful data, did not clearly indicate the practical leads for action, and the new areas of research that flowed from its data. This might have been one of the reasons for the lack of adequate support, and recognition of its valuable contribution.

Now that it is clear that the nutritional status of a population is the major determinant of not only its health status, but also of the process of national development itself, it is to be hoped that the Government of India and the ICMR will provide adequate strength and support to NNMB, in future.

C.Gopalan
President,
Nutrition Foundation of India,
Former Director-General, ICMR

New Delhi,
September 15, 1997

Preface

The National Nutrition Monitoring Bureau (NNMB), the brain child of Dr.C.Gopalan, the then Director (1961-1973) of the Institute, was established in 1972, to assess dietary and nutrition situation in the country on a continuous basis. It commenced its activities with Units in 9 States of Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, and five years later Orissa was included. The NNMB is the only organisation in India, which has been generating data on food and nutrient intake and nutritional status on a continuous basis, using standard techniques on representative samples in rural, urban and tribal areas. The Bureau has carried out surveys in collaboration with the National Sample Survey Organisation (NSSO) and National Council of Applied Economic Research (NCAER). On the occasion of the 50th year commemoration of India's Independence, a publication on "Twenty Five Years of National Nutrition Monitoring Bureau (NNMB)" is being released. This volume is a compilation of the NNMB data on patterns of dietary intakes and nutritional status analysed at the Central Reference Laboratory (CRL), from a unique data base having no parallel in India.

The book is organised into eight sections, and the data is presented in graphic form with appropriate qualifying statements. In the first two sections, a brief introduction, and the total coverage are given. In the remaining sections, to begin with, pooled information on foods, nutrients and nutritional status of rural India is presented, followed by state-wise data on the same.

In the next section, data on time-trends in food, nutrient intakes, nutritional status and secular trends in heights and weights are depicted. Subsequently, information on urban population belonging to different income groups, the trends in diet and nutritional status of slum dwellers and middle income groups and data on tribals are given.

The data, provides an insight on the proportion of population not meeting the nutrition needs, the wide variations in dietary patterns between the States, the changing trends in consumption of foods and nutrients, and on the extent of undernutrition both in children and adults as well as the secular trends.

The reader of the book will get a comprehensive idea on the diet and nutritional status of a vast cross-section of the population in India. This compilation will be of great use to nutrition scientists, both within and outside the country and can serve as a useful document for the administrators for policy formulation and programme development.

My sincere thanks are to the ICMR for establishing and nurturing the NNMB during the last twenty five years. It is commendable that with limited staff and budget, the NNMB has been able to achieve its objectives and continue to generate enormous data for the country, living upto the expectations. This would not have been possible without the contributions of the Officers-In-Charge and staff of regional NNMB Units and the Central Research Laboratory. The cooperation and assistance of the staff are gratefully acknowledged. I gratefully acknowledge Dr.B.N.Tandon, Chairman and all the other members of the Steering Committee for their valuable suggestions, constant encouragement and guidance for carrying out the activities of NNMB. The staff of the CRL, at the NIN, require special appreciation for not only monitoring and coordinating the activity and creating a data base, but also for organising and successfully bringing out this volume in a very short span of time. My thanks are due to all the scientific, technical and other supporting staff for their unstinted cooperation.

National Institute of Nutrition
Hyderabad-500 007, India
September 15, 1997

Dr.*Kamala Krishnaswamy*
Director

1. TWENTY FIVE YEARS OF NATIONAL NUTRITION MONITORING BUREAU

Hunger and disease continue to torment large segments of population, particularly in the rural and tribal areas and urban slums in India. The Constitution of India guarantees better nutrition and good standard of living to all its citizens. The Government of India and the different State Governments have been striving to ensure adequate nutrition to the population by initiating several developmental and nutrition programmes. Development of a data base among different socio-economic segments of the population in the country will in fact be the first step for the formulation of national/regional policies and programmes to control malnutrition. However, it is very essential to ensure that the data is accurately collected adopting standard procedures. In India, the Nutrition Divisions of the respective State governments were collecting such information, which was being published as "Nutrition Work Done in States".

However, there were several lacunae in these surveys. No uniform and standard procedures either in sampling or data collection were being adopted in different States. The investigators were not properly trained. Thus, neither valid interpretations could be drawn from the data so collected, nor inter-state comparisons could be made. Hence, the Indian Council of Medical Research (ICMR) felt the need for establishing an organisation to undertake scientifically planned large scale systematic surveys in different parts of the country using standardised procedures, leading to the establishment of National Nutrition Monitoring Bureau (NNMB) at the National Institute of Nutrition, Hyderabad in the year 1972. Initially, the NNMB Units were established in the nine States of Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh and West Bengal. At the request of the Government of Orissa, a unit was established in the State in 1976.

ORGANISATION

State Units

In each State, in general, the units are located in the Directorate of Health Services under the administration and supervision of the State Nutrition Officer. This is to ensure participation of the State administration in the collection and use of data. In the States of Madhya Pradesh and West Bengal, these are attached to the ICMR Regional Centres. Each Unit consists of one Medical Officer, one Nutritionist, an Auxiliary Nurse Mid-Wife or a Social Worker and one Field Assistant. The Unit is also provided with a Driver and a vehicle.

Central Reference Laboratory (CRL)

The Central Reference Laboratory located at the National Institute of Nutrition, Hyderabad, is responsible for preparation of survey protocol, sampling, recruitment and training of field staff, supervision of data collection, quality control, data cleaning, analysis and preparation of reports.

OBJECTIVES

The specific objectives of NNMB are :

i) To collect data on dietary intakes and nutritional status of the population in each of the States on a continuous basis, and

ii) to evaluate the on-going National Nutrition Programmes, identify their strengths and weaknesses and recommend mid-course corrections to improve their effectiveness.

METHODS

The following investigations are carried out by the NNMB :

1. Demographic and Socioeconomic Particulars

In each of the selected households (HH), data on age and sex composition of the family, literacy status of each individual member of the HH, socio-economic status as assessed by income of each earning member and possession of land and livestock are collected using a specially designed questionnaire.

2. Diet Survey

Dietary intakes are assessed by one day household weighment of raw foods consumed on the day of the survey and assessment of individual dietary consumption by each member during the previous 24 hours. While the family diet survey provides data on the average intakes at the household level, the 24-hour recall method provides information on individual dietary intakes and intra-family distribution of food.

3. Nutrition Assessment

3.1 *Clinical Survey* : All the individuals in the selected HHs are examined clinically by the Medical Officer for the presence of objective deficiency signs.

3.2 *Nutritional Anthropometry* : Body measurements like body weight, height (or length in children below 2 years), mid-upper arm circumference and fat fold at triceps are taken on all the individuals.

4. Sampling

4.1 *Rural areas* : Until 1983, a sample of 500 HHs was covered every year in each State. These HHs were selected from four districts; each district representing a specific developmental category. The sampling facilitated inter-state comparisons. The villages were selected in proportion to the population and in each village, households representing different socio-economic categories were included in the sample.

However, since the NSSO sampling has been considered more representative, a sub-sample of the NSSO sample is selected for NNMB surveys, from the year 1983 onwards. A total of 750 HHs are covered now every year in the rural areas of each State.

The data on dietary consumption is collected using one day weighment method on 80% of the sample and in the rest the dietary intakes of the individuals of the household are assessed using 24-hour recall method.

4.2 *Urban areas :* In the urban areas, a sample of 250 households representing high income group, middle income group, low income group, industrial labourers and slum population is covered. A 3-day weighment method is adopted for assessment of dietary intake in the urban sample.

4.3 *Tribal areas*: Since tribals form an important vulnerable segment of the population, a special survey was carried out, during the years 1985-87, in the villages covered by Integrated Tribal Development Projects (ITDP) in all the NNMB States.

4.4 *Repeat Surveys* : Since one of the important objectives is nutrition monitoring, so as to assess changes in diet and nutritional status, a repeat survey was carried out during 1988-90, in the same villages which were surveyed during 1975-79.

4.5 *Second Repeat Survey* : Currently, a second repeat survey is in progress covering the same villages which were surveyed in 1975-79 and 1988-90.

STRENGTHS OF NNMB

The representativeness of the sample covered by the NNMB is ensured by a rigorous multistage sampling procedure, by which every village in each state has an even opportunity to be included. Standardised techniques are used both in the case of diet surveys and nutrition assessment. These surveys are carried out regularly in all the ten States making it possible to develop a data base on diet and nutrition status on a continuous basis. Apart from the regular annual data collection, the Bureau has also carried out some special studies like NNMB-NSSO linked survey and tribal surveys in the ITDP areas. In addition, it has also participated in evaluation studies of Special Nutrition Programme (SNP), World Food assisted Supplementary Feeding and National Prophylaxis Programme Against Blindness due to Vitamin A Deficiency.

Scientific Data Generated.

The NNMB has consistently confirmed in successive surveys that the primary bottle neck in the dietaries of even the poorest segments of Indians is energy and not protein, as was hitherto believed.

Data on intrafamiiy dietary distribution shows that a higher proportion of preschool children get less than their physiological needs as compared to adults, a finding commonly observed in all the States.

Contrary to the widely prevalent belief that in situations where a HH has insufficient food, the man gets a higher share than the woman, the data collected by the NNMB show that there is no such discrimination. The proportion of men and women having calorie inadequacy is similar. Thus, contrary to the popular belief, NNMB surveys reveal that there is no gender bias against girls.

The nutritional status of rural girls of preschool age has been found to be essentially similar to their male counterparts, indicating that there is no gender bias in nutrition care.

The data also indicate that measurement of consumption of cereals can be used as a proxy for total energy intake. This observation is of considerable significance as it helps to determine rapid, though approximate, estimates of energy intakes at the HH level.

The energy and protein intakes of urban slum dwellers are no way different from those of the rural landless labourers. The nutritional status of even the urban middle income group population is far from satisfactory.

The NNMB found that there is a changing pattern in the types of food grains being consumed. The consumption of cereals - wheat and rice - shows an upward trend, while that of millets - jowar, bajra, ragi and maize - show a downward trend.

Over the period, there has been improvement in the mean calorie intake of rural Indian HHs belonging to the lowest income groups (per capita income < Re.1/day).

The nutritional status of rural Indian preschool children shows a general improving trend between 1975 and 1990. The proportion of severe malnutrition fell from 8.5% in 1975 to about 5% after 15 years.

POLICY LEADS

The NNMB data provided several policy leads of considerable value to the planners. A comparison of the data on IMR and child mortality in conjunction with the data collected by the Bureau indicates that better child survival does not necessarily mean better child health and nutrition. While control of mortality can be achieved even in the context of poverty and under-nutrition, promotion of health and optimal nutritional status call for a holistic approach.

The NNMB surveys in urban areas indicate that there are considerable disparities in the body size between different socio-economic groups. It appears that the section of the population (Agriculture workers), which has to depend for its livelihood on manual labour and which, therefore, has to have a sturdy body-build, ends up as the one with the poorest body size.

USERS OF NNMB DATA

NNMB data is being extensively used both by the national and international organizations. Some of the important users have been:

International Organisations

i) UNICEF, ii) FAO, iii) WHO, iv) World Bank, v) International Food Policy and Research Institute, New York vi) International Crops Research Institute of the Semi-Arid Tropics, Hyderabad, and vii) London School of Hygiene and Tropical Medicine, London.

National Organisations

a) Planning Commission, b) Department of Women and Child Development, c) ICAR, d) Nutrition Foundation of India, e) ICMR, f) DGHS, and g) State Governments and State Planning Bodies.

Universities/Institutions

a) Maharashtra Association for Cultivation of Science, Pune; b) National Institute of Public Cooperation and Child Development, New Delhi; c) National Institute of Rural Development, Hyderabad; d) Operations Research Group, Vadodara; e) State Institute of Rural Development, Hyderabad; 0 National Council of Applied Economic Research, New Delhi; g) Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore; h) College of Home Science, M.S. University, Vadodara; i) Acharya N.G.Ranga Agricultural University, Hyderabad; j) Central Food Technological Research Institute, Mysore; k) Medical Colleges in different States, etc.

Individual Scholars

A number of Doctoral and Post-doctoral Research Scholars from different Universities also make use of the NNMB data. In fact, some individuals have even obtained their Ph.D using the data collected by the NNMB.

LIMITATIONS

It has to be kept in mind, while interpreting the data collected by the NNMB, that, over the years the sampling design and coverage varied between surveys depending on the actual objectives of the survey. By and large, the urban surveys were carried out in the capital cities of the States.

Food and nutrient intake and nutritional status of the community, need not have one to one relationship, as certain non-nutritional factors also contribute significantly to the overall nutritional status.

The activities of the Bureau are at present limited to just 10 States. Some of the prosperous States like Punjab and Haryana, and none of the North eastern States are covered.

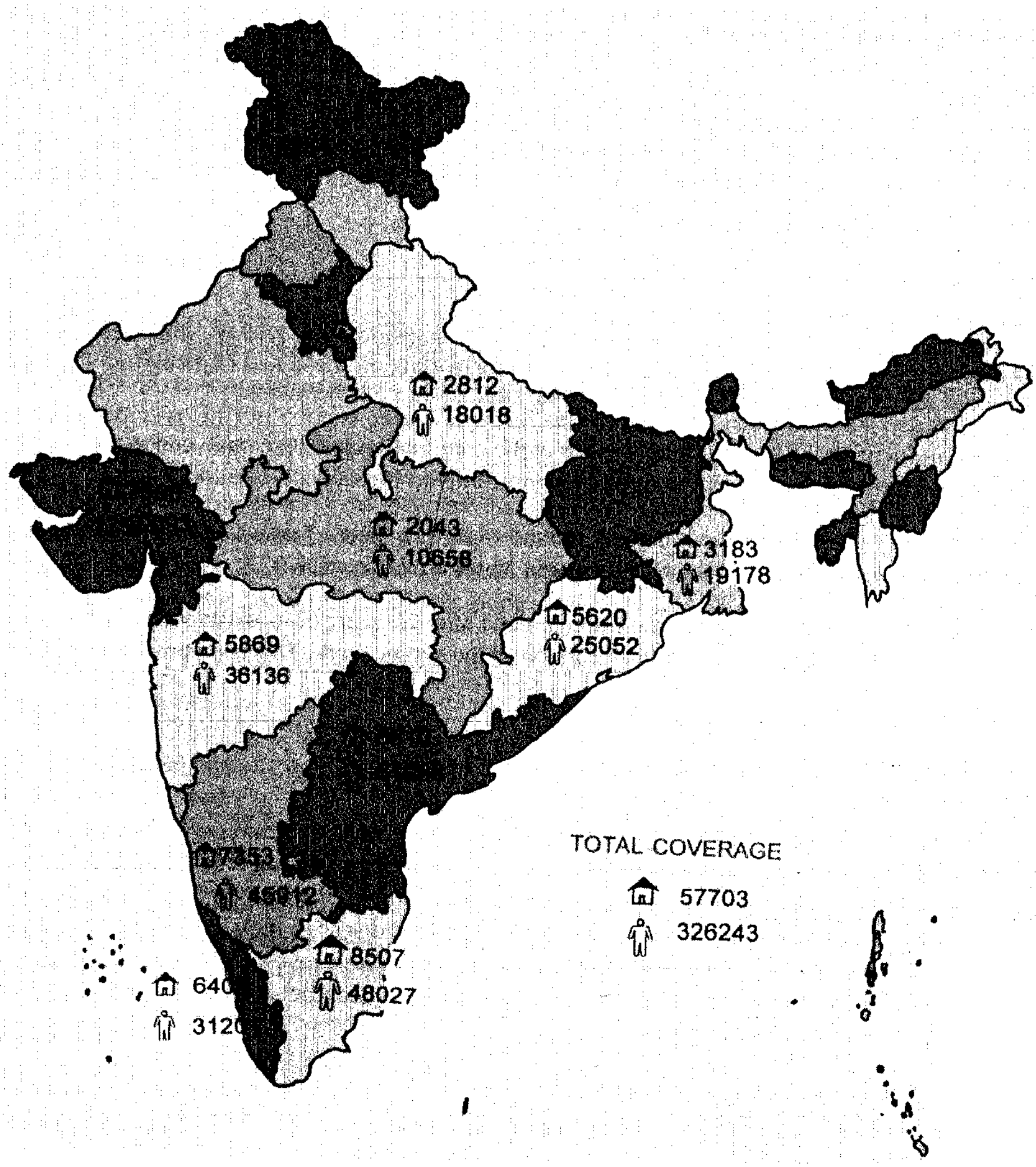
In view of the temporary nature of the Bureau, even after 25 years of its existence, there is a high turn over of the staff of the Bureau, resulting in disruption of the survey work. This sometimes affects the quality *of* the data.

FUTURE

The NNMB, in the years ahead, if expanded to other States of the country, will provide not only the much needed data base for formulation of meaningful nutrition plans and national policies but also help to enrich and enhance the relevance of nutrition research in the country. If the scope of the activities of NNMB is enlarged, it can also provide estimates of selected diet related diseases, their risk factors and distribution of selected health parameters in reference population. It can help in investigation and documentation of cause-specific mortality. The wealth of information thus generated can be used for national policies and in the development of targeted programmes.

2. COVERAGE

A total of 57,703 households were covered for diet and nutrient intakes and 3,26,243 individuals were assessed for nutritional status.



3. FOODS, NUTRIENTS AND NUTRITIONAL STATUS - RURAL
(States Pooled)

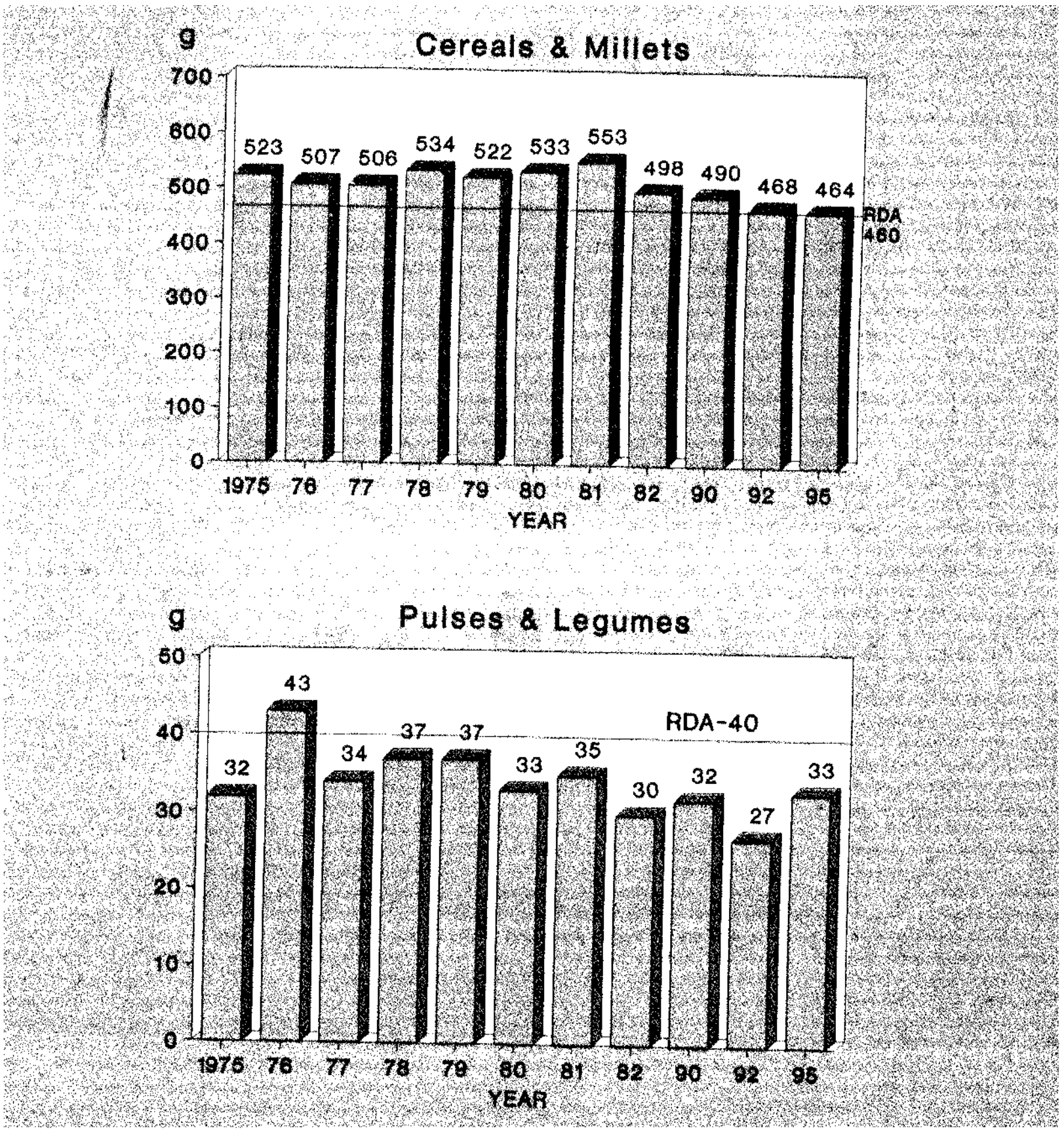
3.1 INTAKE OF FOODS (CU/Day)

3.1.1 Cereals & Millets

The average consumption of cereals and millets, though tended to decrease, was above or equal to RDA.

Pulses & Legumes

The intake of pulses and legumes remained marginally lower than the recommended levels.

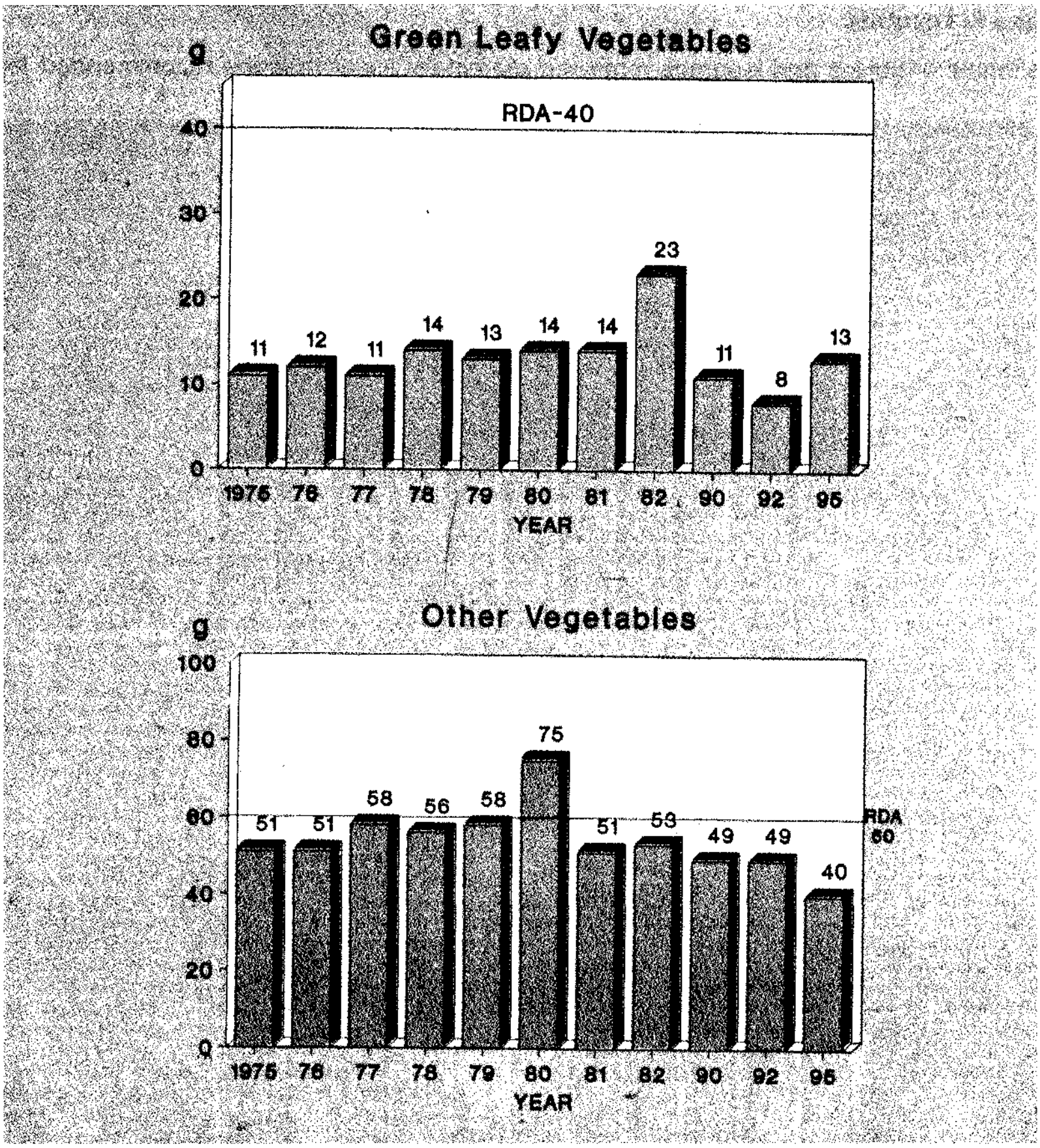


3.1.2 Green Leafy Vegetables

The average intake of GLV, an inexpensive source of vitamins and minerals, was about a third of the RDA.

Other Vegetables

The consumption of other vegetables was marginally lower than the RDA.

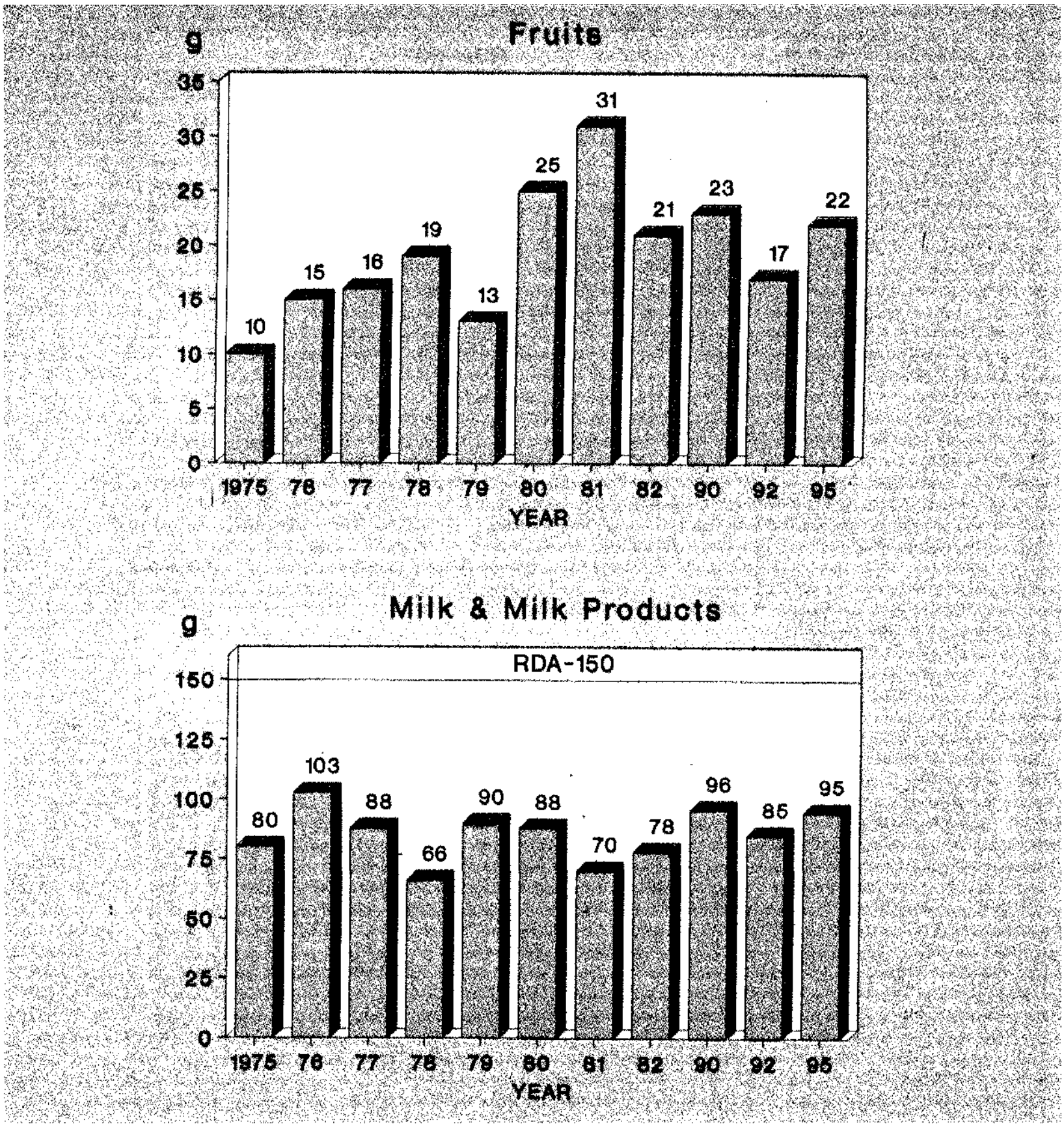


3.1.3 Fruits

The consumption of fruits showed slight increase over the years.

Milk & Milk Products

The consumption of milk and milk products, though showed minor fluctuations, was just above half the RDA.

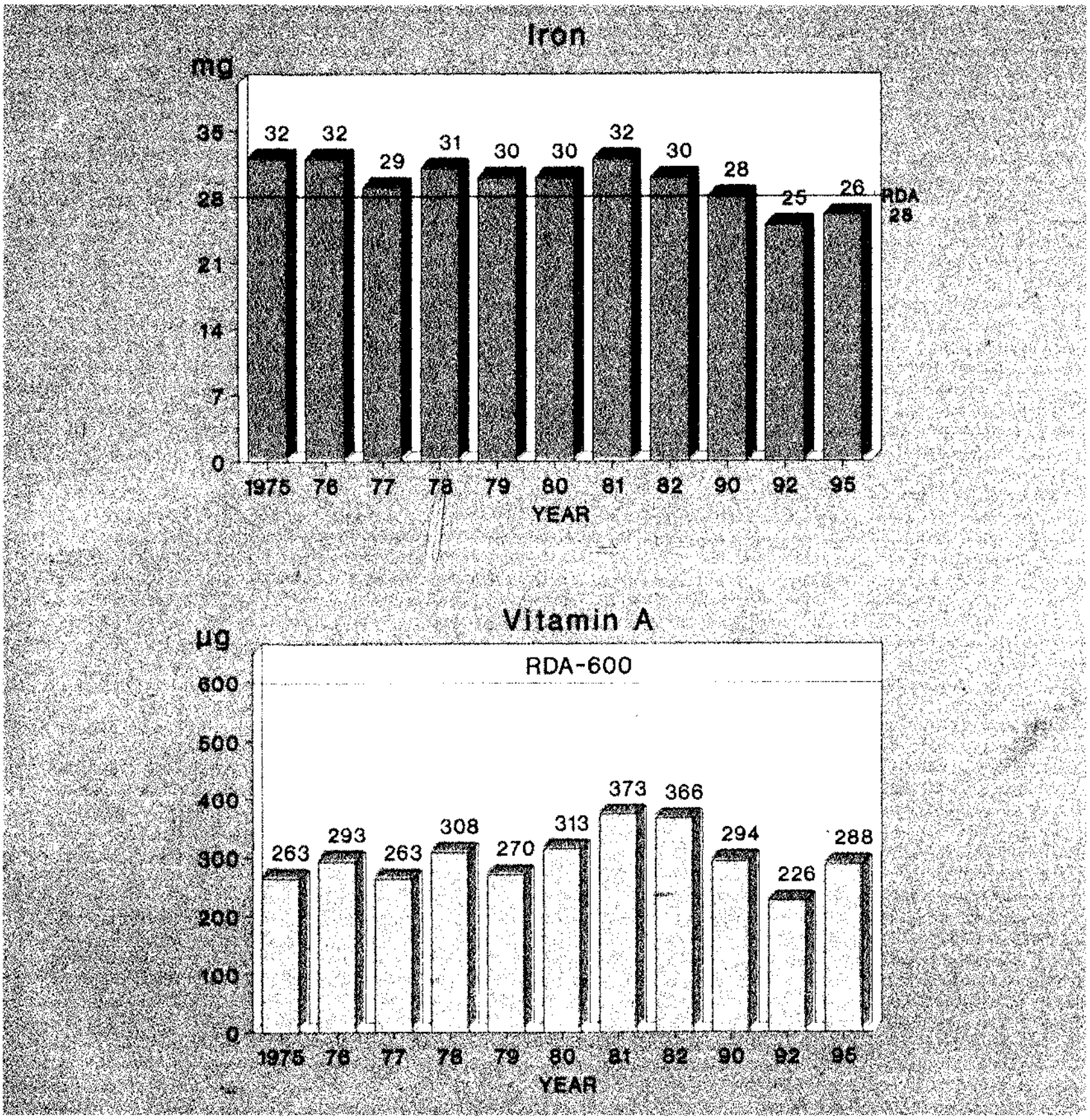


3.2.2 Iron

The intake of iron was comparable to the recommended allowances. Though the daily average intake of iron was apparently normal, the bio-availability of iron in Indian diets, in general, is poor (3%).

Vitamin A

The intake of vitamin A, derived mainly as *β*-carotene and expressed as Retinol Equivalents, showed fluctuations, ranging from about 30 to 60% of the RDA.

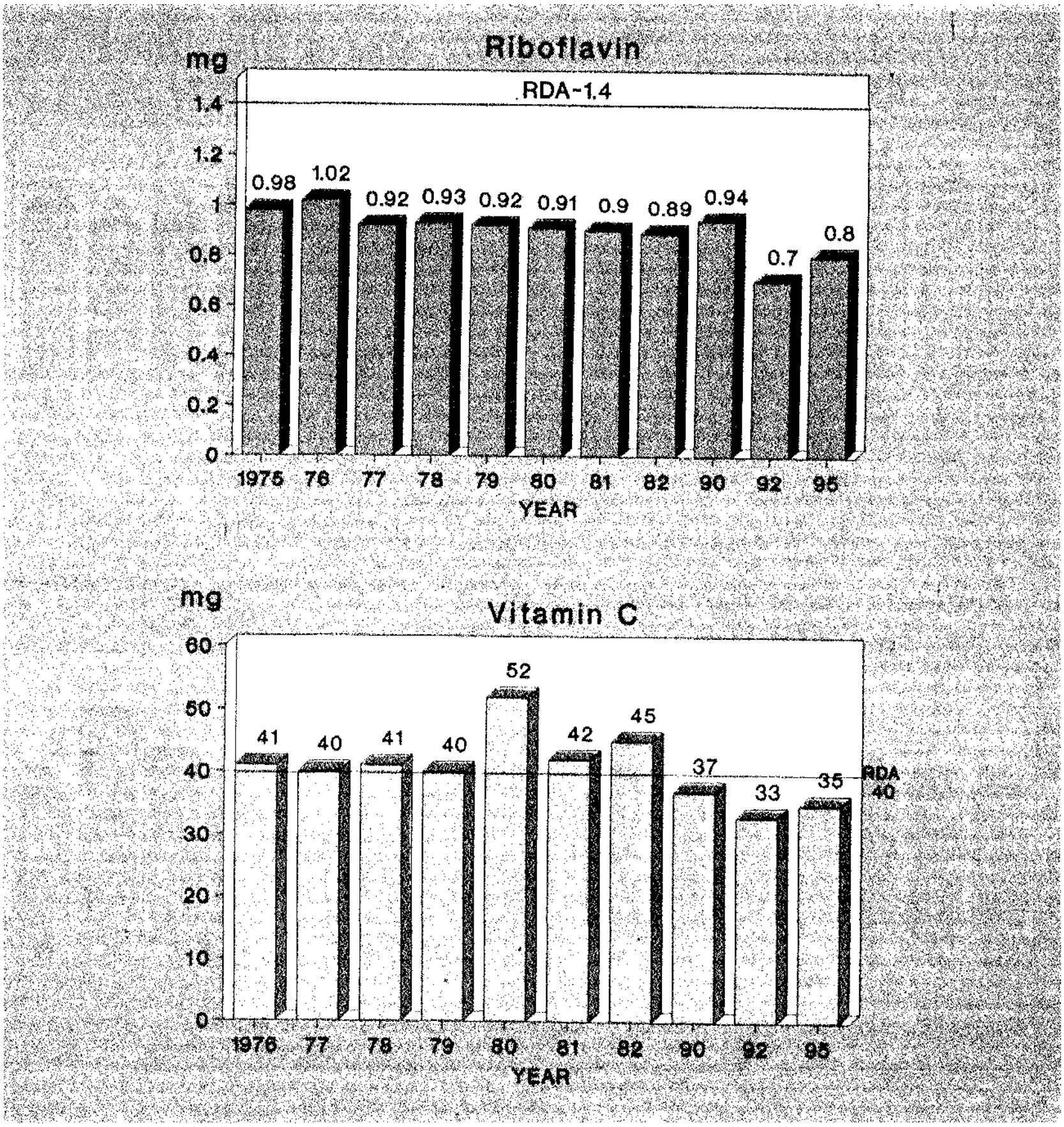


3.2.3 Riboflavin

The intake of riboflavin was about two-thirds of RDA.

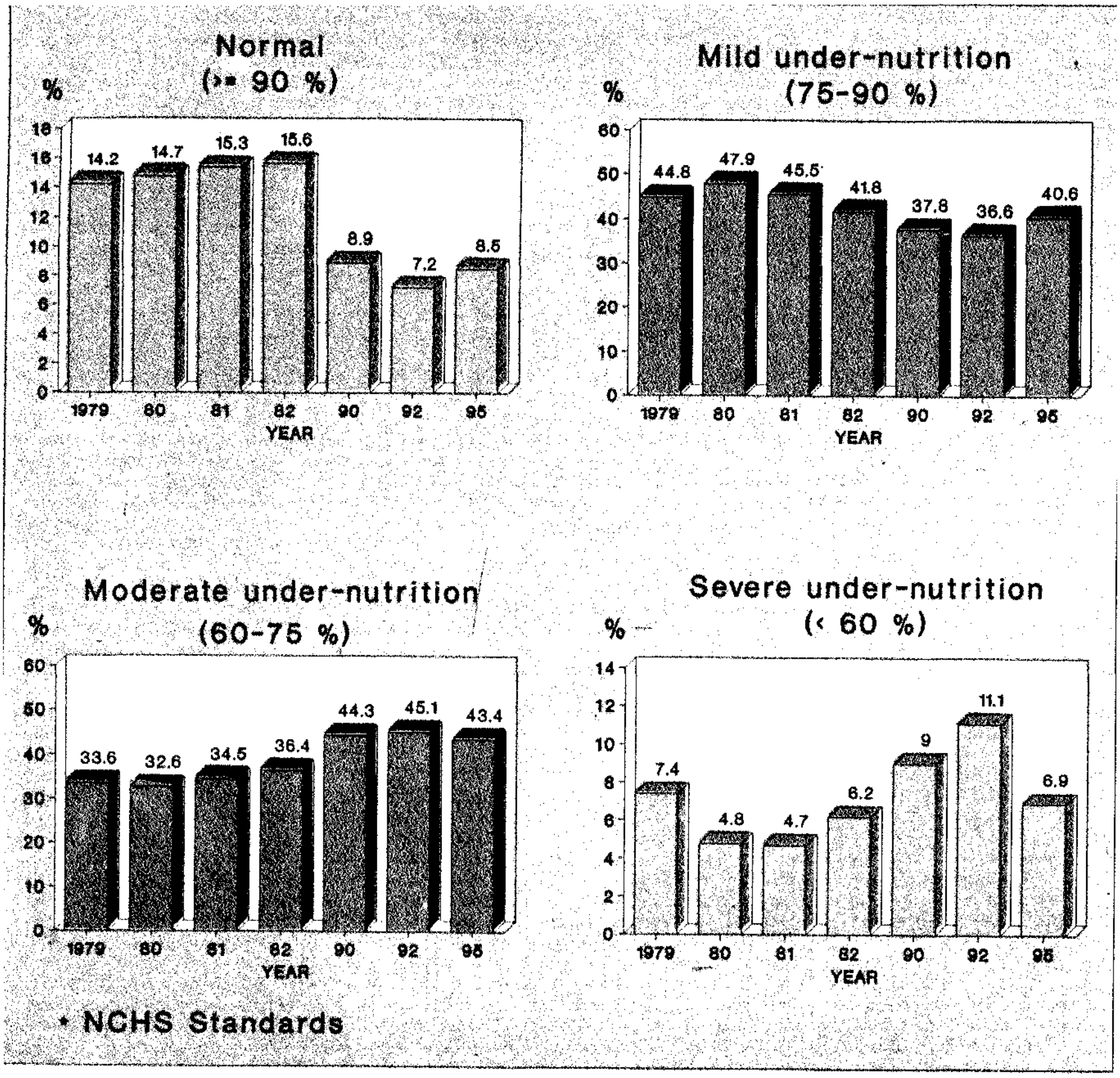
Vitamin C

The intake of vitamin C was satisfactory.



3.3 DISTRIBUTION OF 1-5 YEAR CHILDREN BY WEIGHT FOR AGE

The proportion of normal and mildly malnourished children tended to decrease from about 15% to 9%, and from 45% to 41% respectively. Consequently, there was an increase in the percentage of moderately malnourished children. The proportion of severely malnourished children showed fluctuations between 7 and 11%.

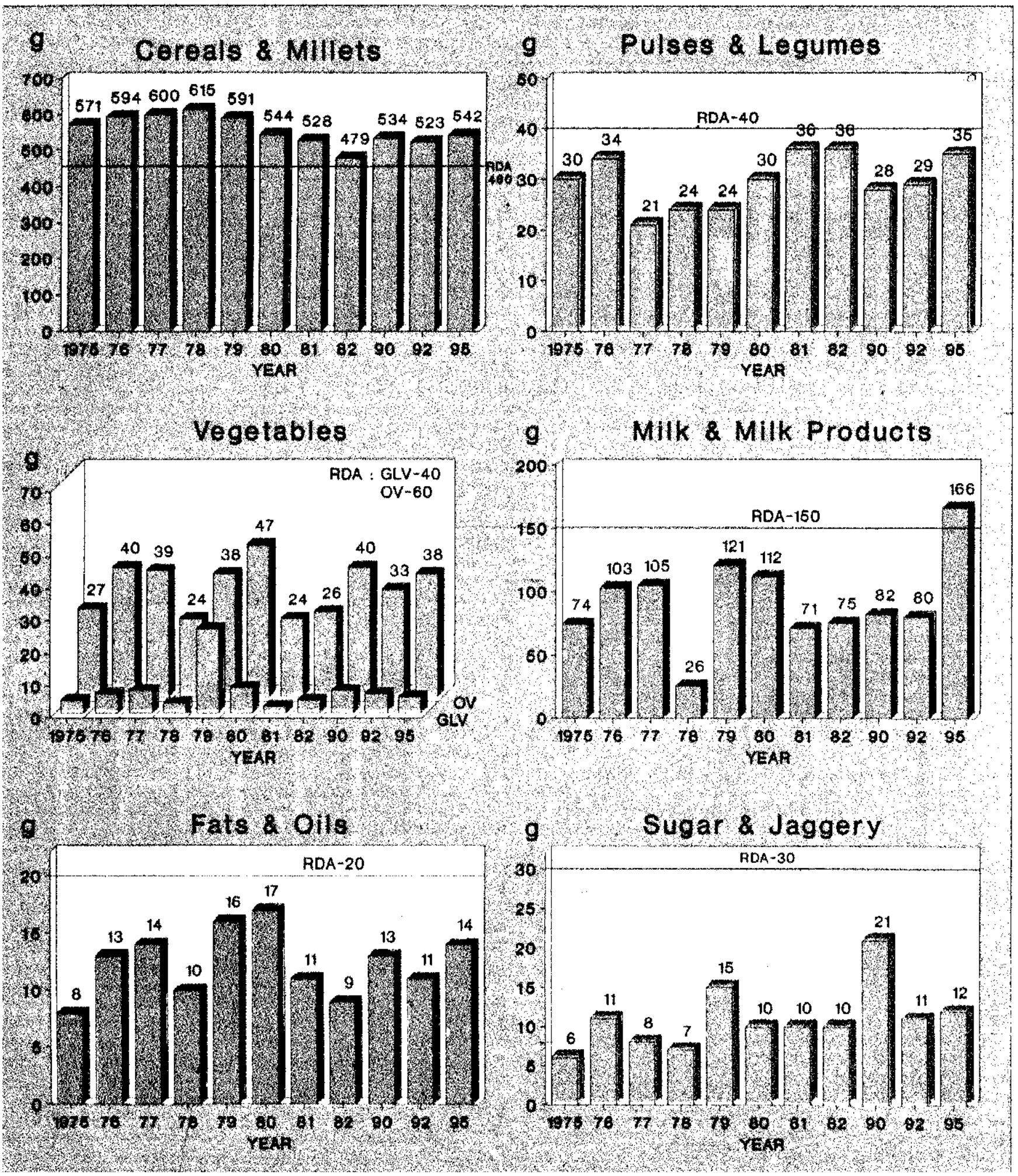


4. CONSUMPTION OF FOODS AND NUTRIENTS (CU/Day) - RURAL
(State-wise)

4.1 ANDHRA PRADESH

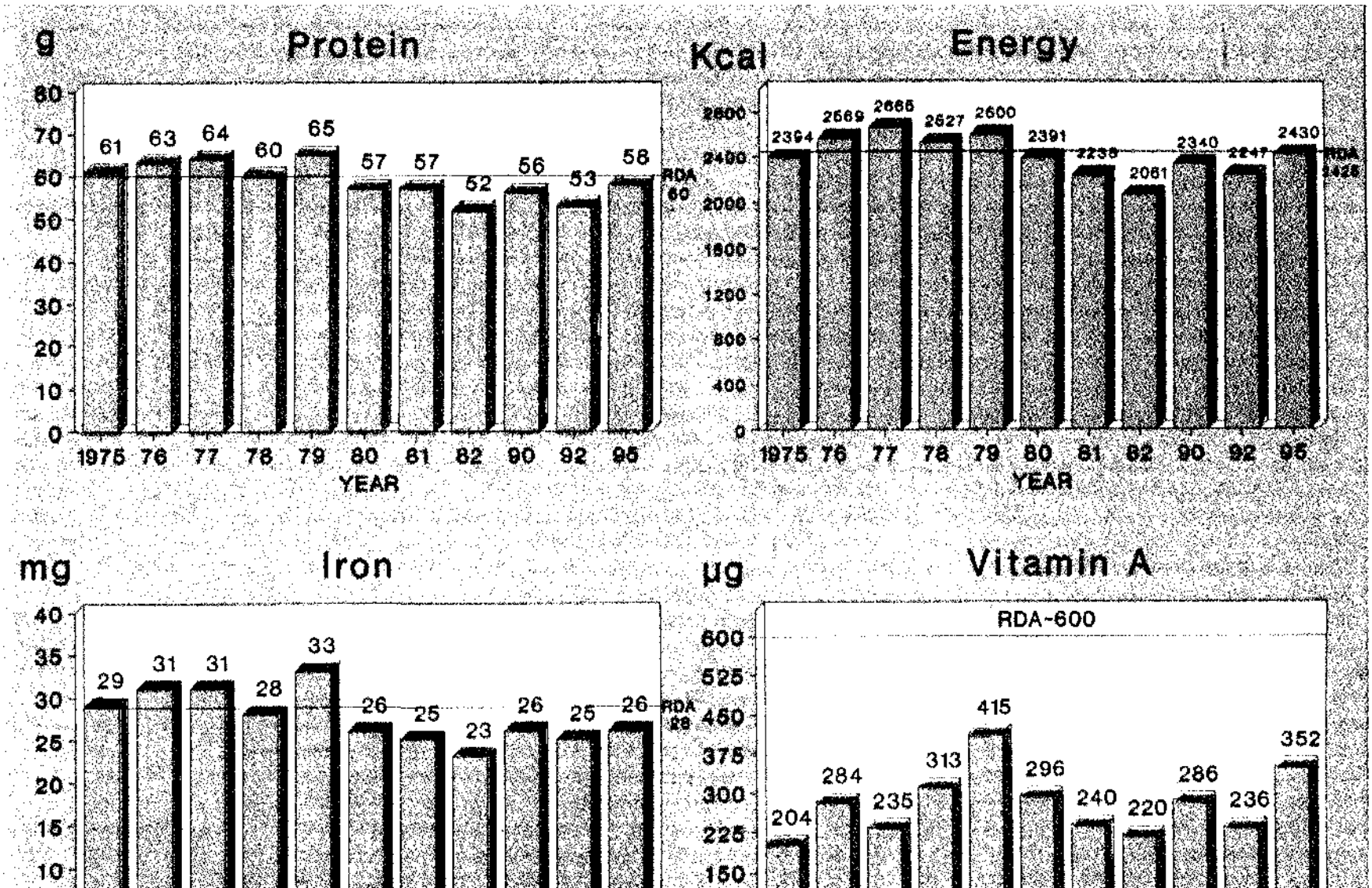
4.1. 1 Foods

The average consumption of cereals & millets was consistently higher than the RDA, while that of pulses & legumes, milk & milk products and fats & oils was about two-thirds of the recommended levels. The intake of GLV was woefully inadequate, while that of other vegetables was half of the requirements.



4.1.2 Nutrients

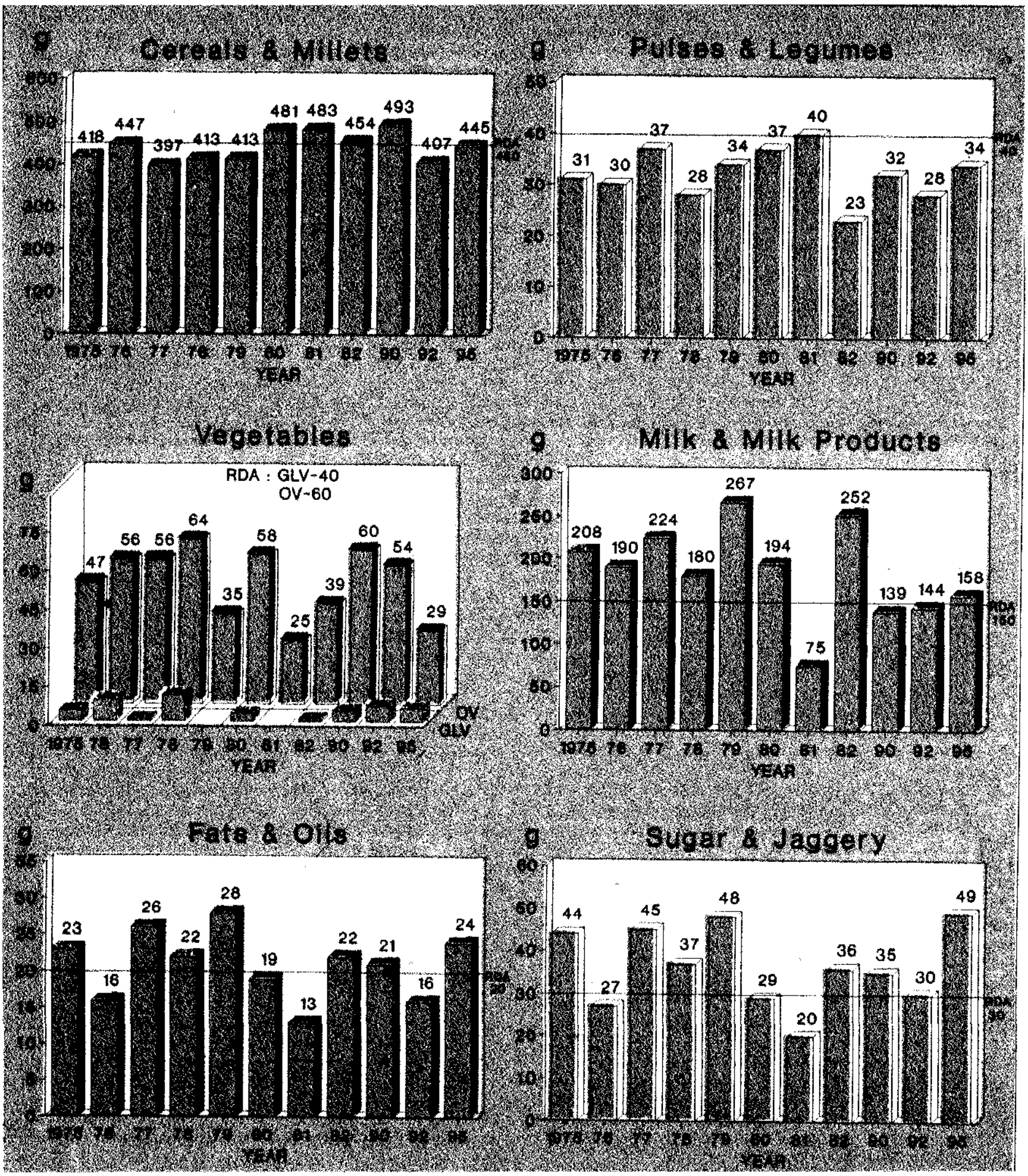
The consumption of protein, energy and iron was satisfactory. However, the intake of riboflavin and vitamin A was about 50% of the RDA.



4.2 GUJARAT

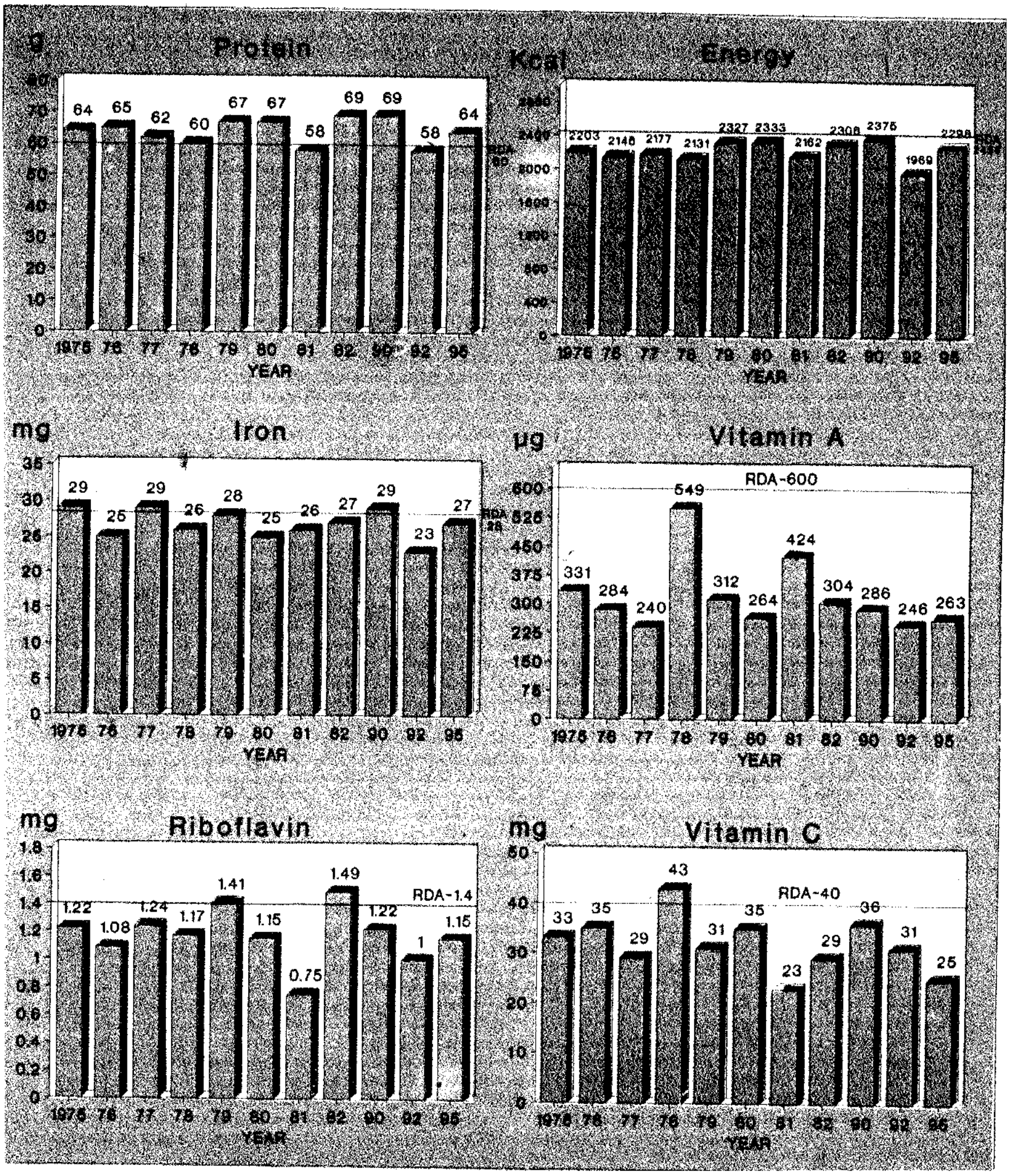
4.2..1 Foods

The consumption of cereals & millets, pulses & legumes, fats & oils and sugar & jaggery were comparable to RDA, while that of milk and milk products was almost always higher than RDA. The consumption of other vegetables was about two-thirds of RDA, while that of GLV was negligible.



4.2.2 Nutrients

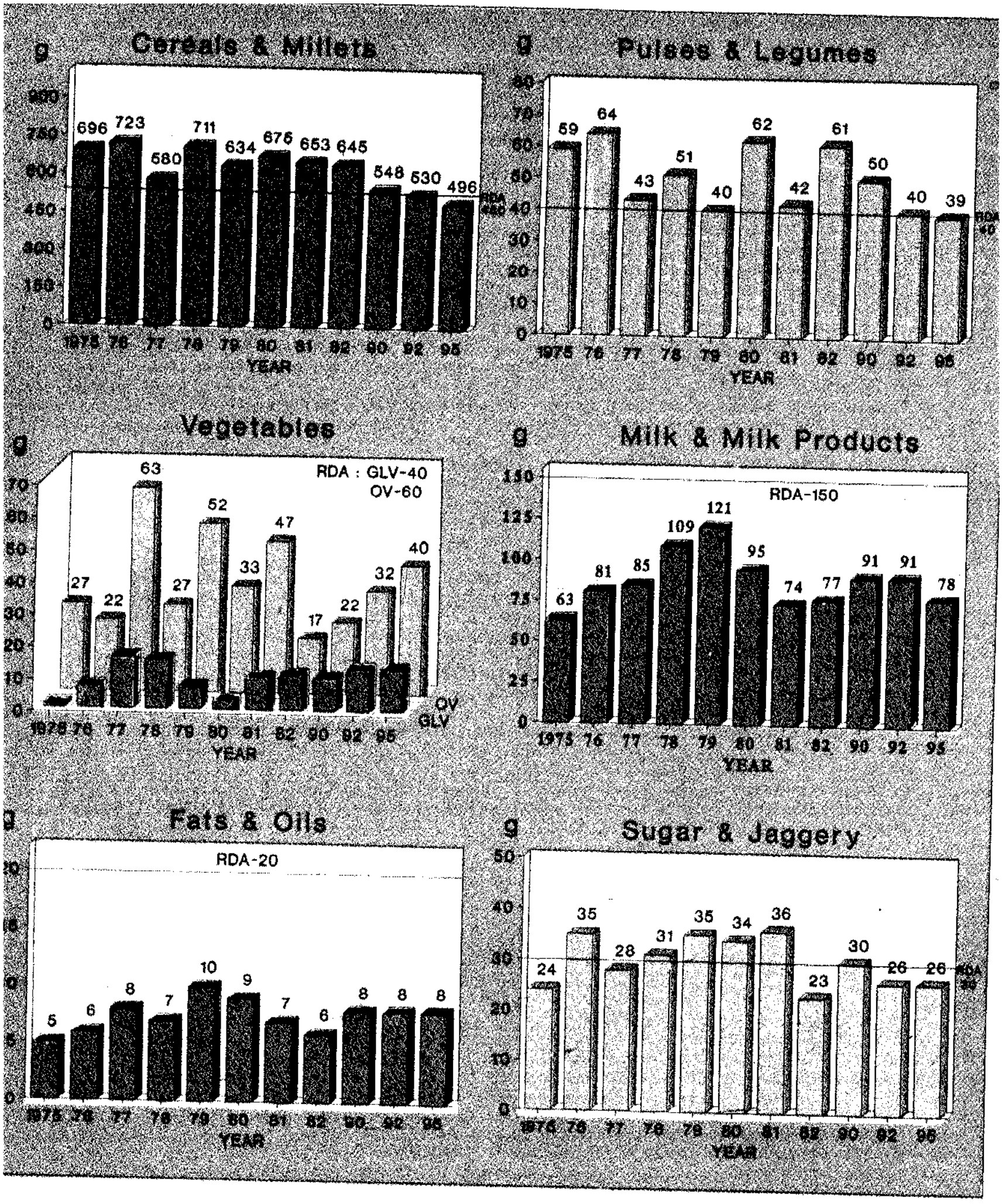
The intakes of protein, energy and iron were satisfactory, and that of vitamin A was about half of the RDA. The consumption of riboflavin and vitamin C was low



4.3 KARNATAKA

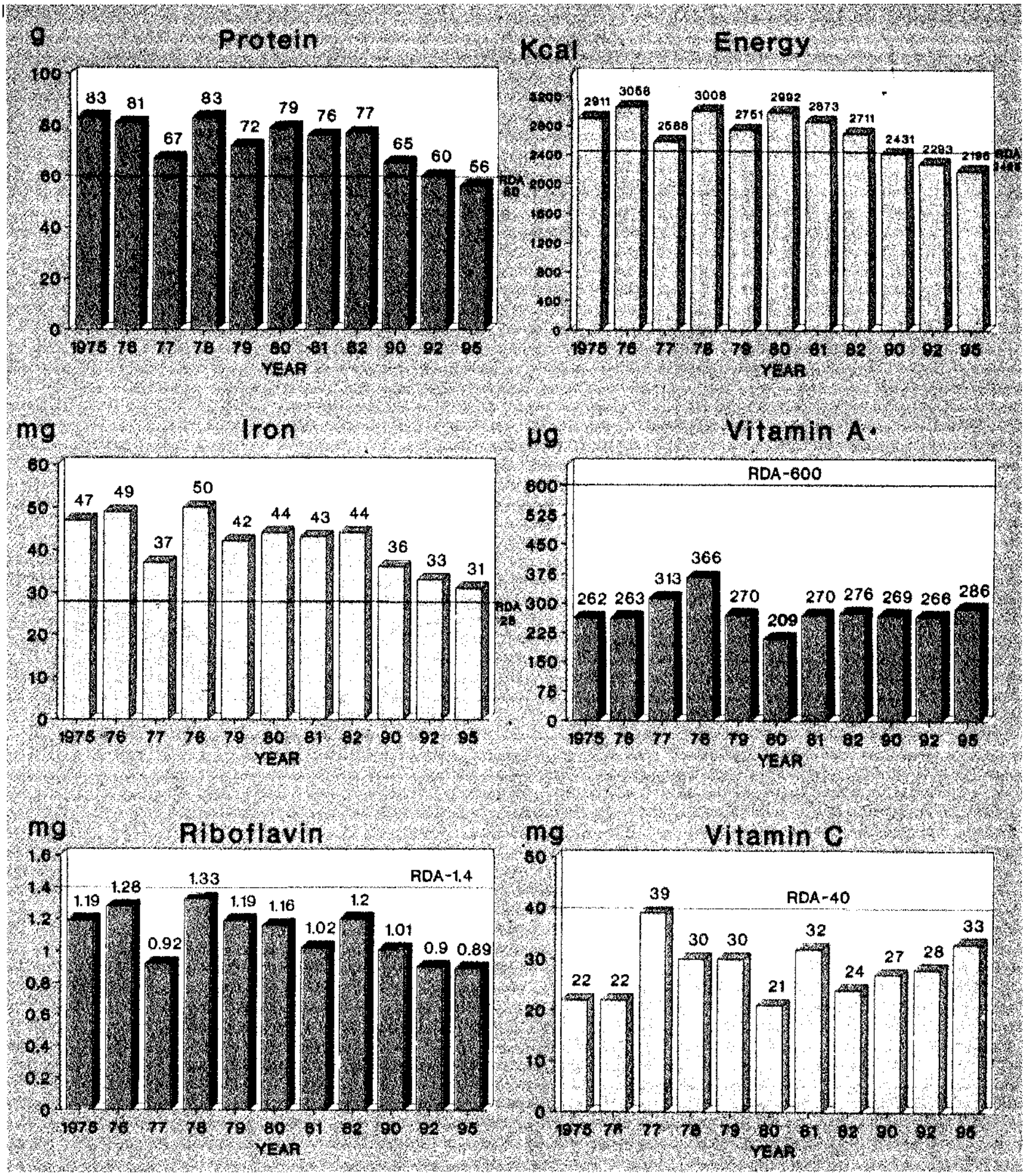
4.3.1 Foods

The consumption of cereals & millets, pulses & legumes and sugar & jaggery was above the RDA, while that of GLV and fats & oils was about a third of RDA. The consumption of milk was about 50% RDA. The intake of other vegetables was below RDA and showed wide variation.



4.3.2 Nutrients

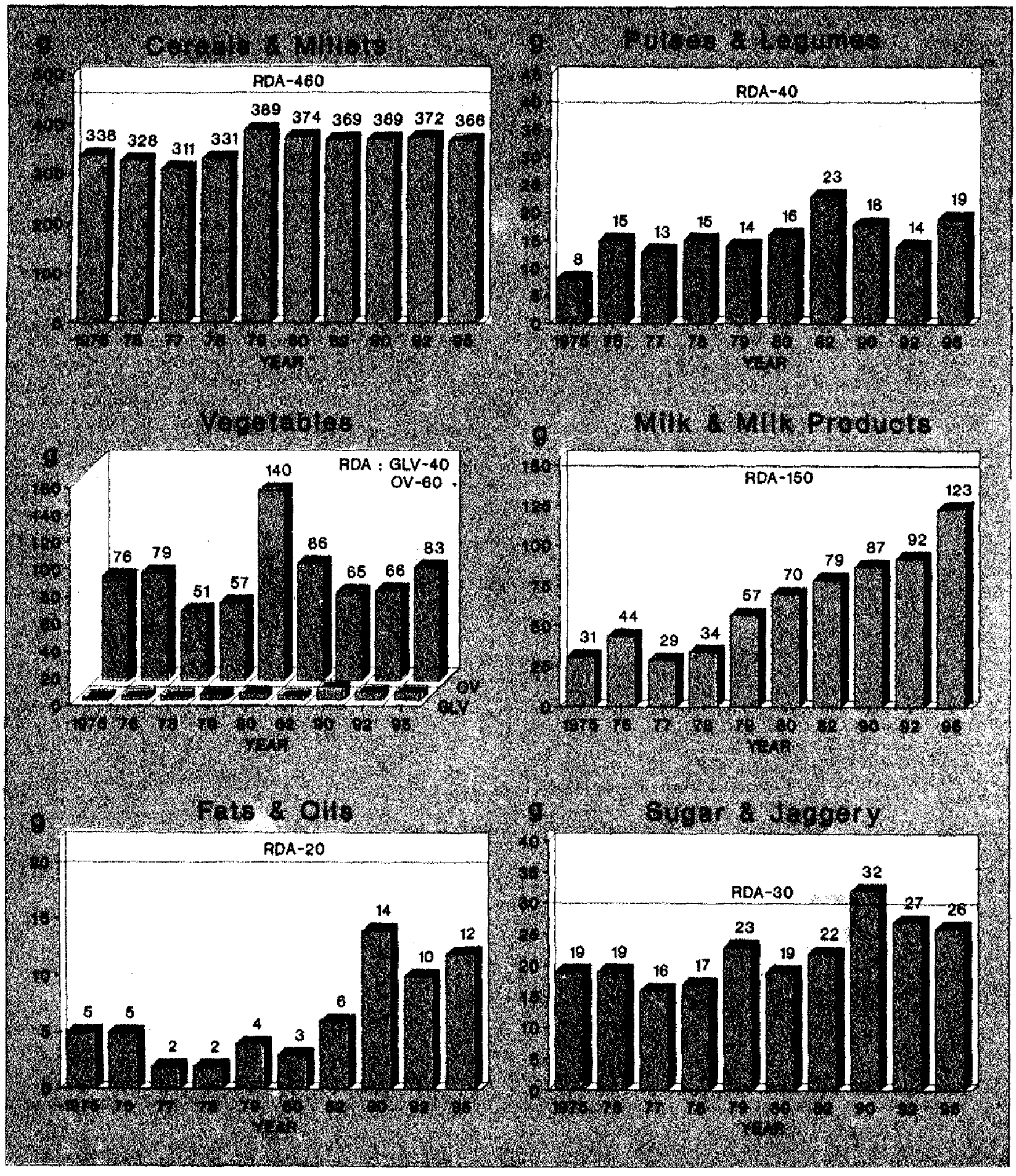
The consumption of vitamin A was less than half of the recommended levels, while that of riboflavin and vitamin C was marginally lower. The intake of energy, protein and iron was more than the RDA.



4.4 KERALA

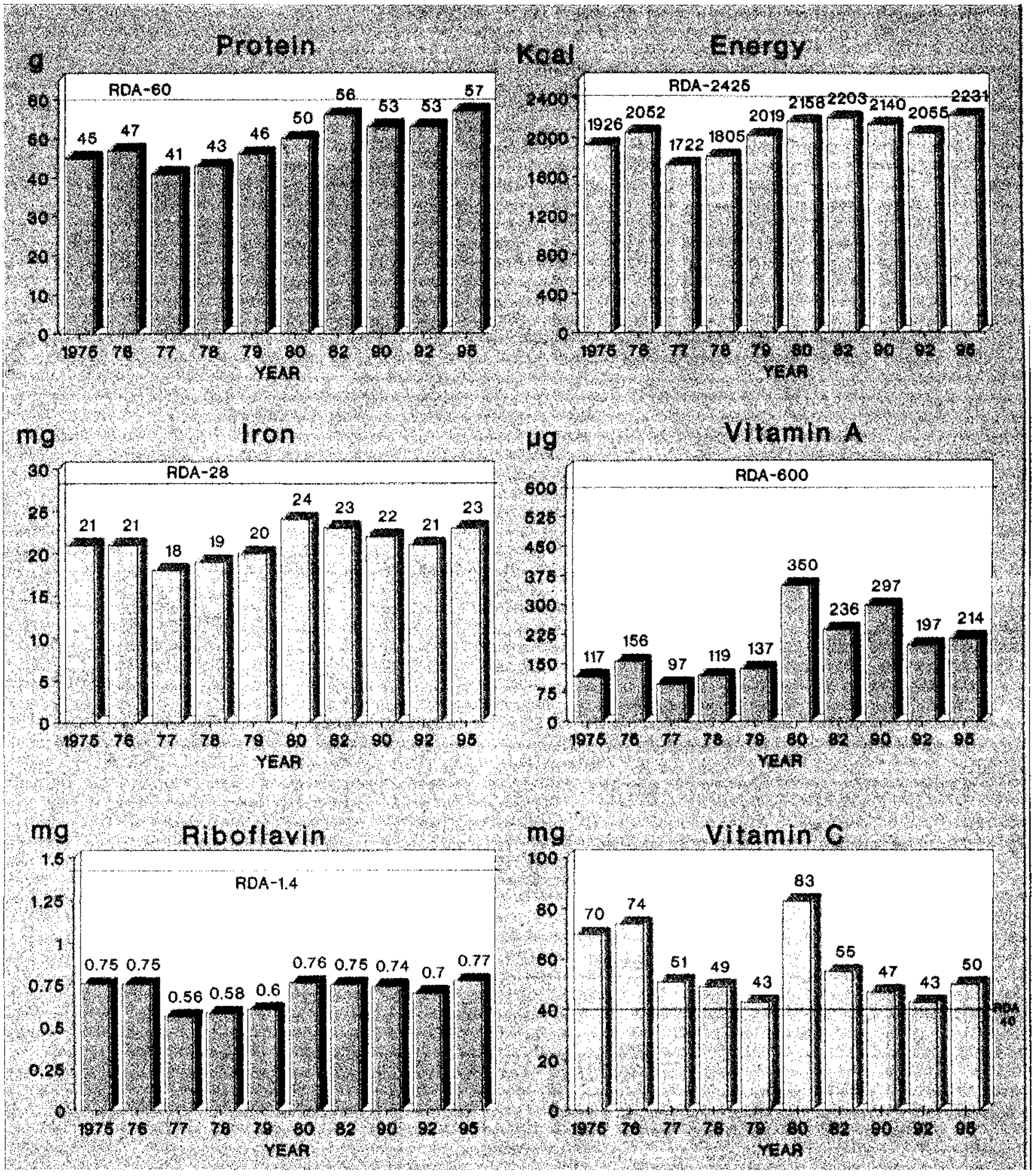
4.4.1 Foods

The average consumption of cereals & millets was marginally lower than the RDA, while that of pulses & legumes was about half the RDA. The intakes of GLV and fats & oils was less than one-fourth of RDA, while that of other vegetables was satisfactory. There was considerable improvement in the consumption of milk & milk products, fats & oils and sugar & jaggery.



4.4.2 Nutrients

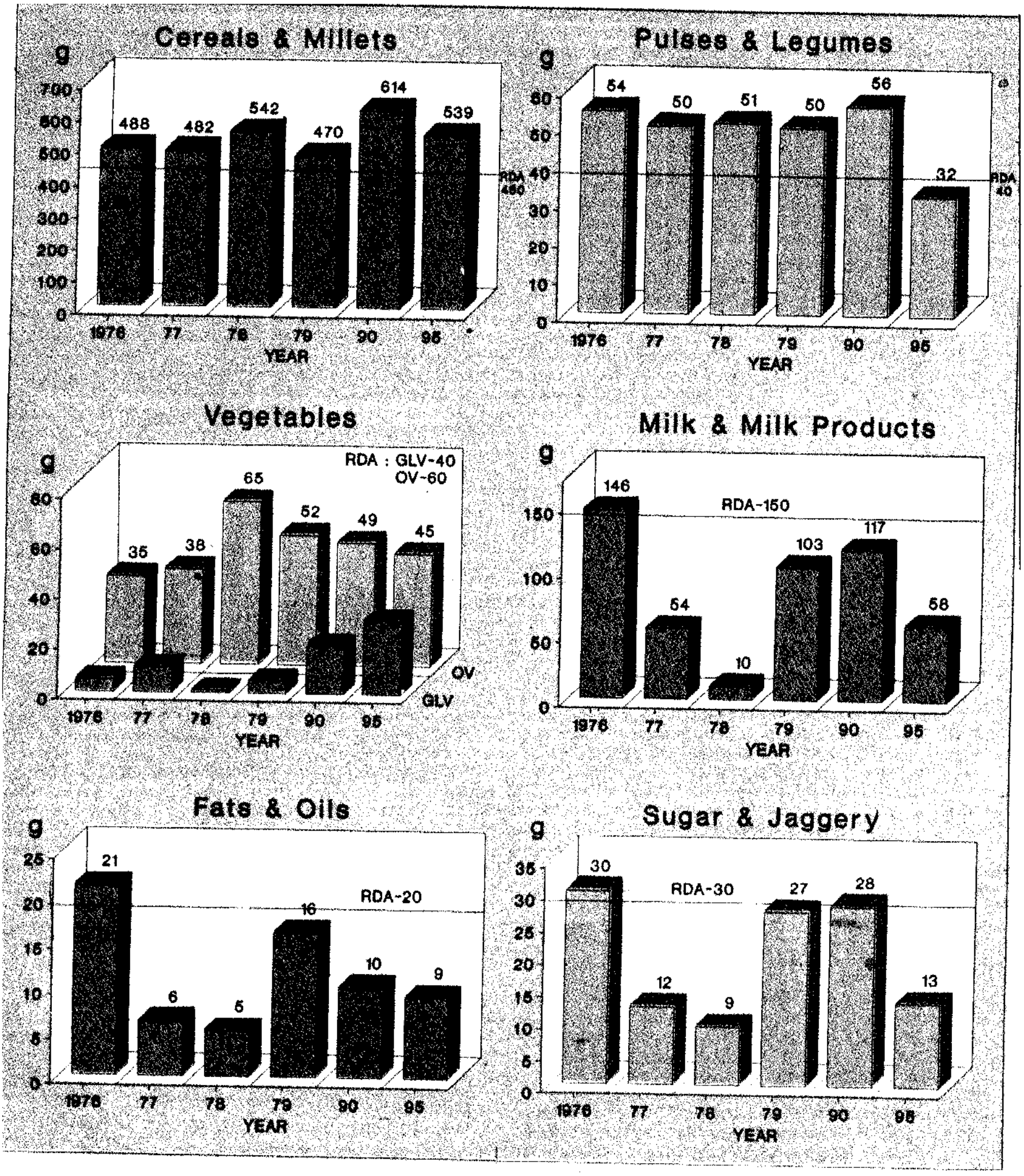
The consumption of protein, energy and iron was marginally lower, while that of vitamin C was more than the RDA. The intake of vitamin A and riboflavin was about a third and a half of RDA, respectively. There was marginal improvement in the intakes of protein and energy.



4.5 MADHYA PRADESH

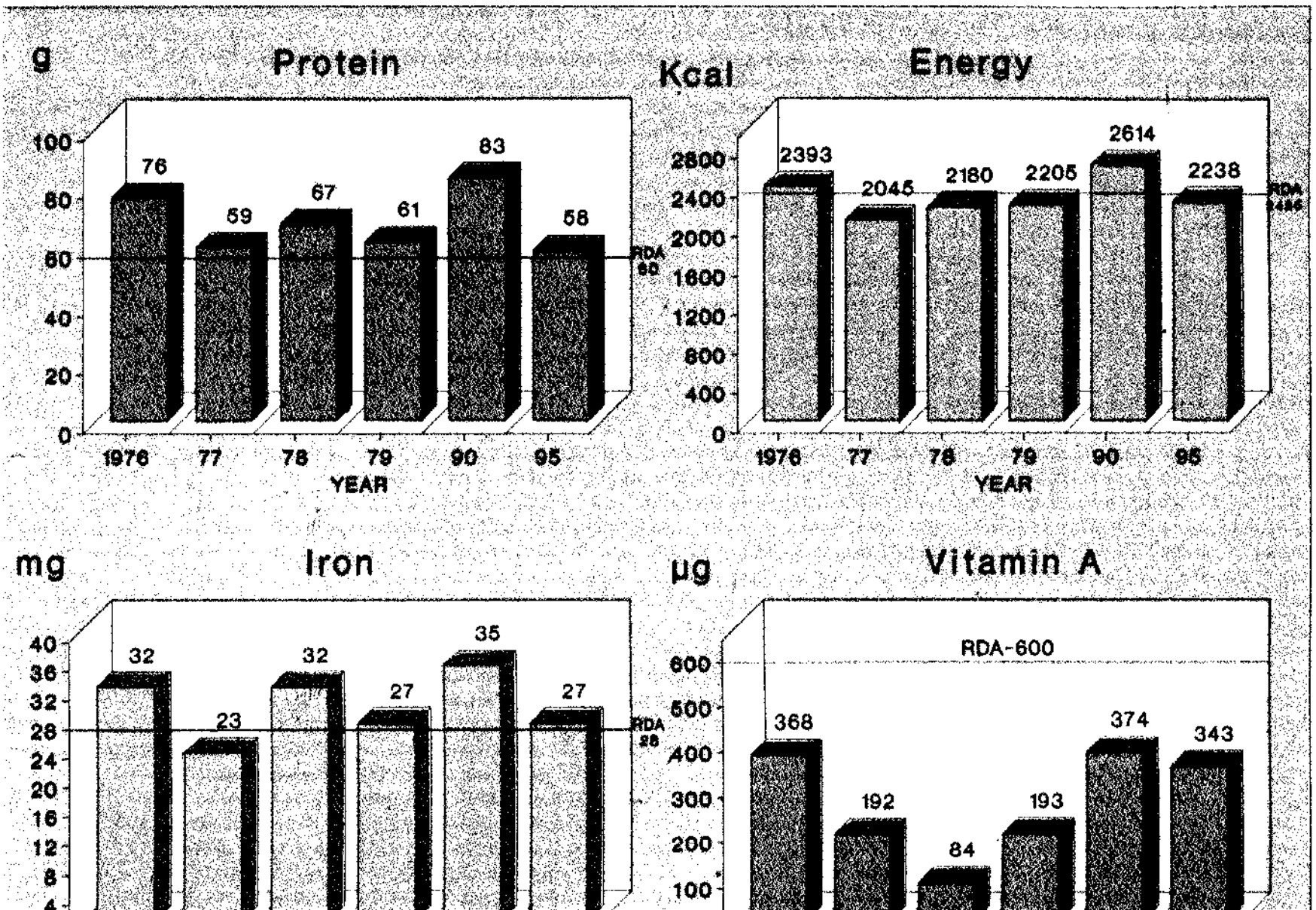
4.5.1 Foods

The intake of cereals & millets and pulses & legumes were well above the RDA, while that of other vegetables ranged from half to two-thirds of the RDA. The intake of other foods was less than recommended levels and showed wide variations.



4.5. 2 Nutrients

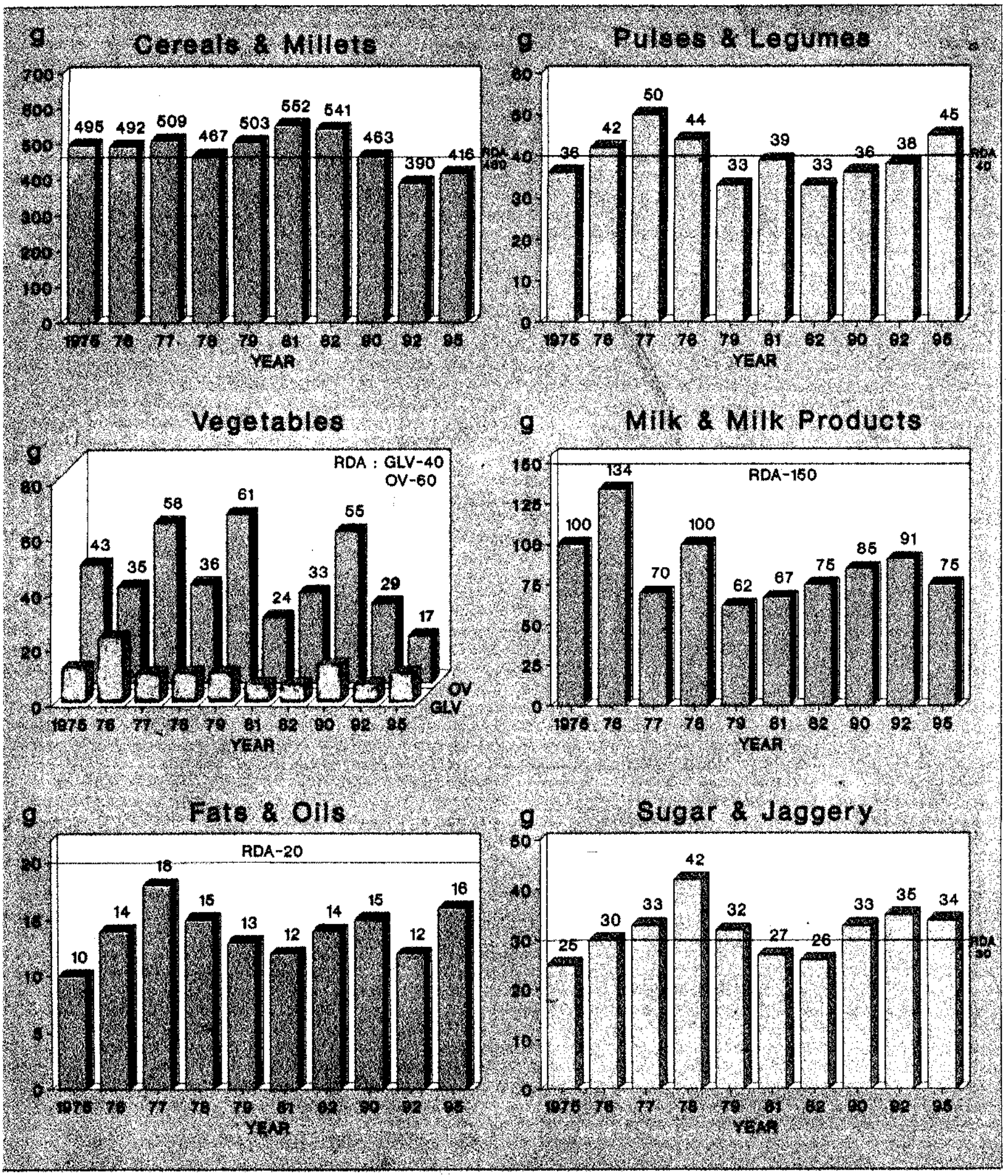
The average intake of protein, energy and iron was satisfactory, and that of vitamin A and riboflavin was less than RDA and showed fluctuations. The intake of vitamin C showed an improvement.



4.6 MAHARASHTRA

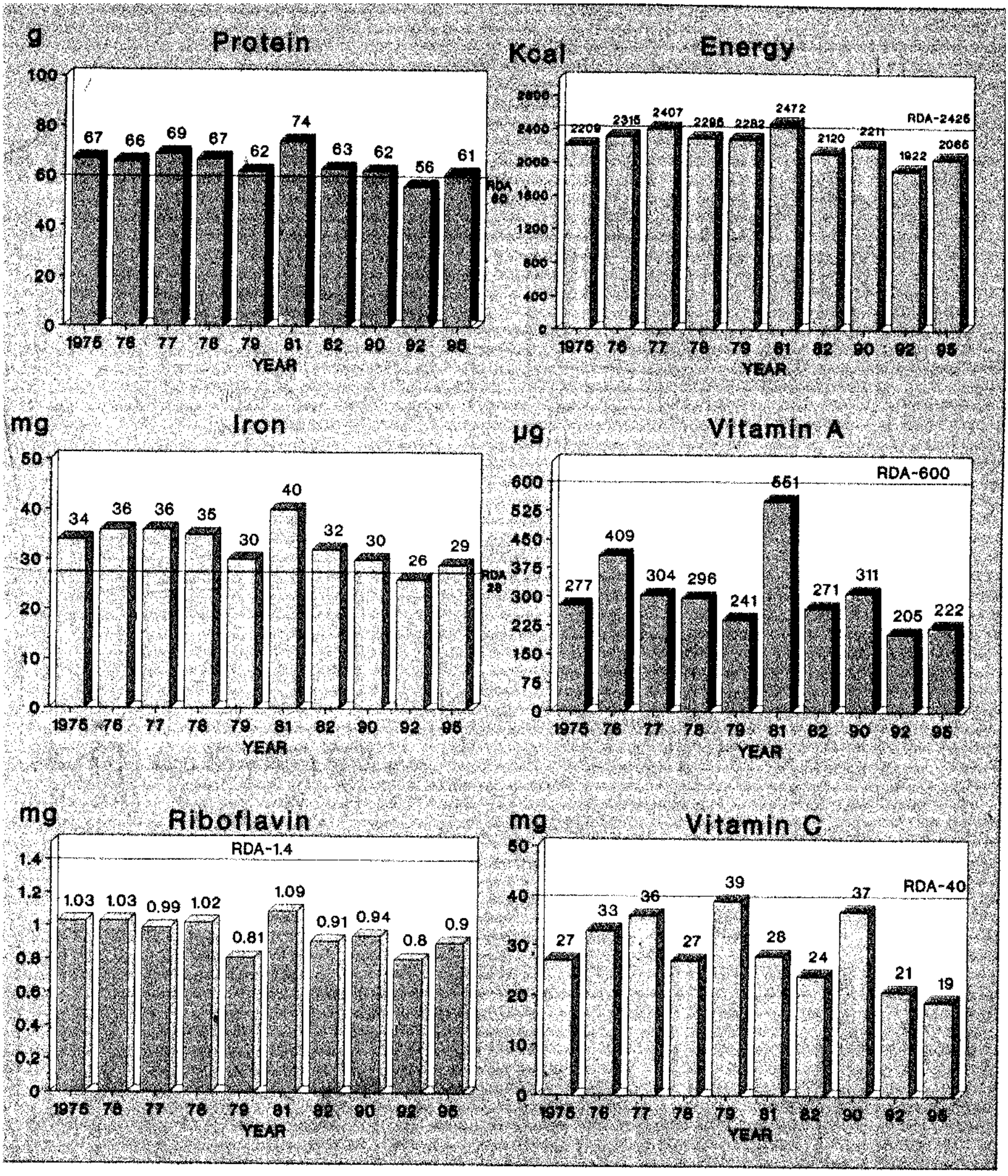
4.6. 1 Foods

The intakes of cereals & millets, pulses and legumes and sugar & jaggery were satisfactory, while that of fats & oils was about 75% of RDA. The consumption of milk & milk products was about a half of RDA, where as that of the GLV was about 25% of recommended levels. The intake of other vegetables showed wide variation with the levels being below RDA.



4.6.2 Nutrients

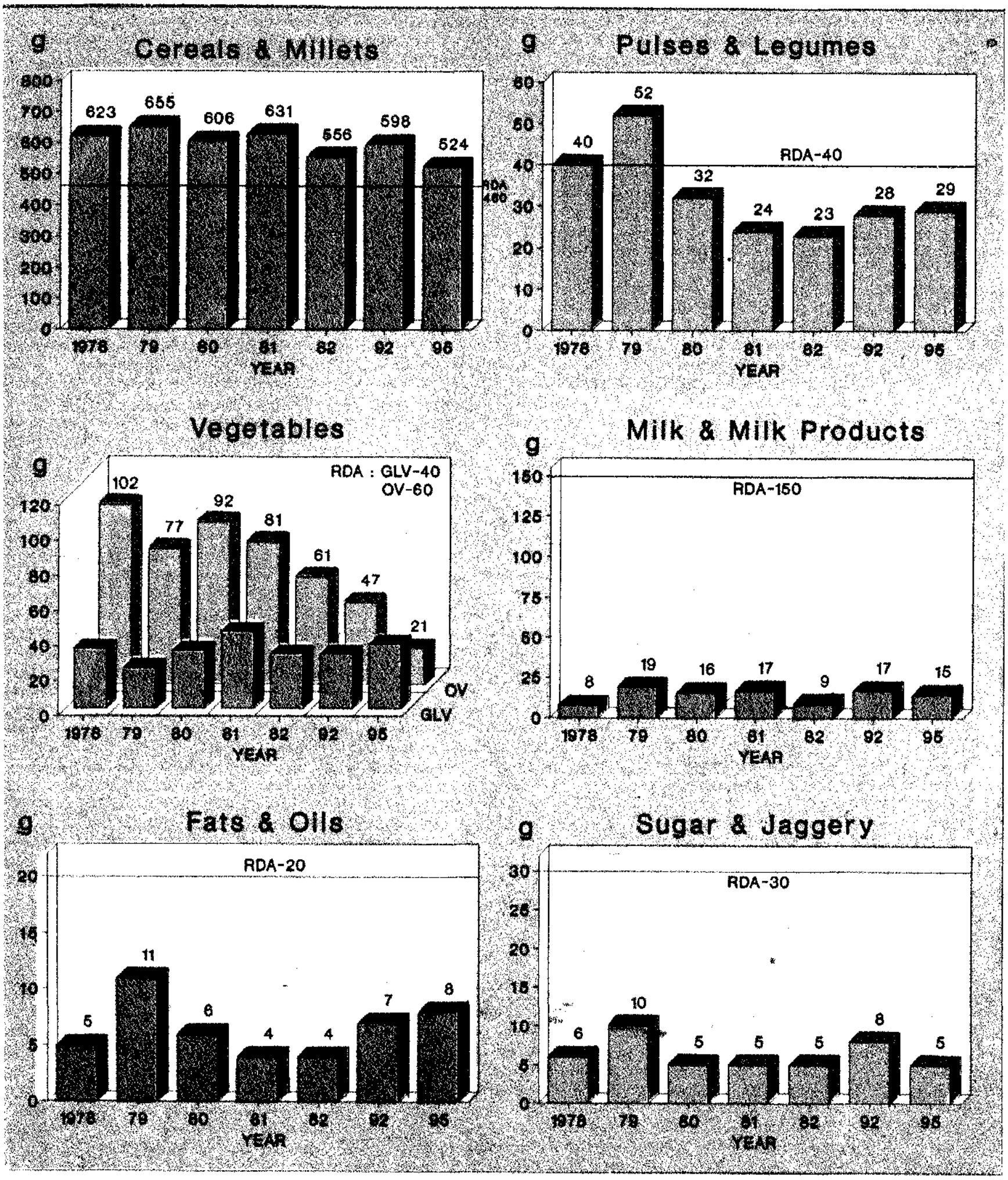
The consumption of protein, energy and iron was satisfactory, and that of riboflavin and vitamin C was about three-fourths of RDA. The intakes of vitamin A was about 50% of the recommended levels.



4.7 ORISSA

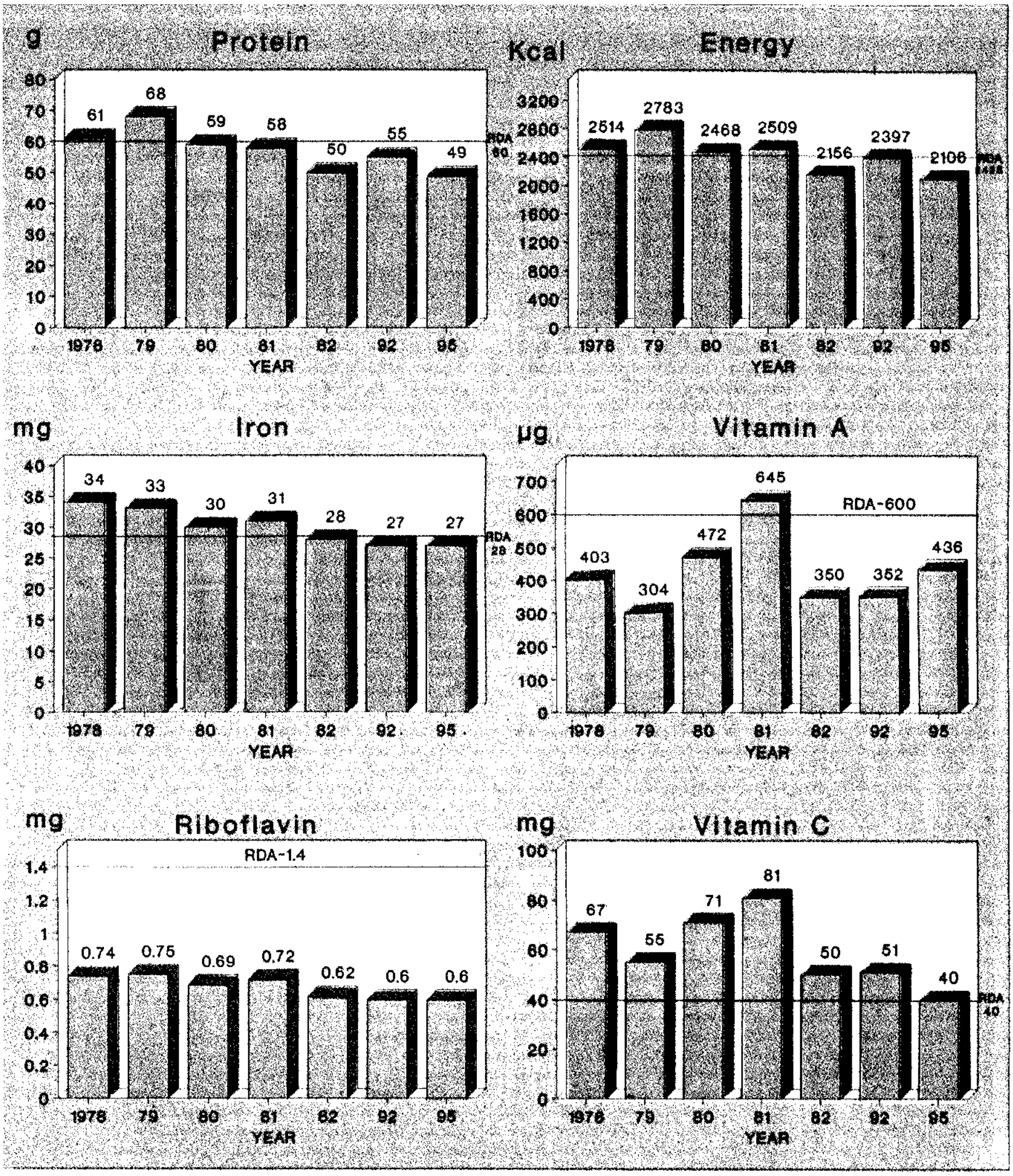
4.7. 1 Foods

The consumption of cereals was above RDA, and that of pulses & legumes and GLV was about three-fourths of the requirements. The intake of other vegetables, which was satisfactory tended to decrease after 90's. In general, the intake of milk & milk products, fats & oils and sugar & jaggery was much below the desired levels.



4.7.2 Nutrients

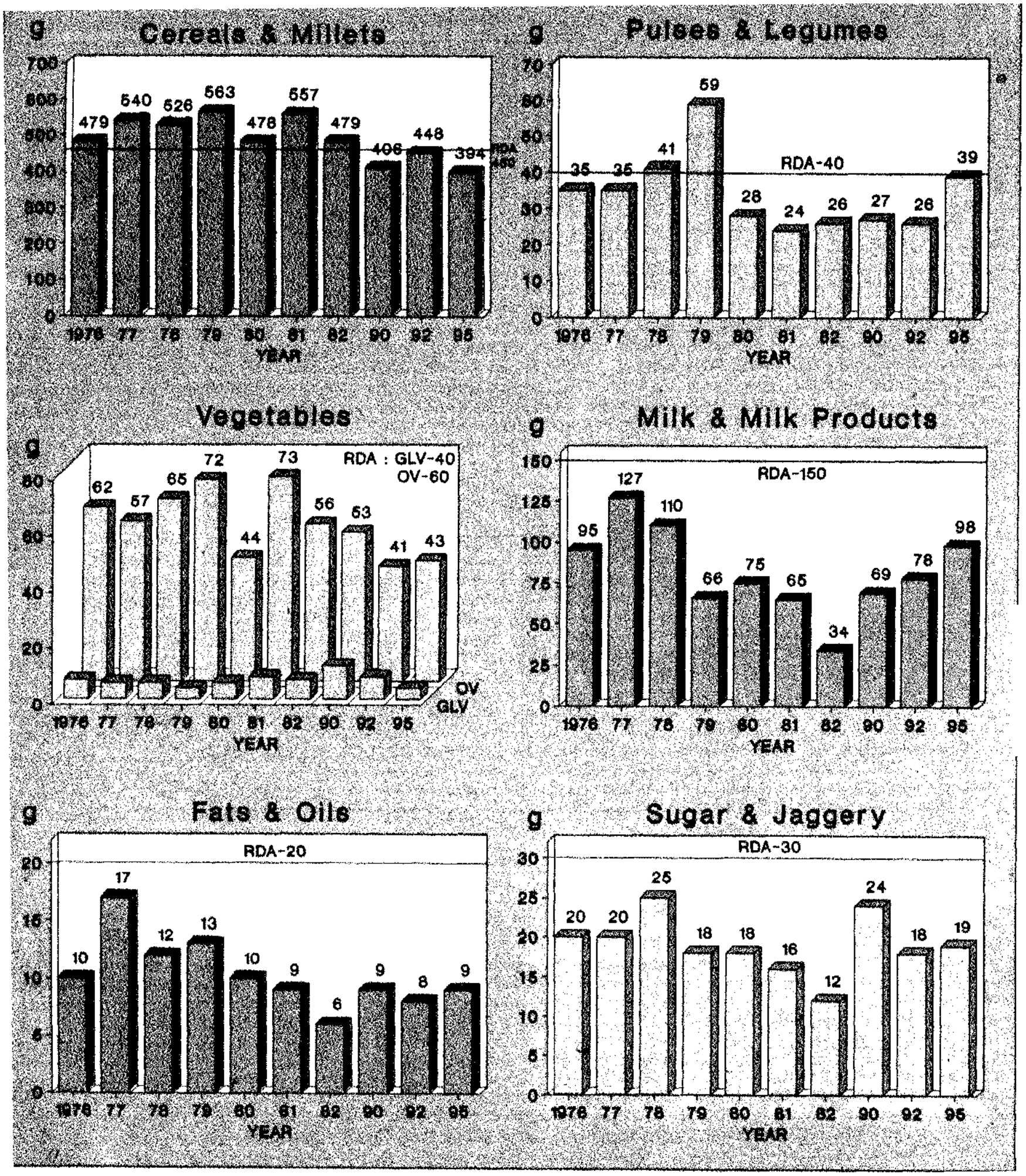
The intake of protein, energy and iron was satisfactory, while vitamin A intake was about three-fourths of RDA. The consumption of riboflavin was 50% of the requirement. The intake of vitamin C was well above the RDA



4.8 TAMIL NADU

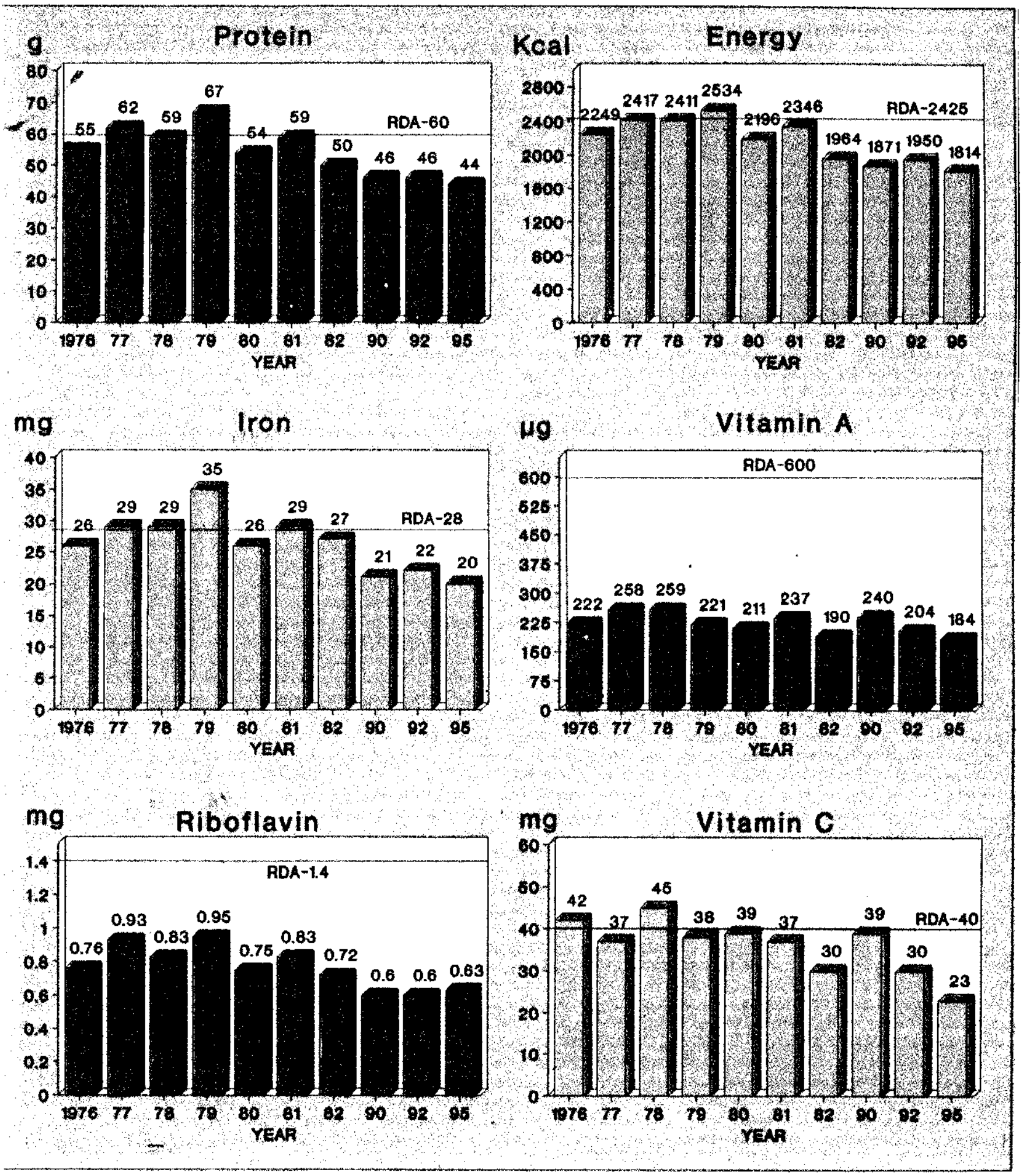
4.8.1 Foods

The consumption of GLV and fats & oils was much below the RDA. Wide fluctuations were observed in the consumption of milk & milk products. The consumption of other vegetables which was satisfactory, tended to decrease during 90's.



4.8.2 Nutrient

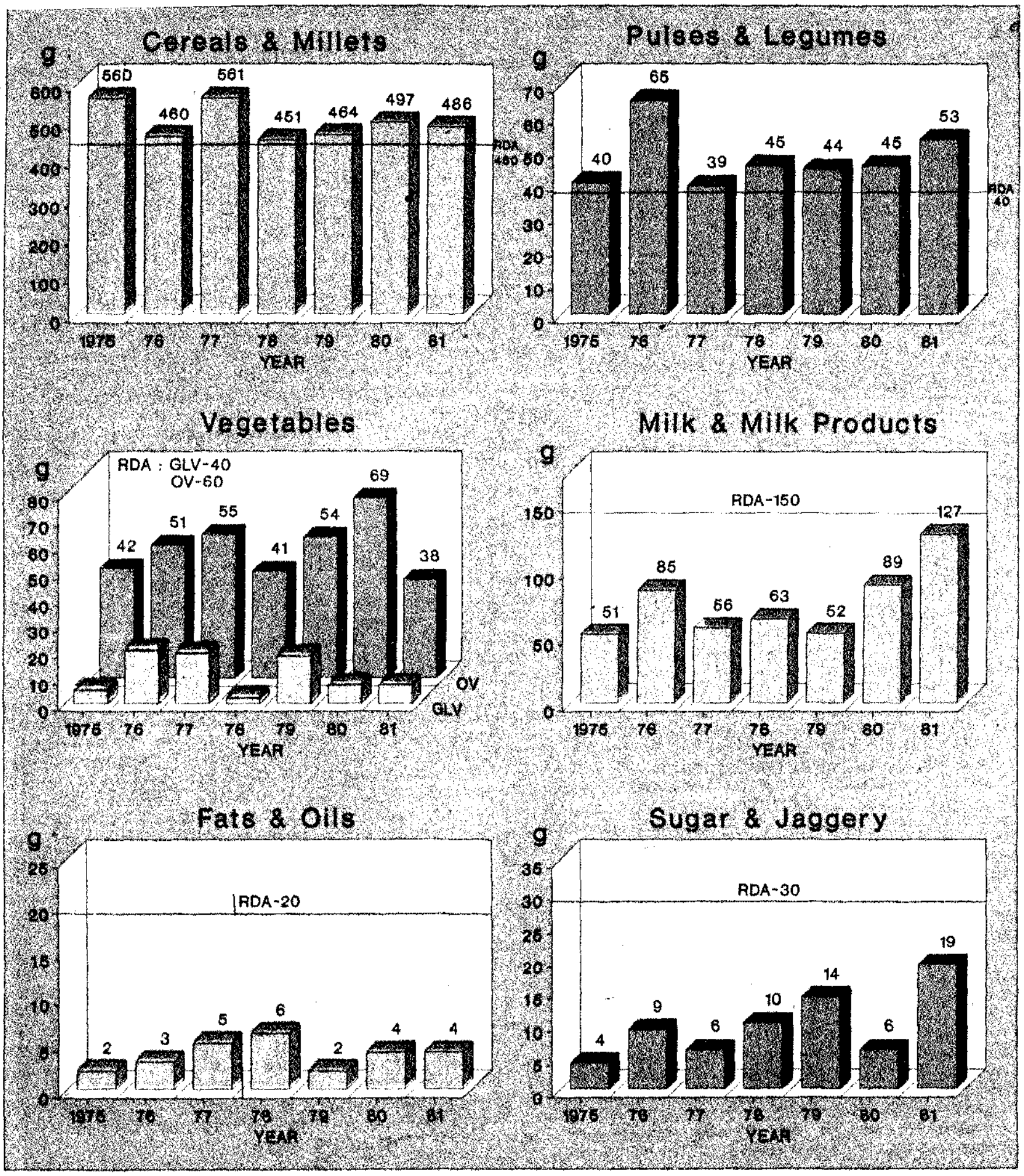
The intake of vitamin A and riboflavin was far below the RDA. There was a decreasing trend in the intakes of protein and energy



4.9 UTTAR PRADESH

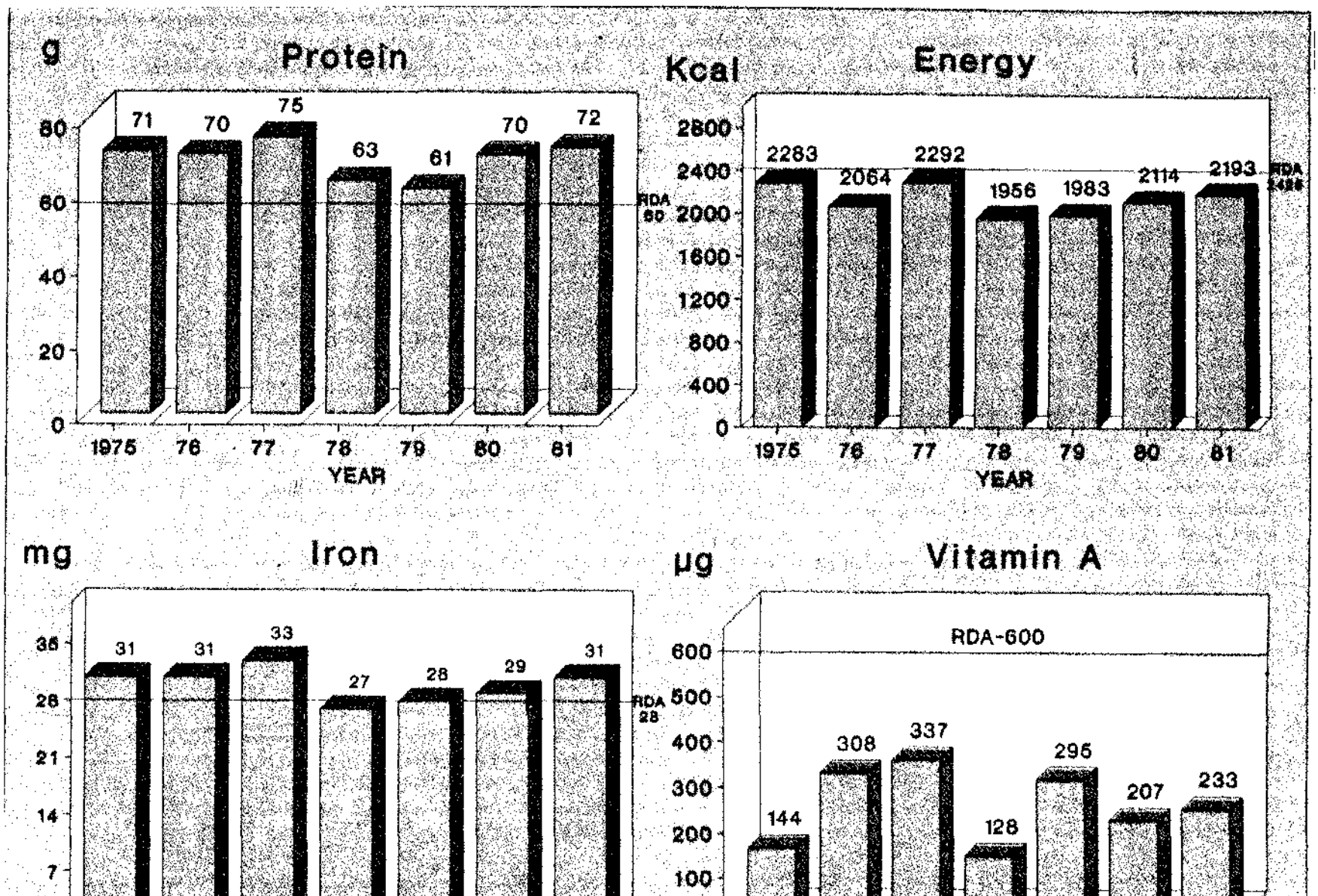
4.9.1 Foods

The intake of cereals & millets, pulses and legumes was satisfactory. The intake of other vegetables was marginally low. Consumption of milk and milk products was about a half of the RDA, while that of GLV, fats & oils and sugar & jaggery ranged from one-third to about one-fourth of RDA.



4.9.2 Nutrients

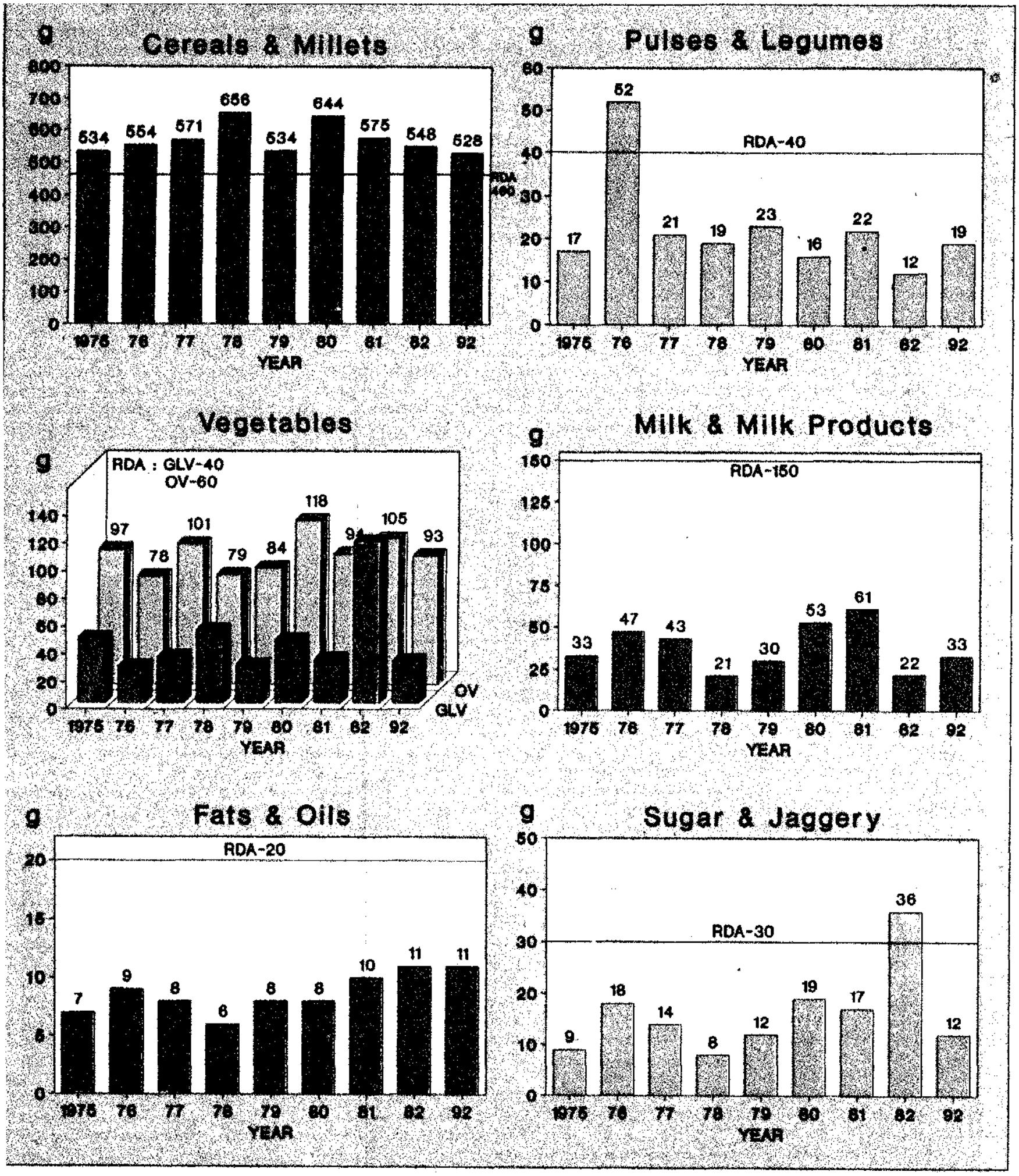
The intake of protein, iron and vitamin C was comparable to RDA, while that of energy, riboflavin was marginally low. The consumption of vitamin A was less than half of RDA.



4.10 WEST BENGAL

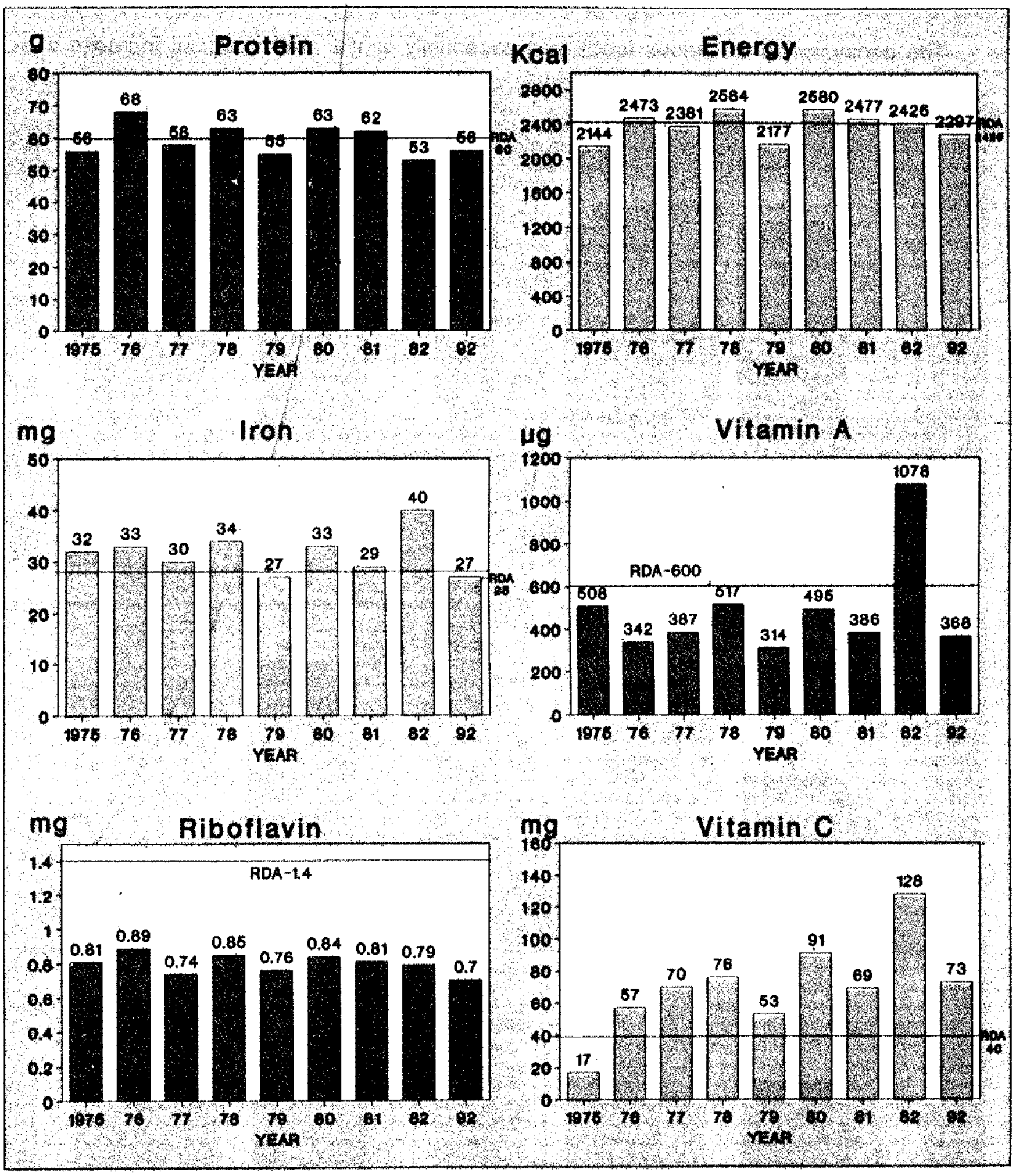
4.10.1 Foods

The consumption of cereals & millets and other vegetables was more than the RDA, while that of pulses, fats & oils and sugar & jaggery was about half of the RDA. The intake of milk & milk products was about a third of RDA.



4.10.2 Nutrients

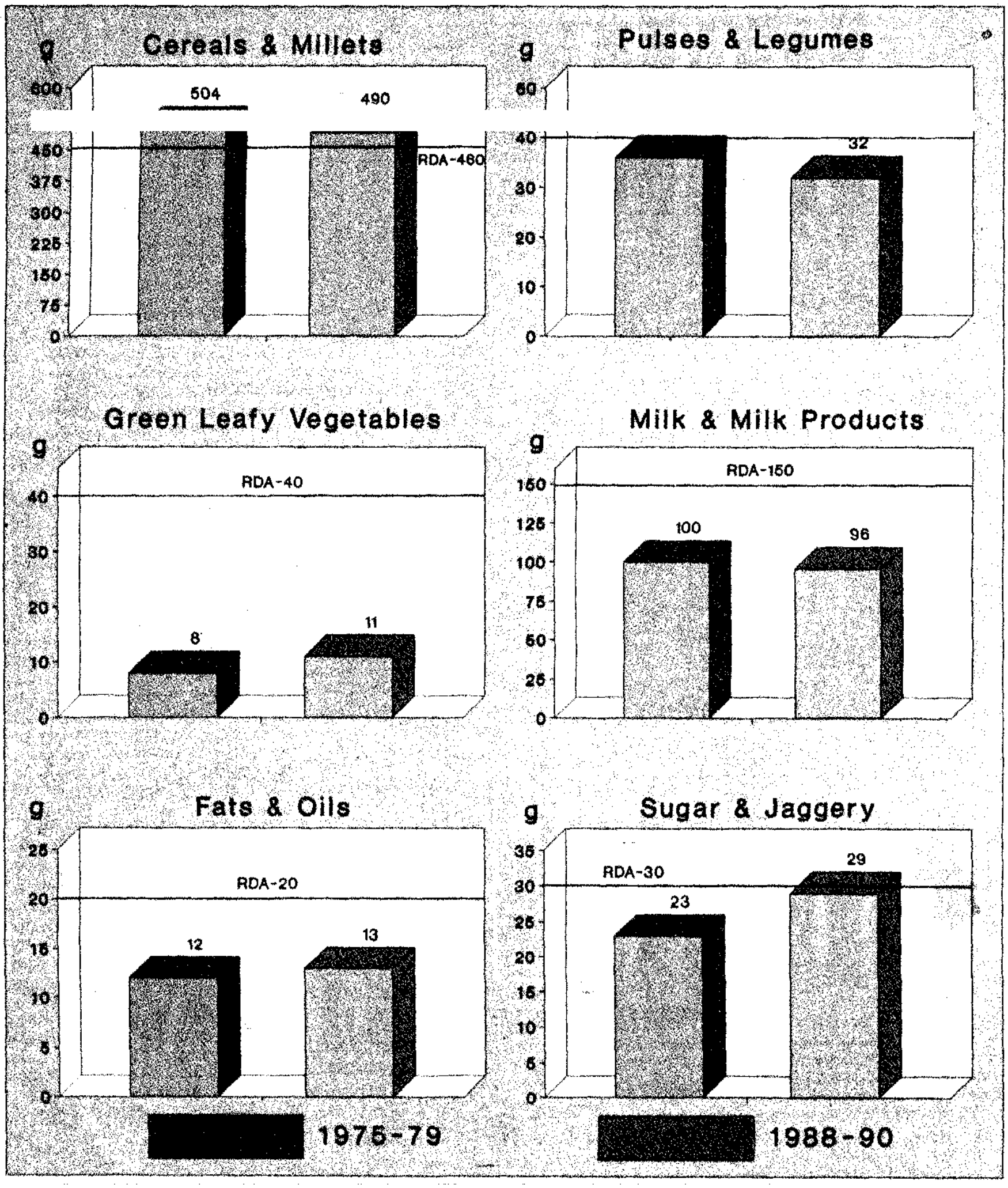
The intake of protein, energy, iron and vitamin C was satisfactory, while that of vitamin A showed fluctuations. The intake of riboflavin was about half of the recommended levels.



5. TRENDS IN FOOD & NUTRIENT INTAKE AND NUTRITIONAL STATUS - RURAL (1975-79 and 1988-90)

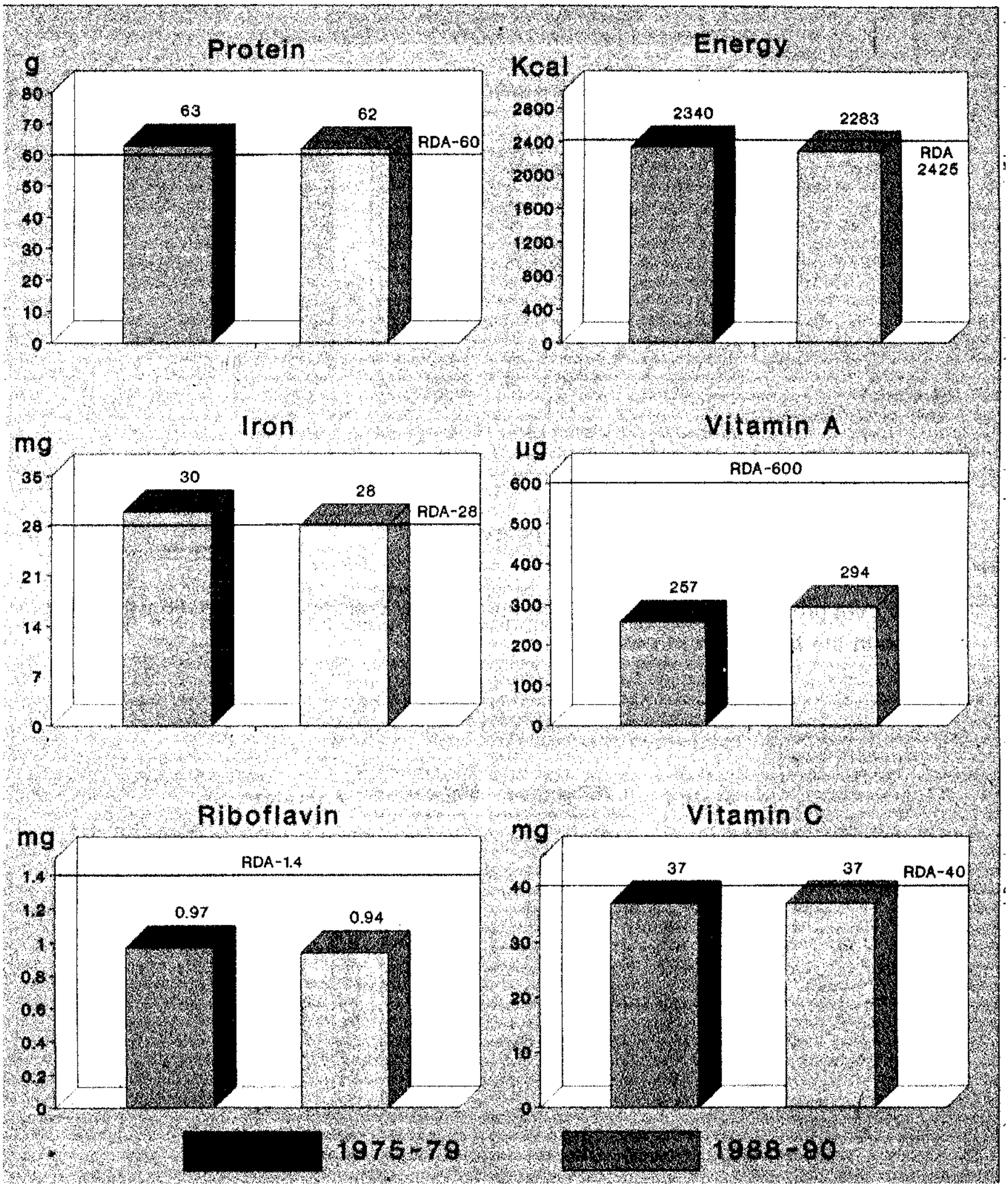
5.1 CONSUMPTION OF FOODS (CU/Day)

The consumption of various foods was essentially similar with marginal increase in sugar & jaggery.



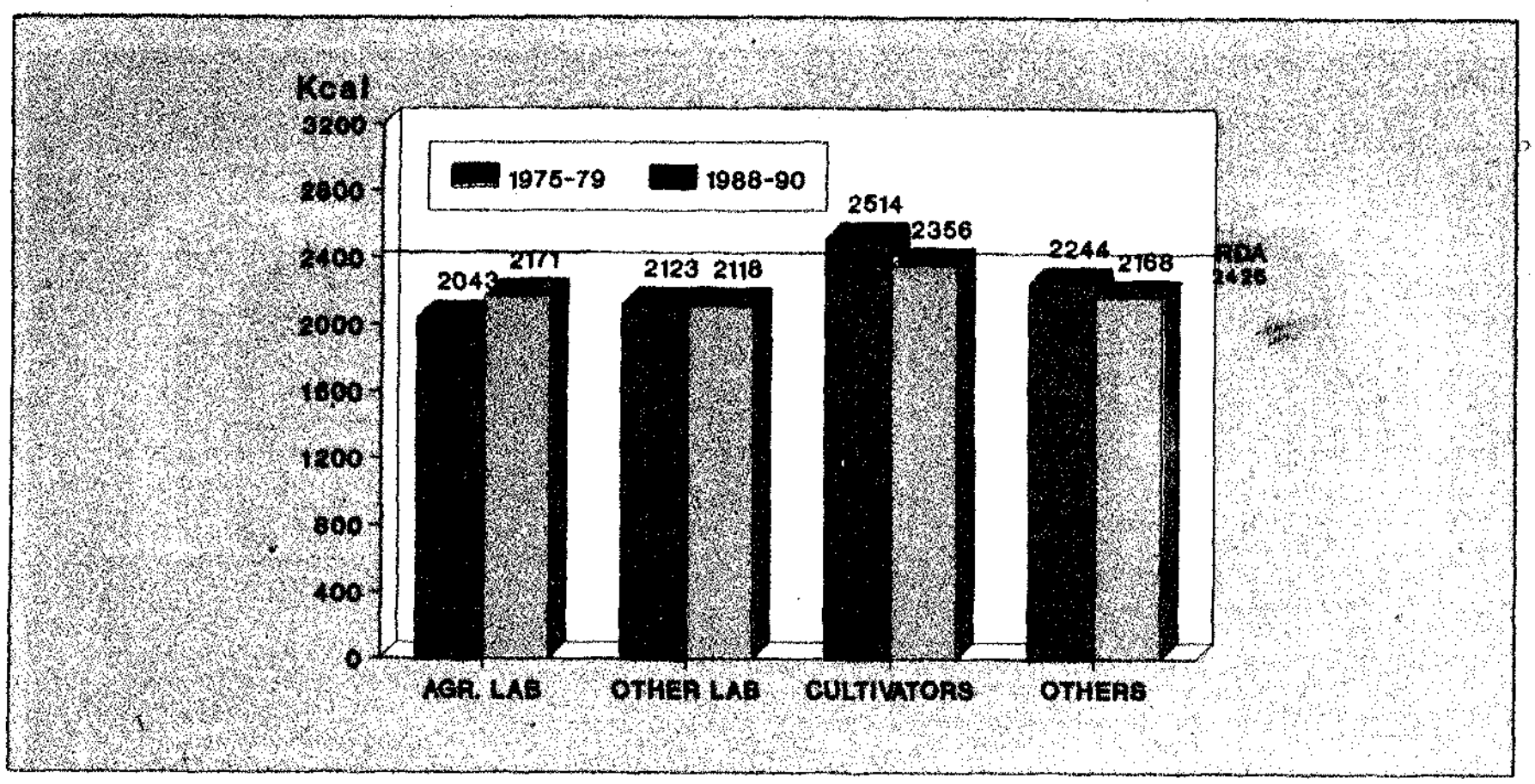
5.2 INTAKE OF NUTRIENIS ((CU/Day)

The levels of intake of various nutrients over the period was similar.



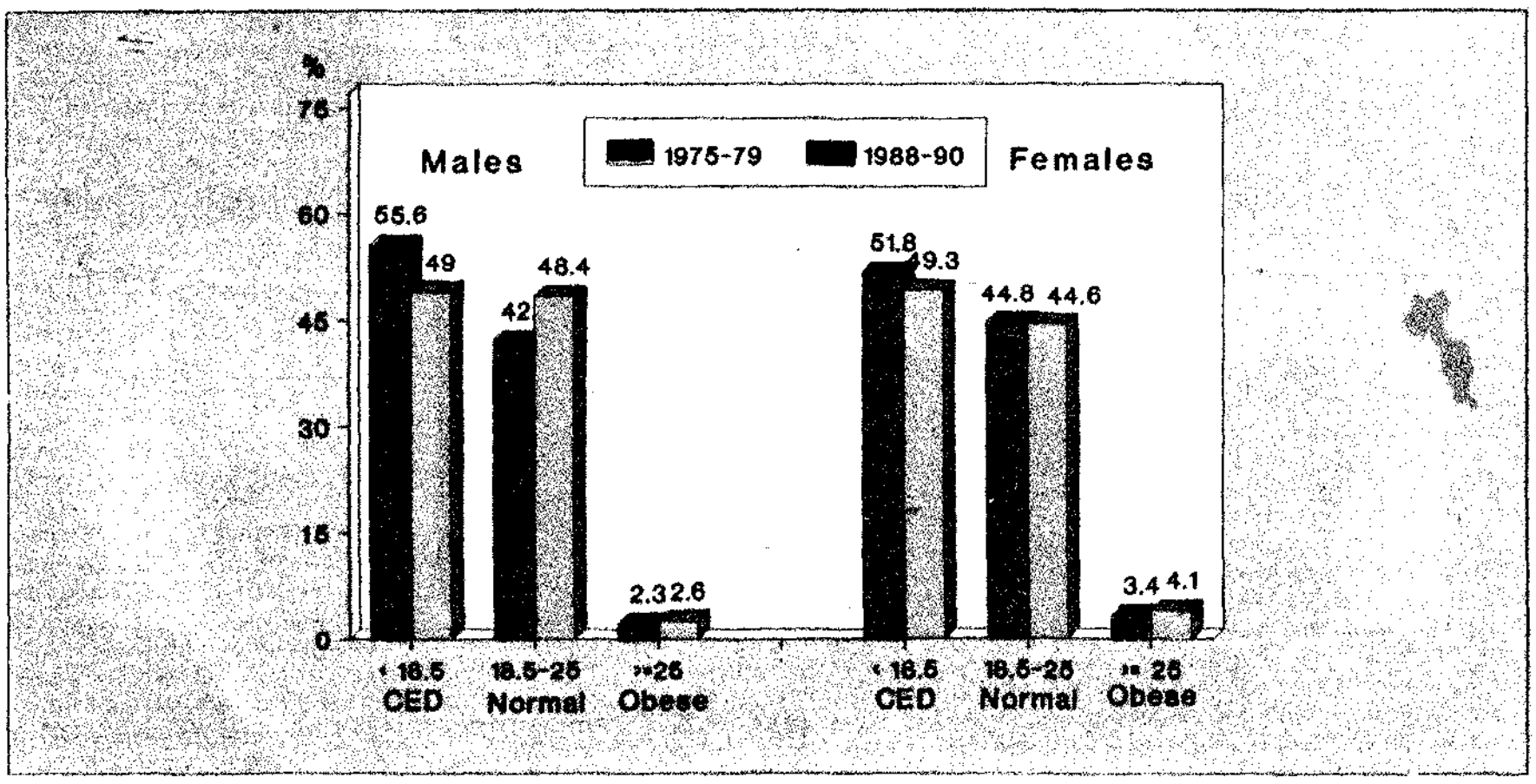
5.3 ENERGY INTAKES BY OCCUPATION

The intake of energy showed a marginal increase in agricultural labourers, while it decreased among cultivators and others. However, the energy intakes in other labourers did not show any change.



5.4 PER CENT DISTRIBUTION OF ADULTS BY BMI

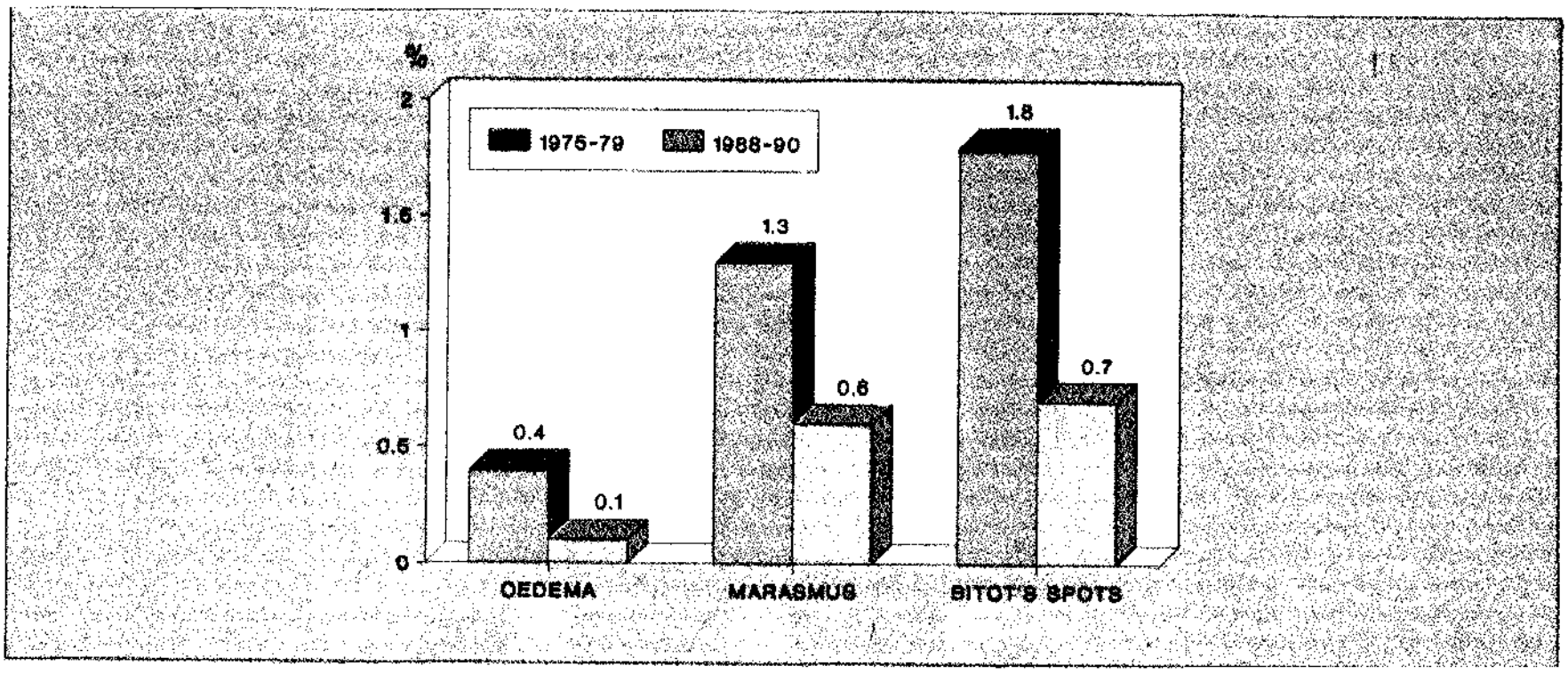
The per cent prevalence of adults with chronic energy deficiency decreased with concomitant increase in the proportion of normals.



5.5 NUTRITIONAL STATUS OF PRESCHOOL CHILDREN (1-5 Years)

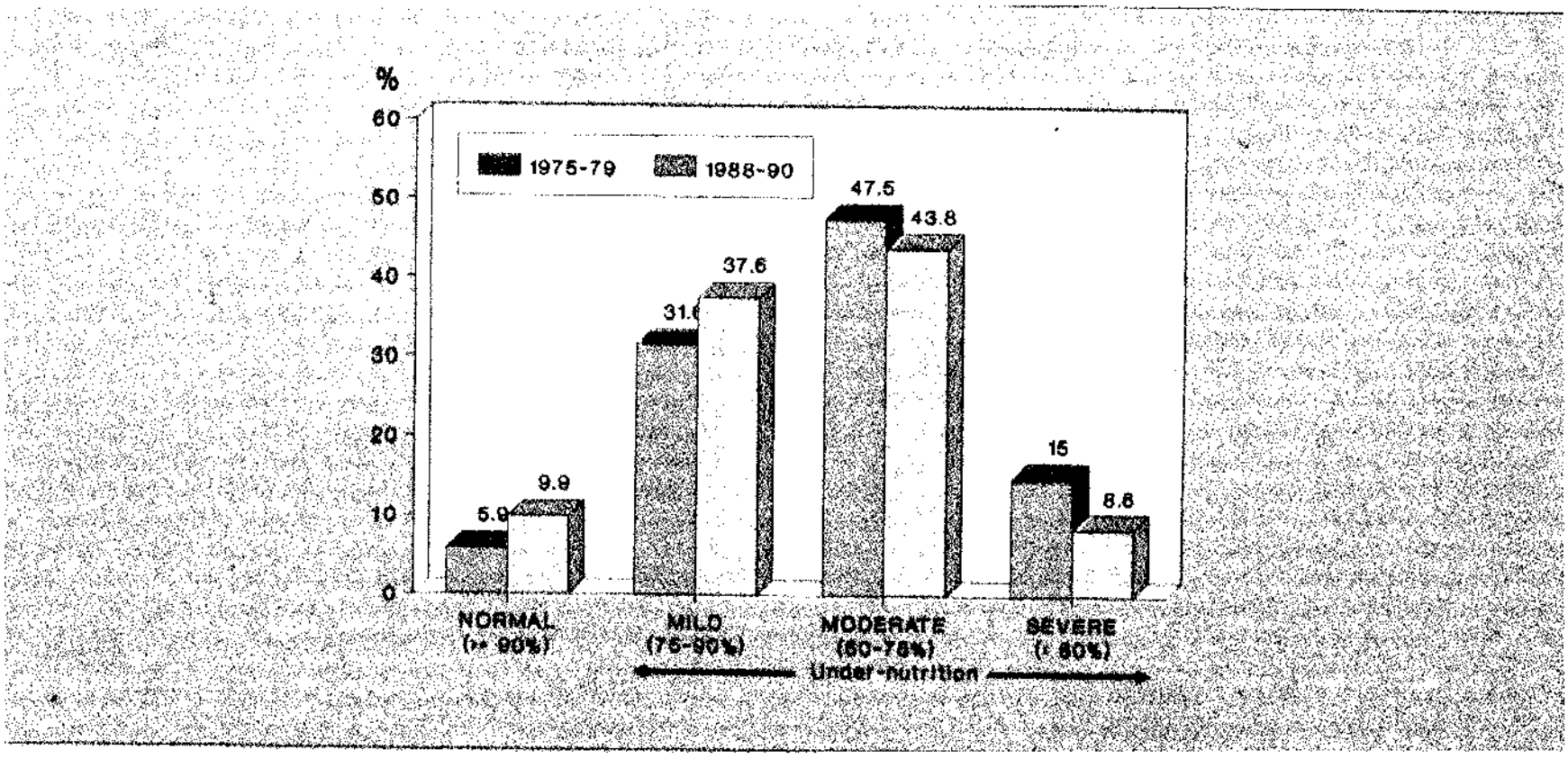
5.5.1 Prevalence of Nutritional Deficiency Signs

The prevalence of overt cases of protein energy malnutrition (PEM) such as oedema and marasmus and vitamin A deficiency, like Bitot spots, decreased over the period.



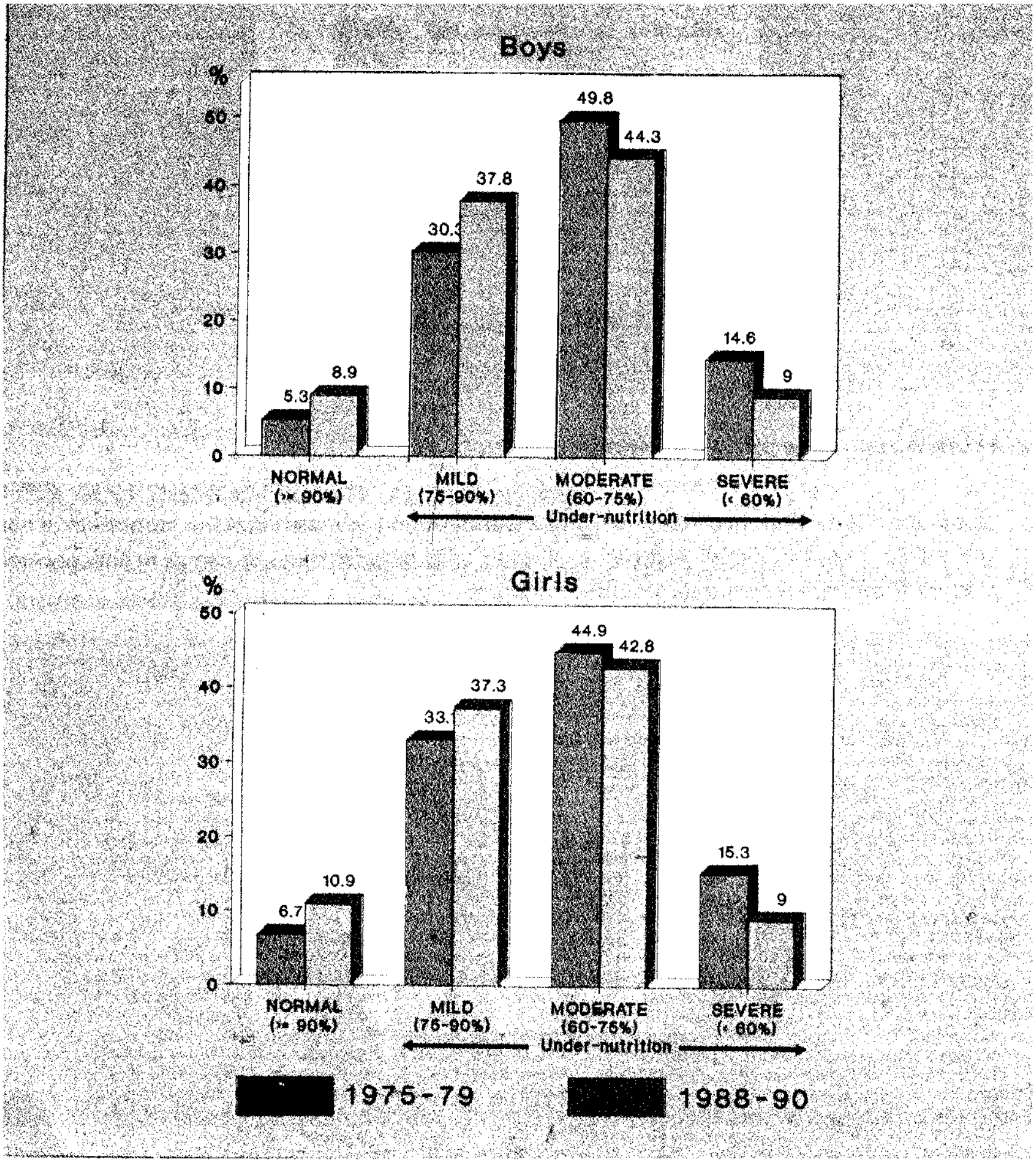
5.5.2 Weight for Age - 1-5 Years (Pooled)

Distribution of children according to Gomez Classification revealed that the proportion of normal and mildly undernourished children increased with concomitant decrease in the per cent of moderate and severely undernourished children.



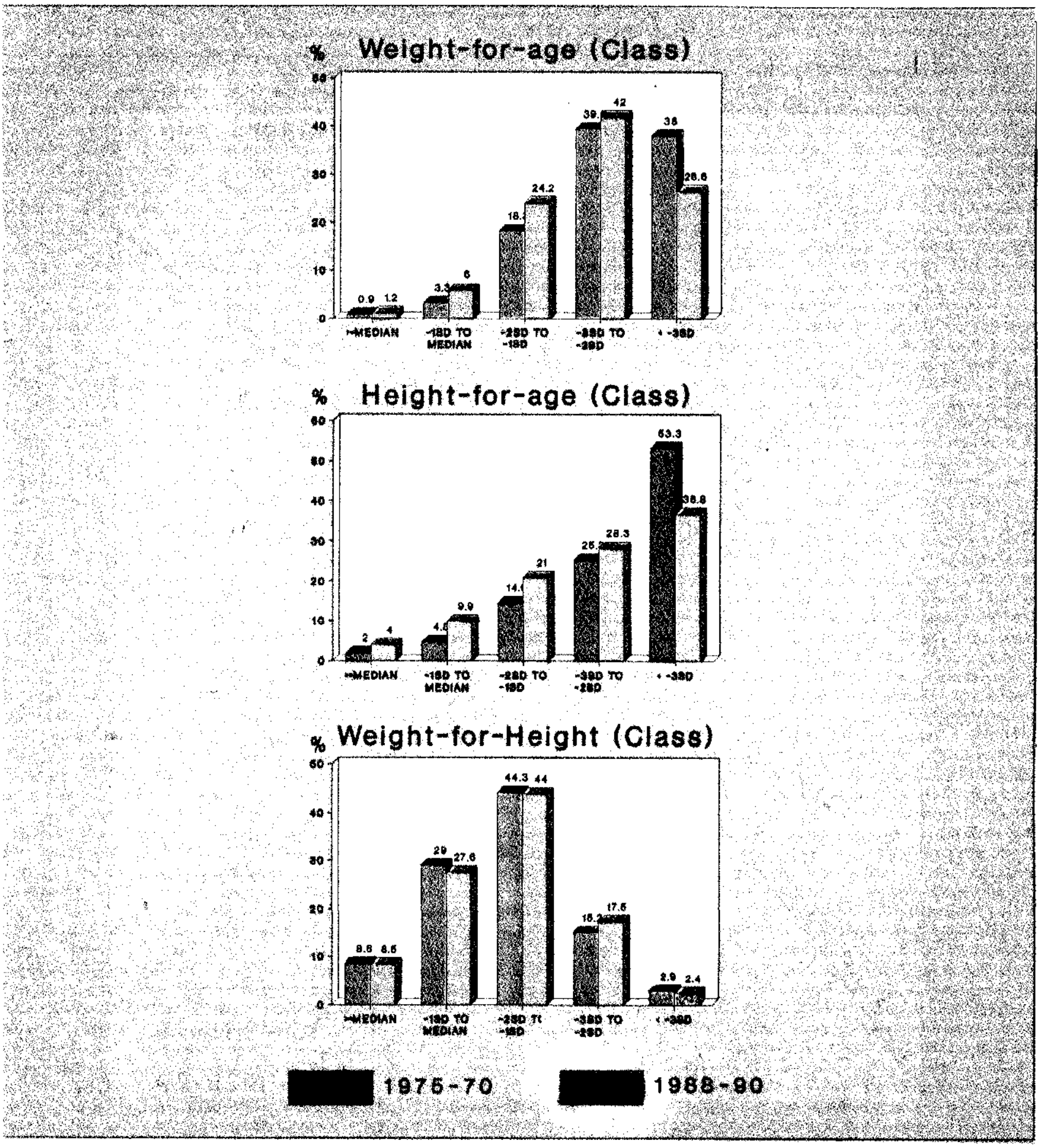
5.5.3 Weight for Age : Boys and Girls

Distribution of boys and girls according to Gomez Classification indicated an increase in the prevalence of normal and mild undernutrition. There was a decrease in the proportion of moderate and severely undernourished children both in boys and girls.



5.5.4 Standard Deviation Classification

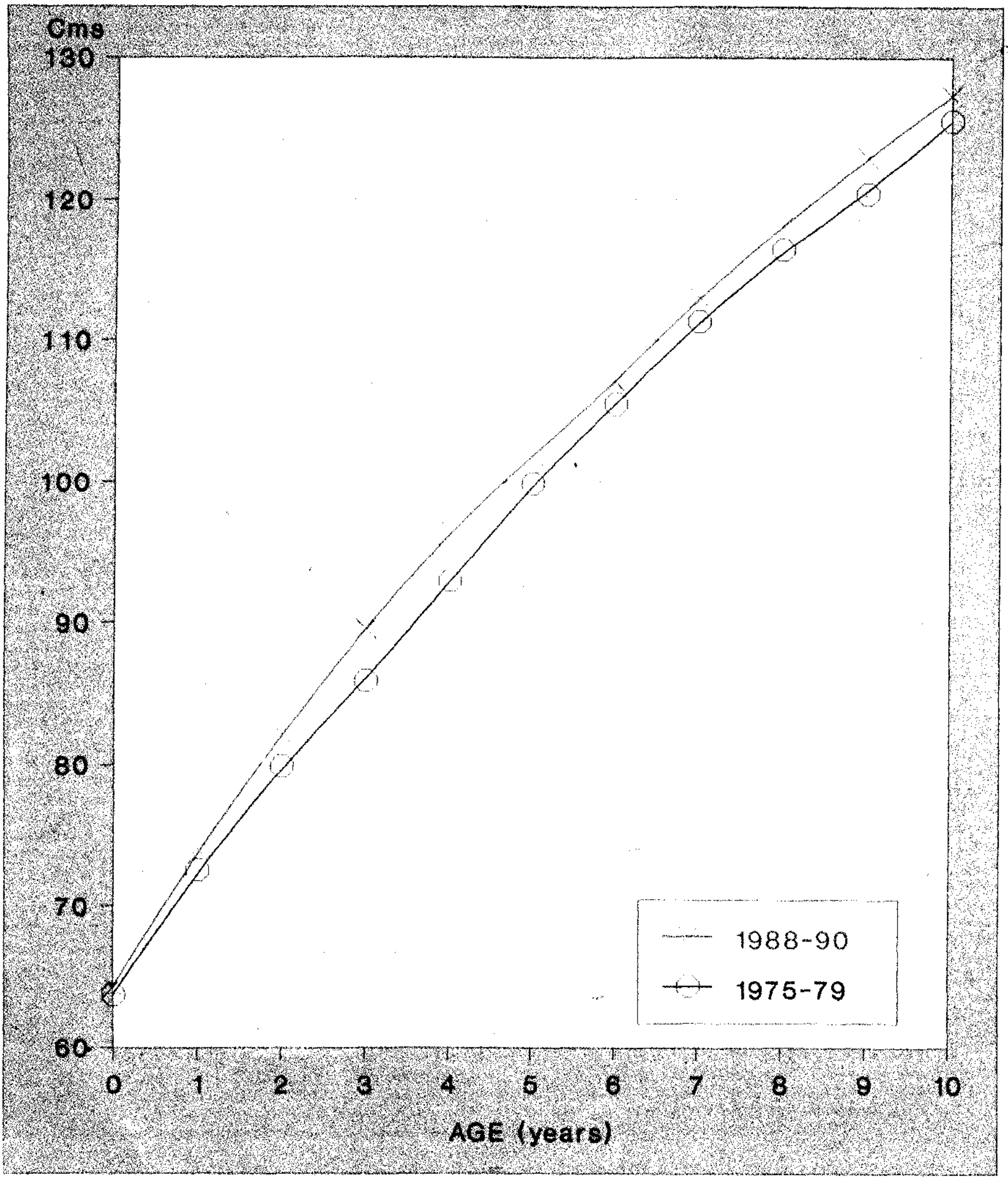
There was a considerable reduction in the prevalence of both severe undernutrition (≤3SD of weight for age) and stunting (≤3SD of height for age) in 1-5 year old children.



5.6 SECULAR TRENDS IN HEIGHTS AND WEIGHTS

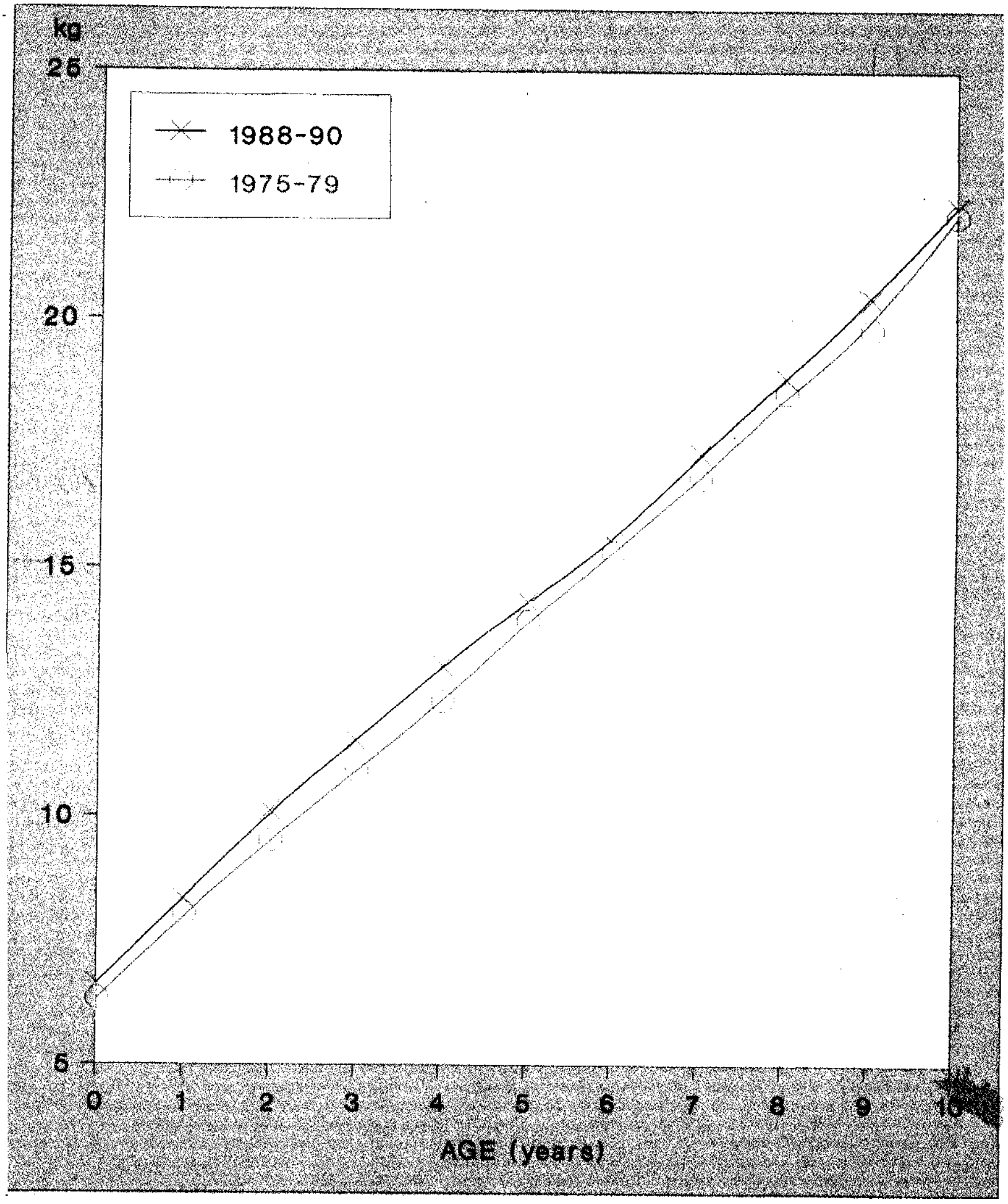
5.6.1 Distance Chart of Heights (Cm) of 0-10 Year Boys

The boys surveyed in 1988-90 tended to be taller by 3-4 cms as compared to those in 1975-79, indicating secular changes in growth. However, they were much shorter than their American counterparts.



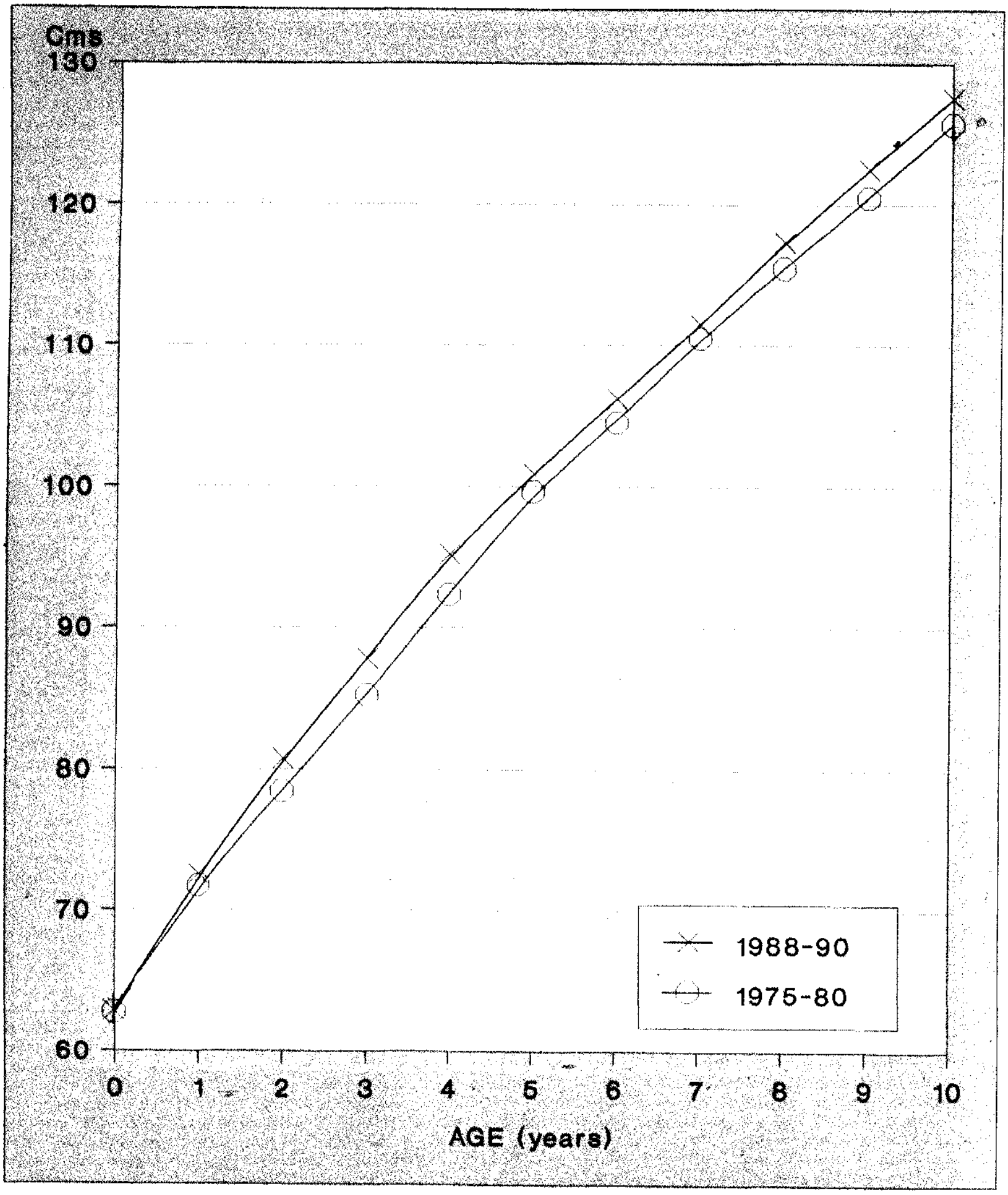
5.6.2 **Distance Chart of Weights (Kg) of 0-10 Year** Boys

The boys were heavier by about 1 kg during 1988-90 as compared to those in 1975-79. However, they were lighter than their American counterparts.



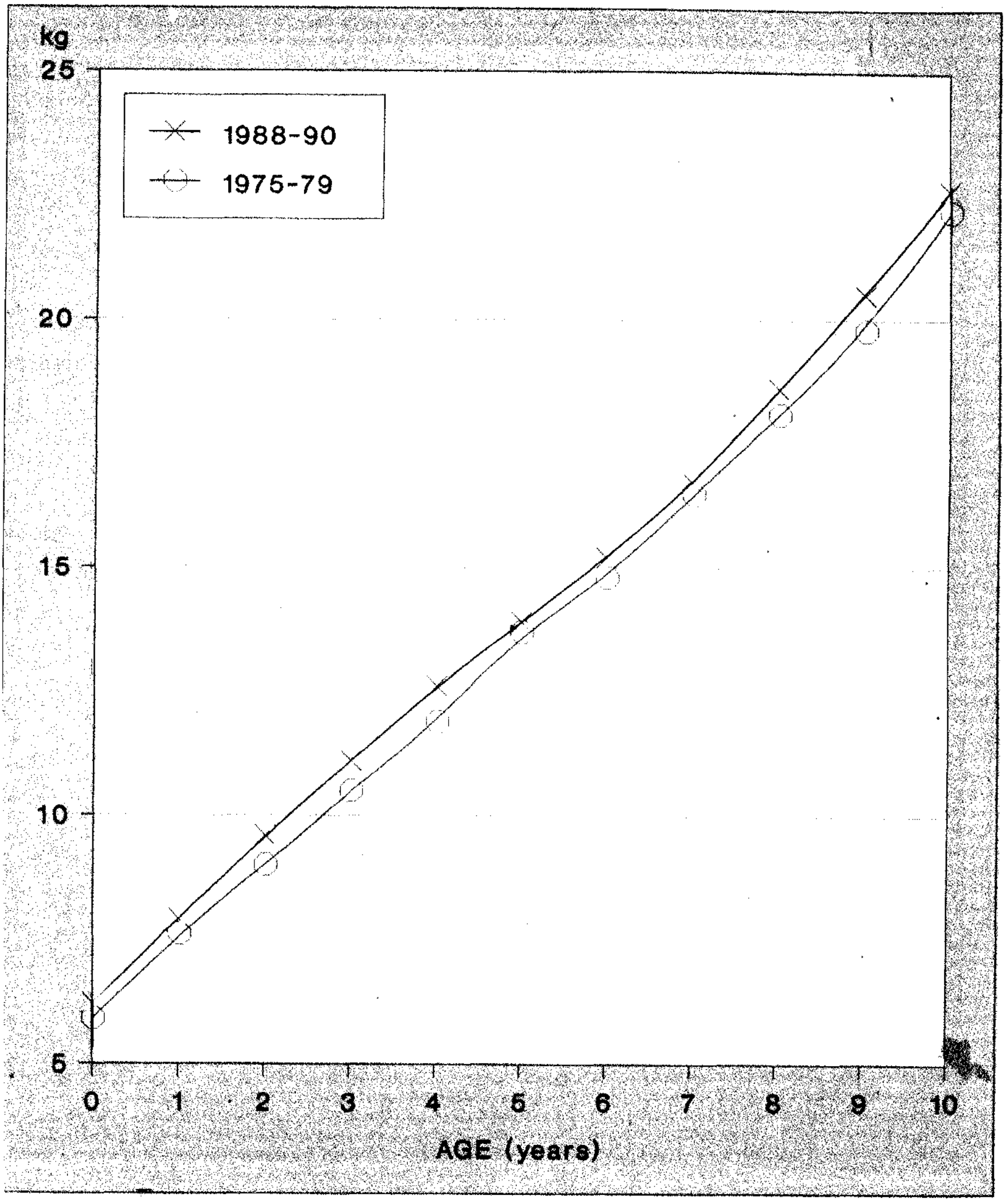
5.6.3 Distance Chart of Heights (Cm) of 0-10 Year Girls

Even among the girls, there was an increase of 3-4 cms. in the height.



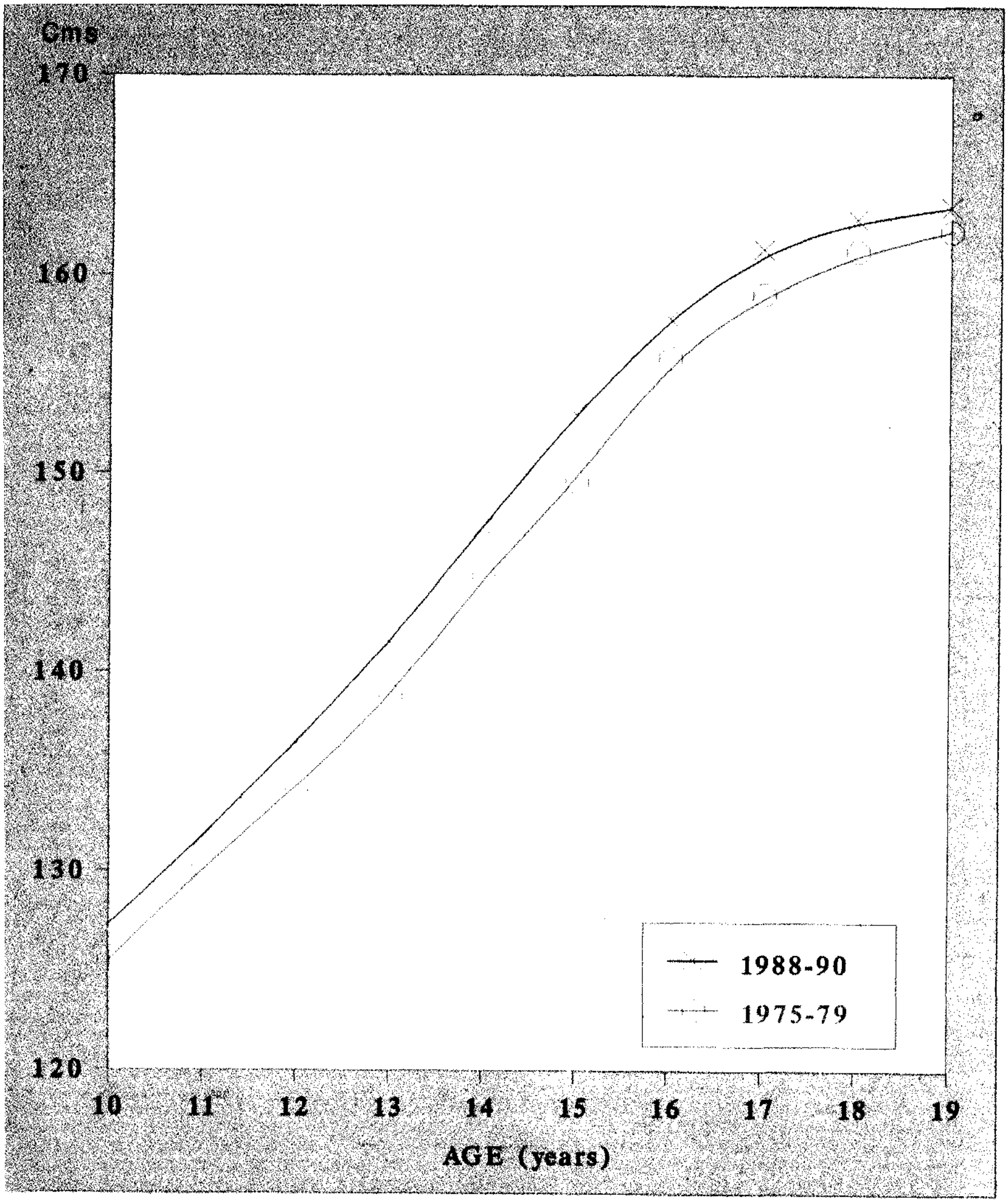
5.6.4 Distance Chart of Weights (Kg) of 0-10 Year Girls

The girls tended to be heavier by about 1 kg. during 1988-90



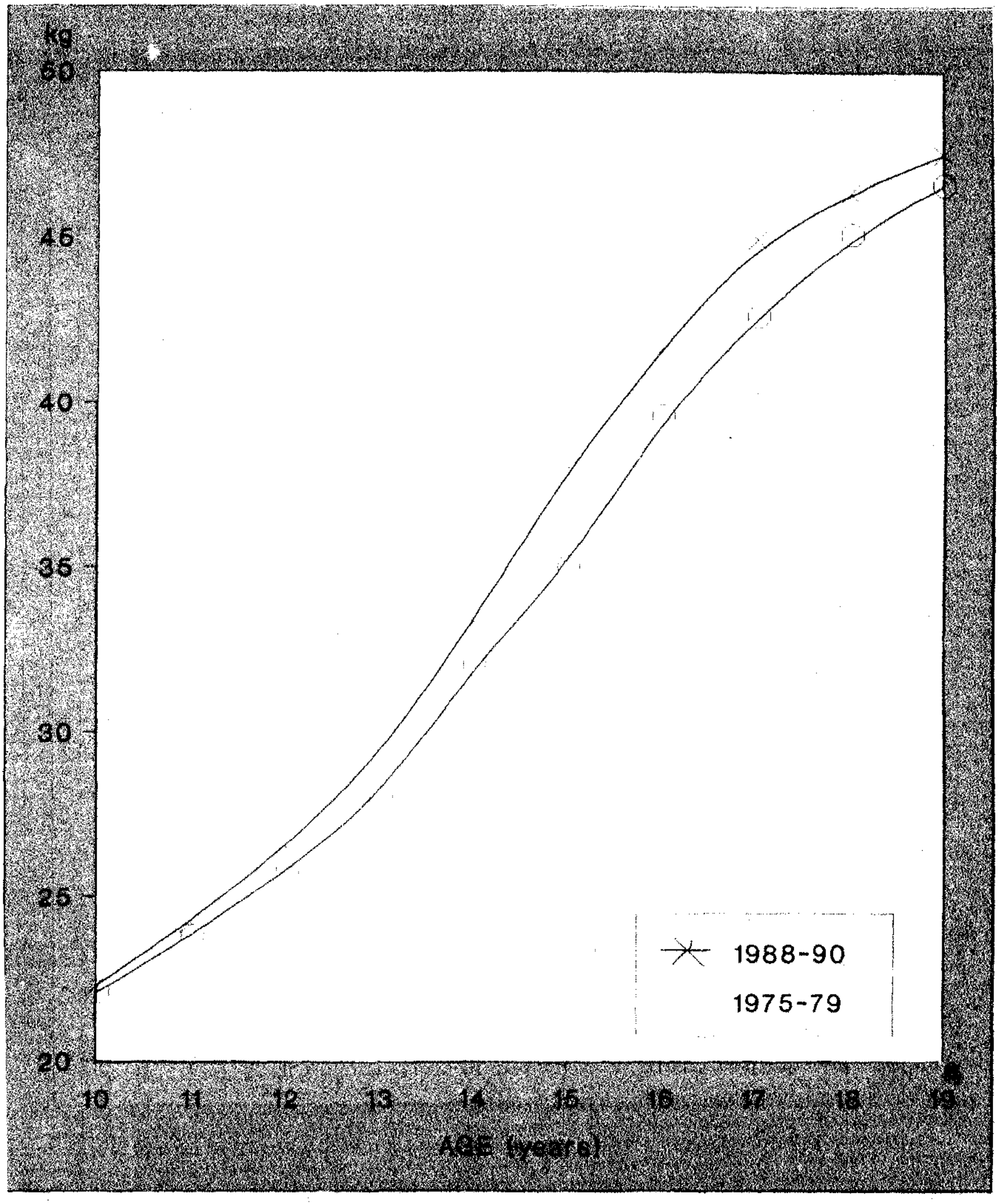
5.6.5 Distance Chart of Heights (Cm) of 10-19 Year Boys

The males tended to be 3-4 cms taller in 1988-90 as compared to 1975-79.



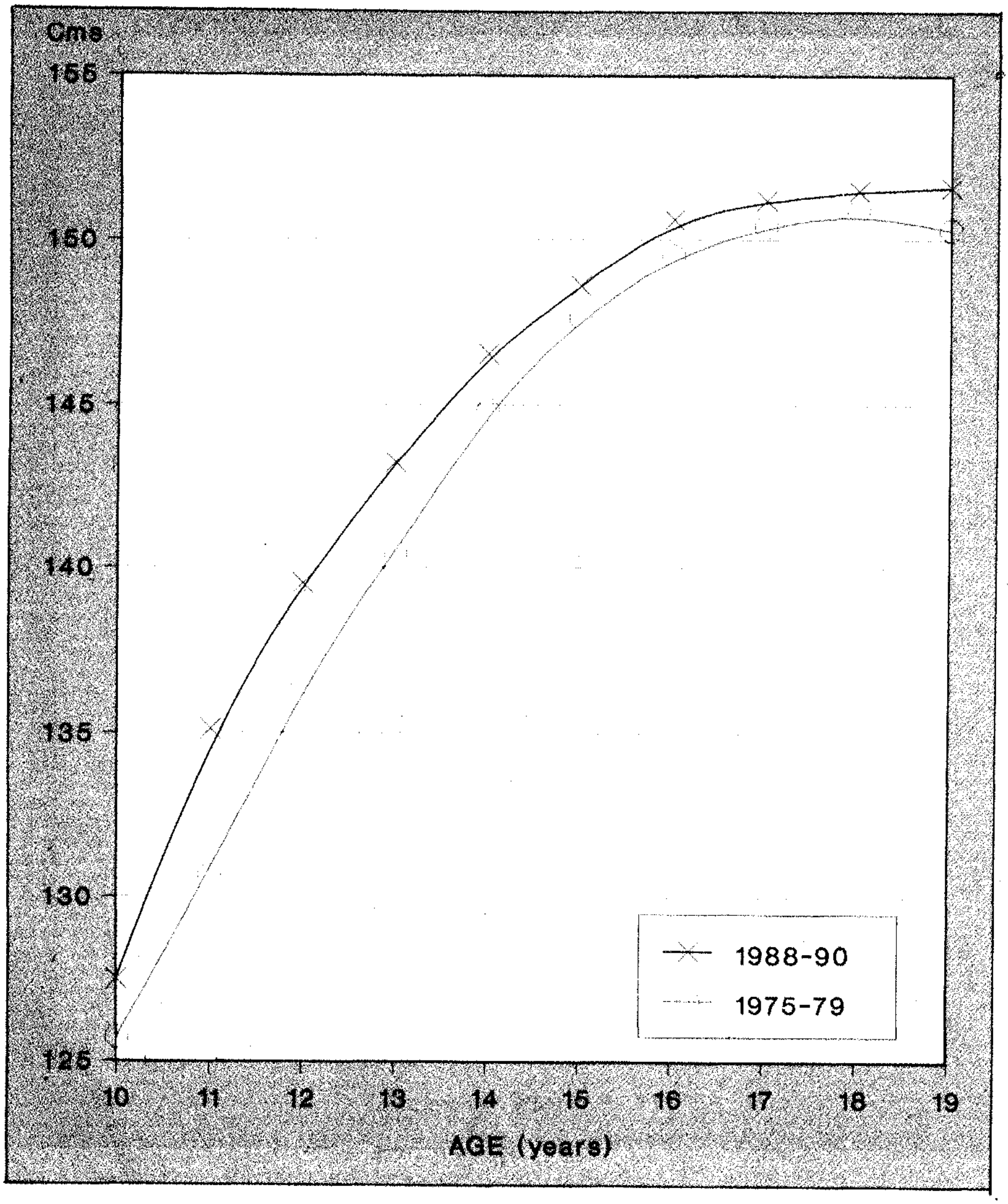
5.6.6 Distance Chart of Weights (Kg) of 10-19 Year Boys

During 1988-90, the 10-14 years boys were heavier by 1 kg, while 15-17 year boys were heavier by about 2-3 kgs than those during 1975-79



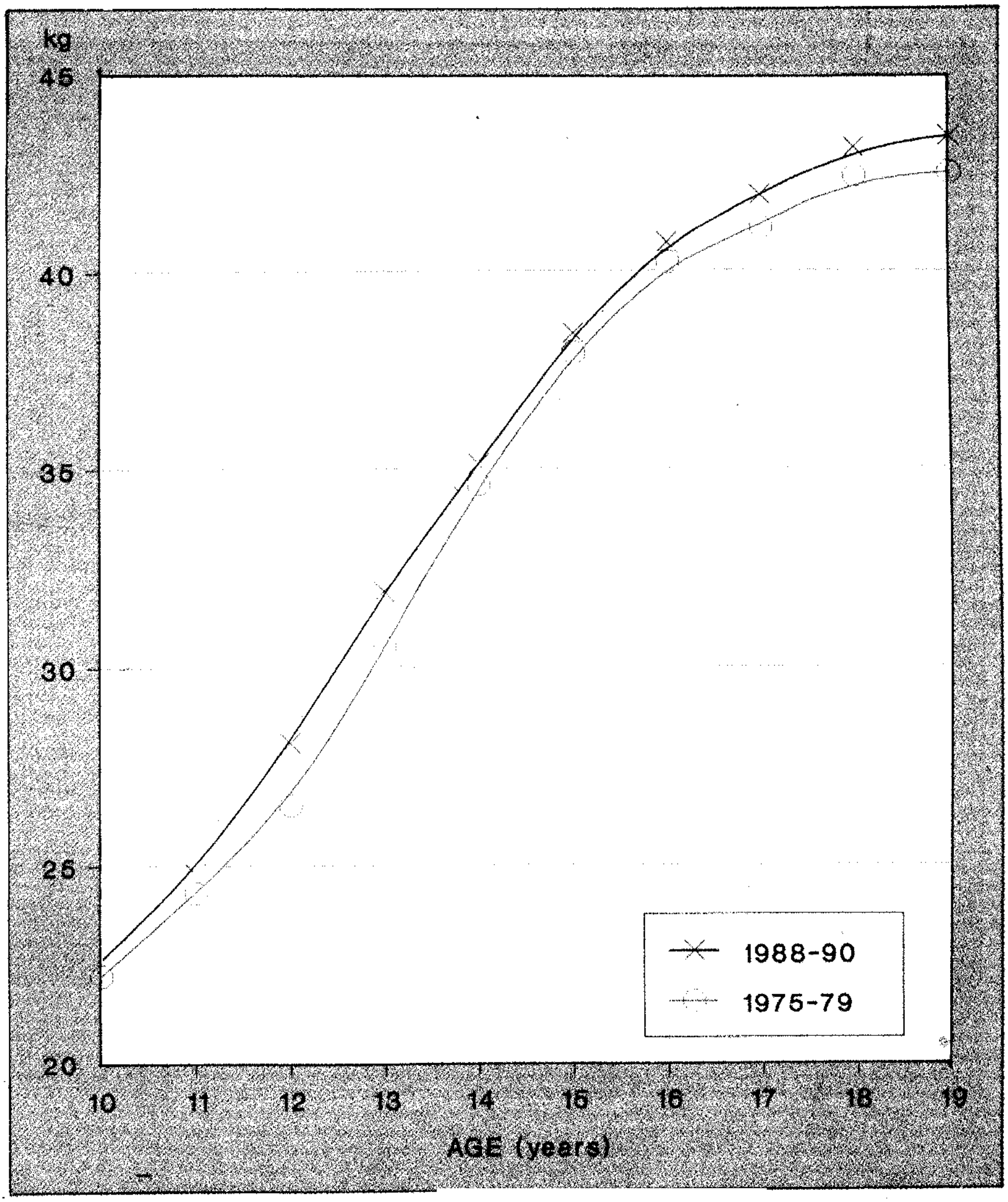
5.6.7 Distance Chart of Heights (Cm) of 10-19 Year Girls

Among the 10-19 years girls, the increase in the heights was of higher magnitude in 11-13 year age group as compared to those in 14-19 years during 1988-90.



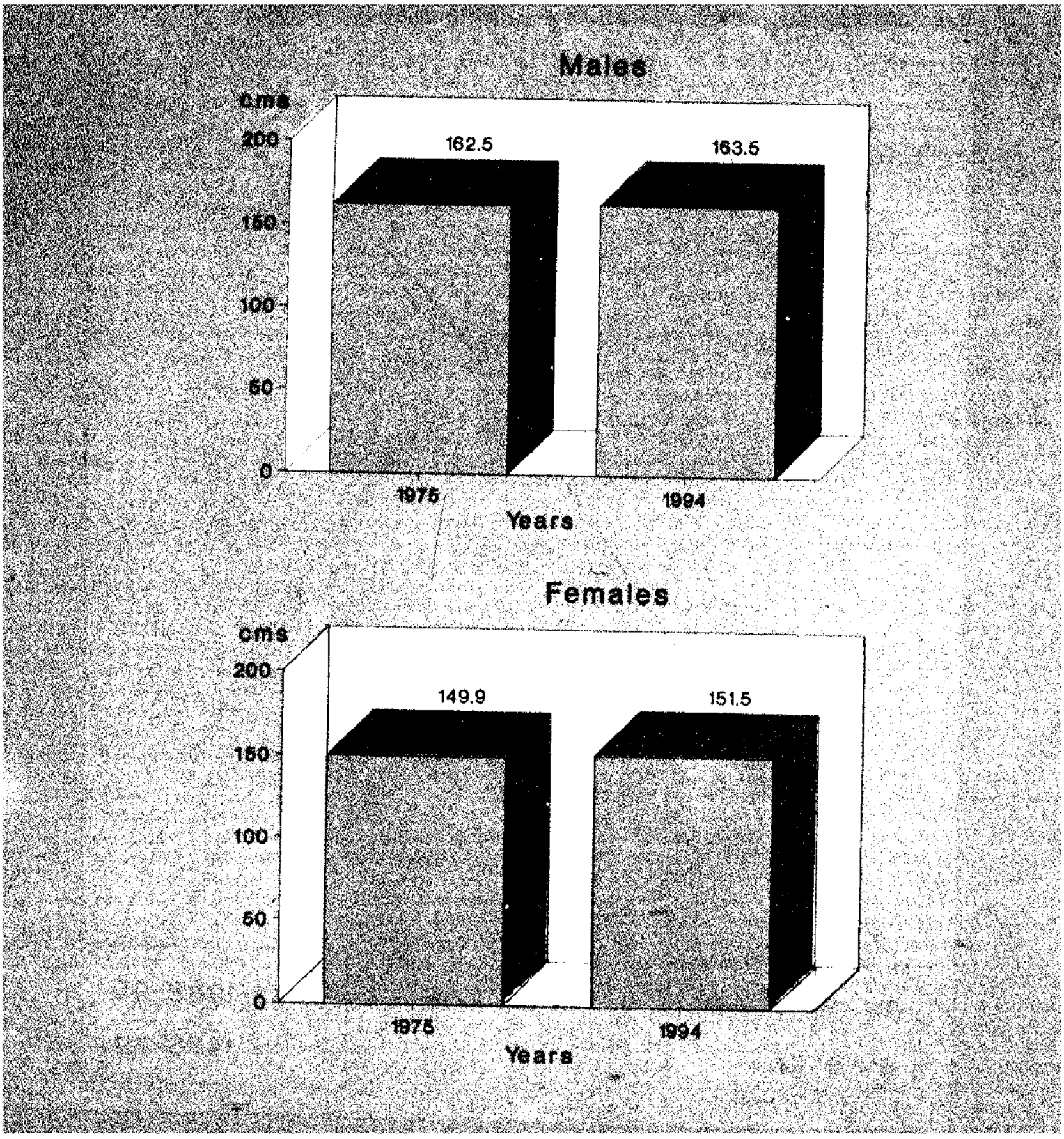
5.6.8 Distance Chart of Weights (Kg) of 10-19 Year Girls

The 10-19 year girls showed an increase of about 1 kg of body weight during 1988-90.



5.6.9 Adult Stature

The average heights of adult males and females show an increase over the last two decades.



6. FOOD AND NUTRIENT INTAKE AND NUTRITIONAL STATUS BY SOCIO-ECONOMIC VARIABLES - RURAL (1994)

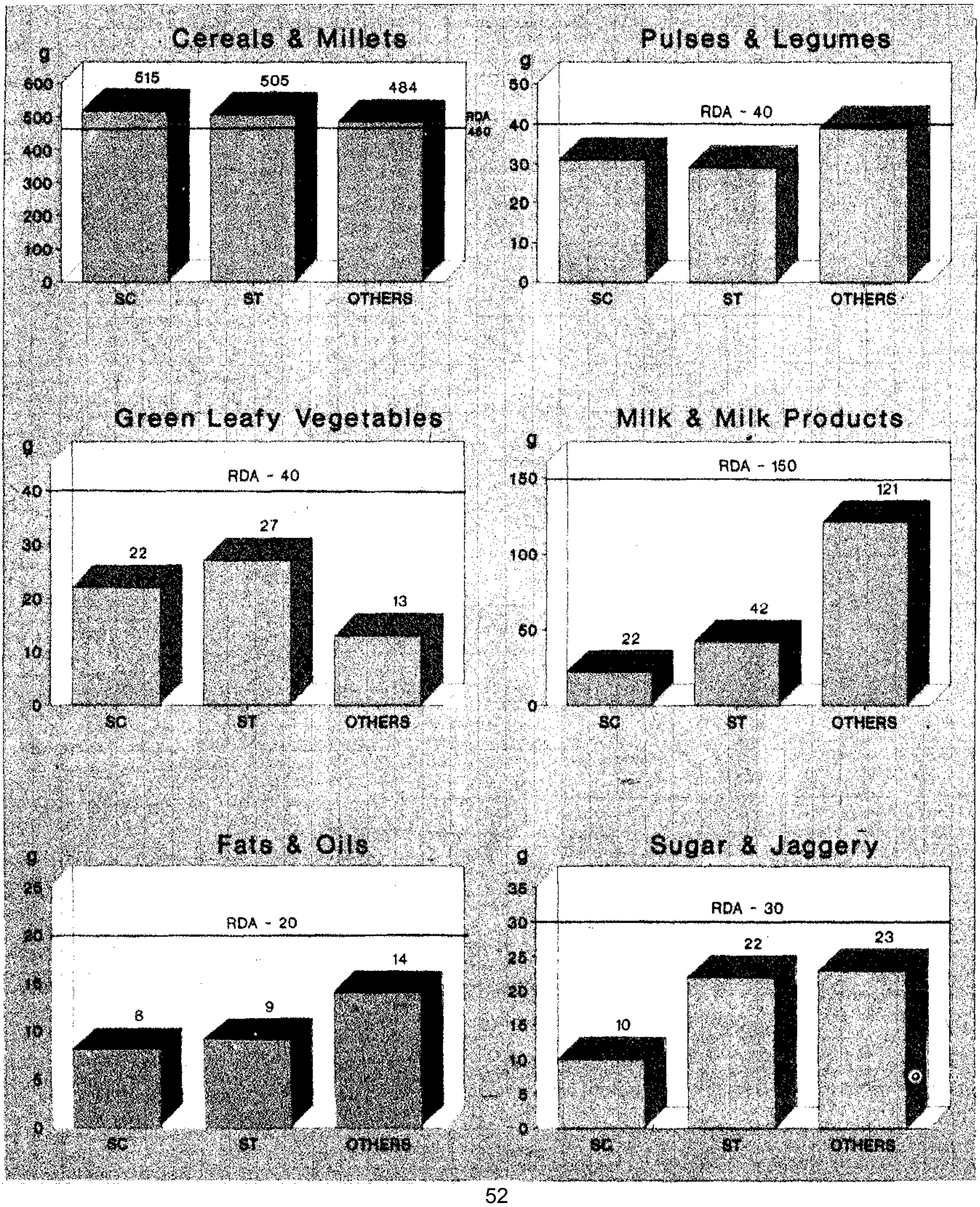
6.1 COMMUNITY

6.1.1 Intake of Various Foods (CU/Day)

The average intake of cereals and millets was comparable to RDA in all the groups, while that of other foods was low.

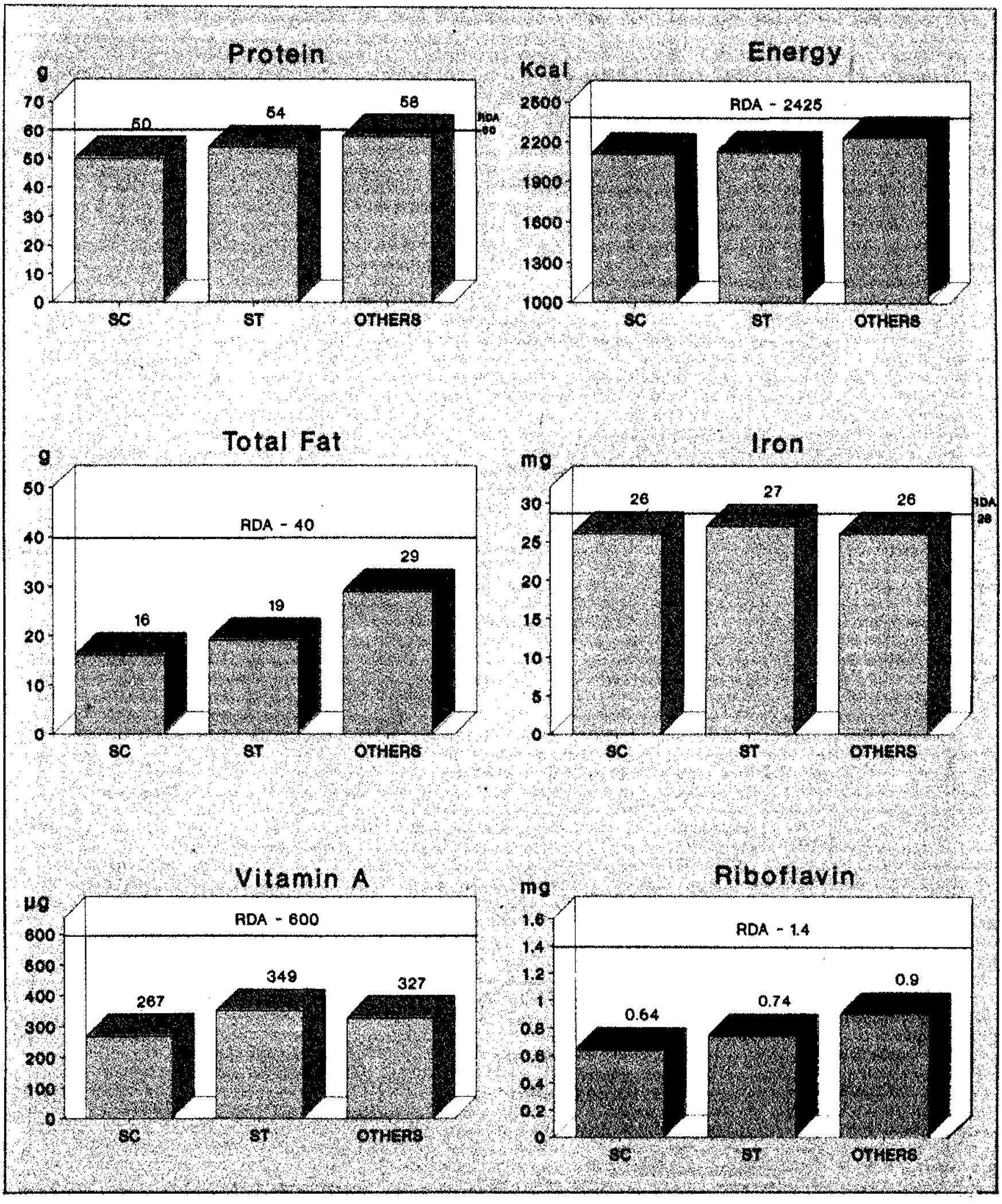
The consumption of income-elastic foods such as milk & milk products and fats & oils was much less among the weaker sections like SC and ST.

In contrast, the intake of GLV showed a reverse trend



6.1.2 Intake of Nutrients (CU/Day)

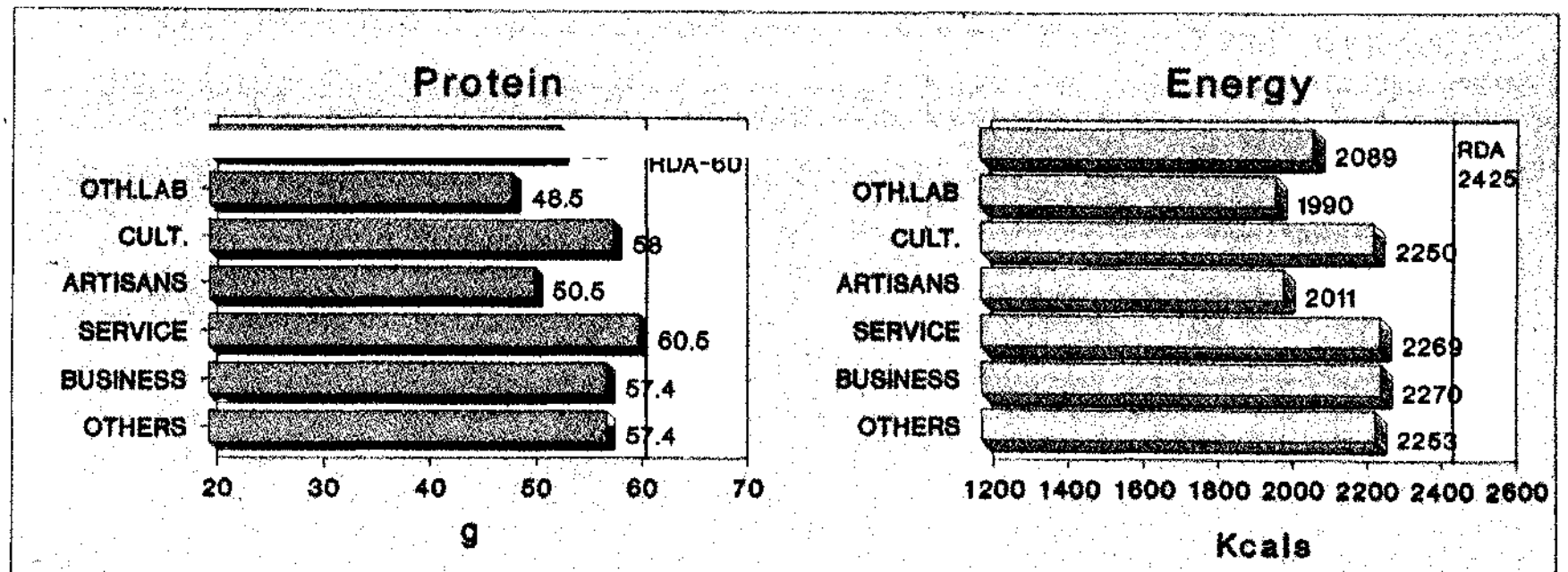
The intake of various nutrients except iron, was less than the RDA. The deficit was more among the weaker sections.



6.2 OCCUPATION

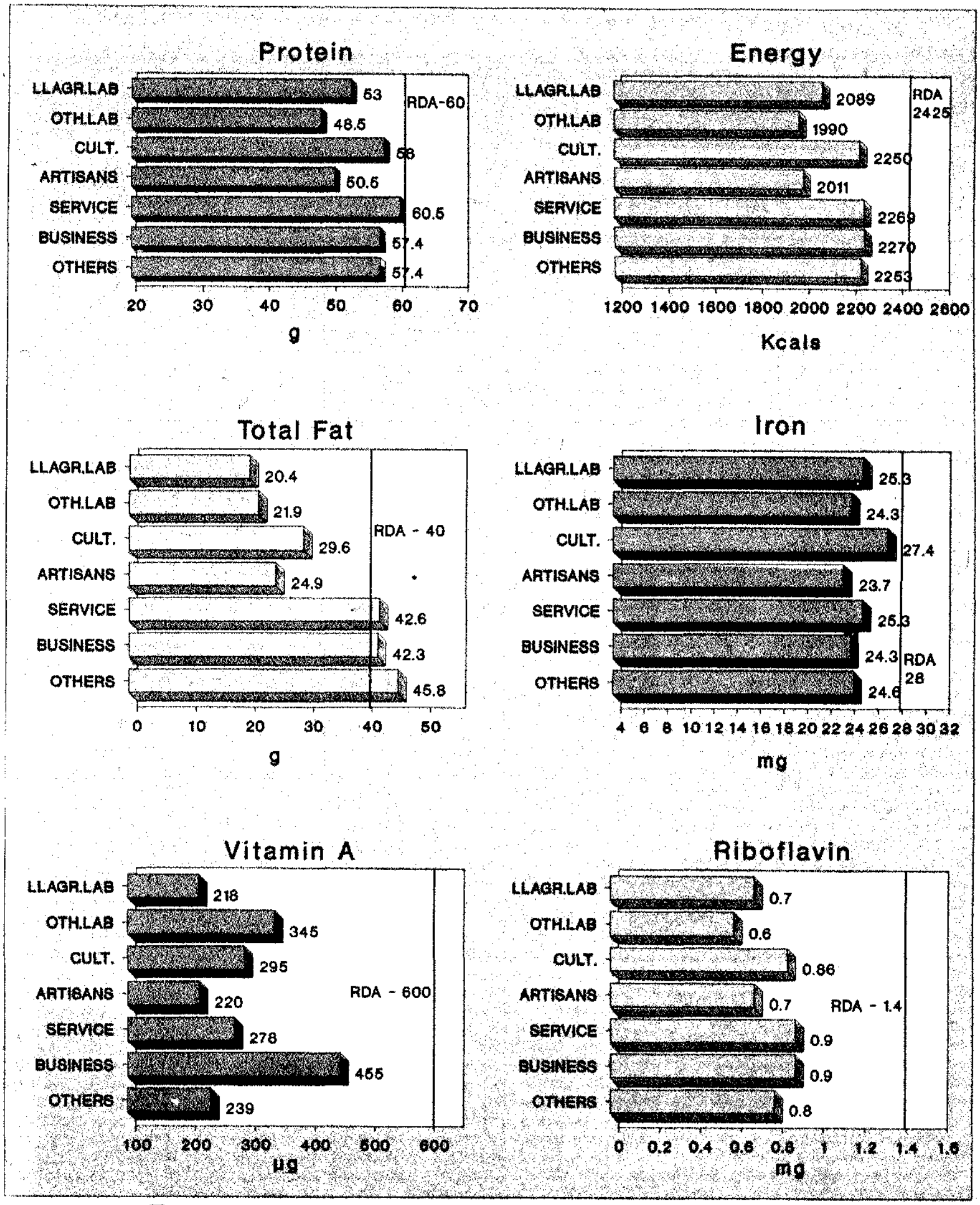
6.2. 1 Intake of Foods (CU/Day)

The intakes of cereals and millets of landless agriculture labourers and cultivators were above the RDA. There appeared to be a decrease in cereal intake with better occupational status. The consumption of income-elastic foods like milk & milk products, fats & oils and sugar & jaggery was higher in the households with occupations like services, business etc.



6.2.2 Intake of Nutrients (CU/Day)

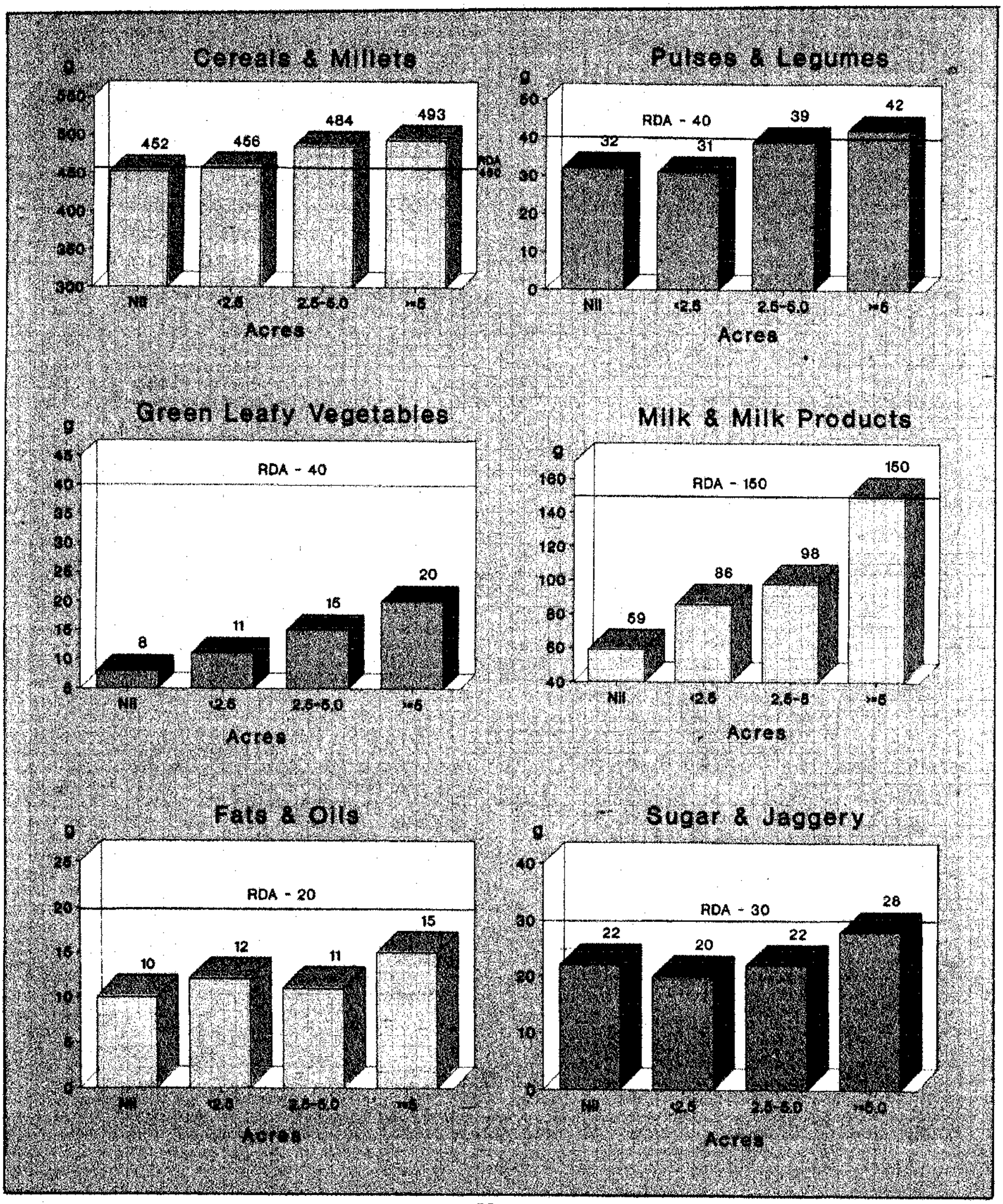
The intakes of energy, protein, total fat and riboflavin were lower among the labourers and artisans, while that of total fat was higher in the households with occupations like services and business groups. However, no perceptible occupational differences were observed.



6.3 SIZE OF LAND HOLDINGS

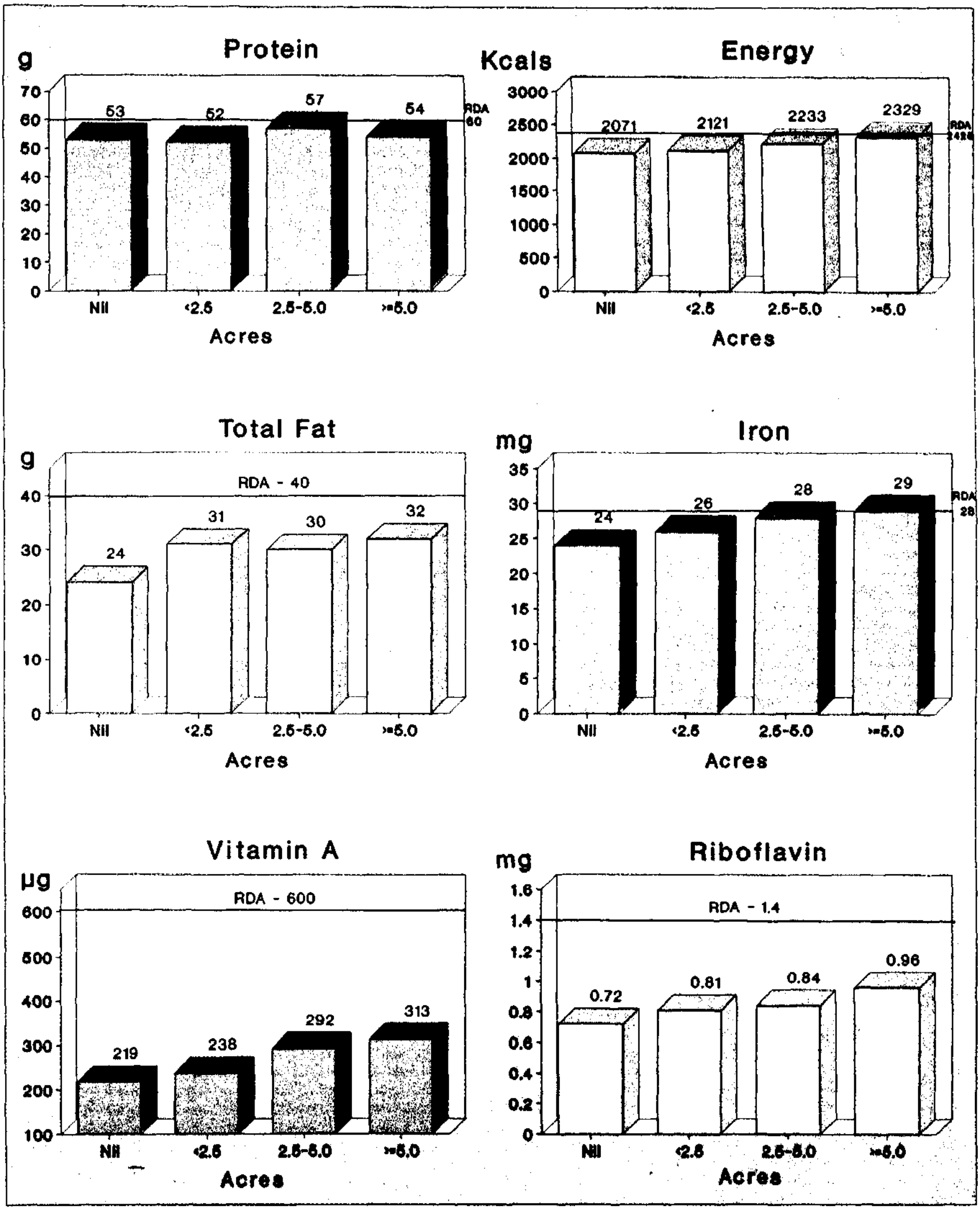
6.3.1 Intake of Foods (CU/Day)

There was a clear cut improvement in the consumption of GLV and milk & milk products as the size of the land holdings per household increased. In the case of cereals & millets, pulses & legumes, fats & oils and sugar & jaggery, the increasing trend was not as obvious.



6.3.2 Intake of Nutrients (CU/Day)

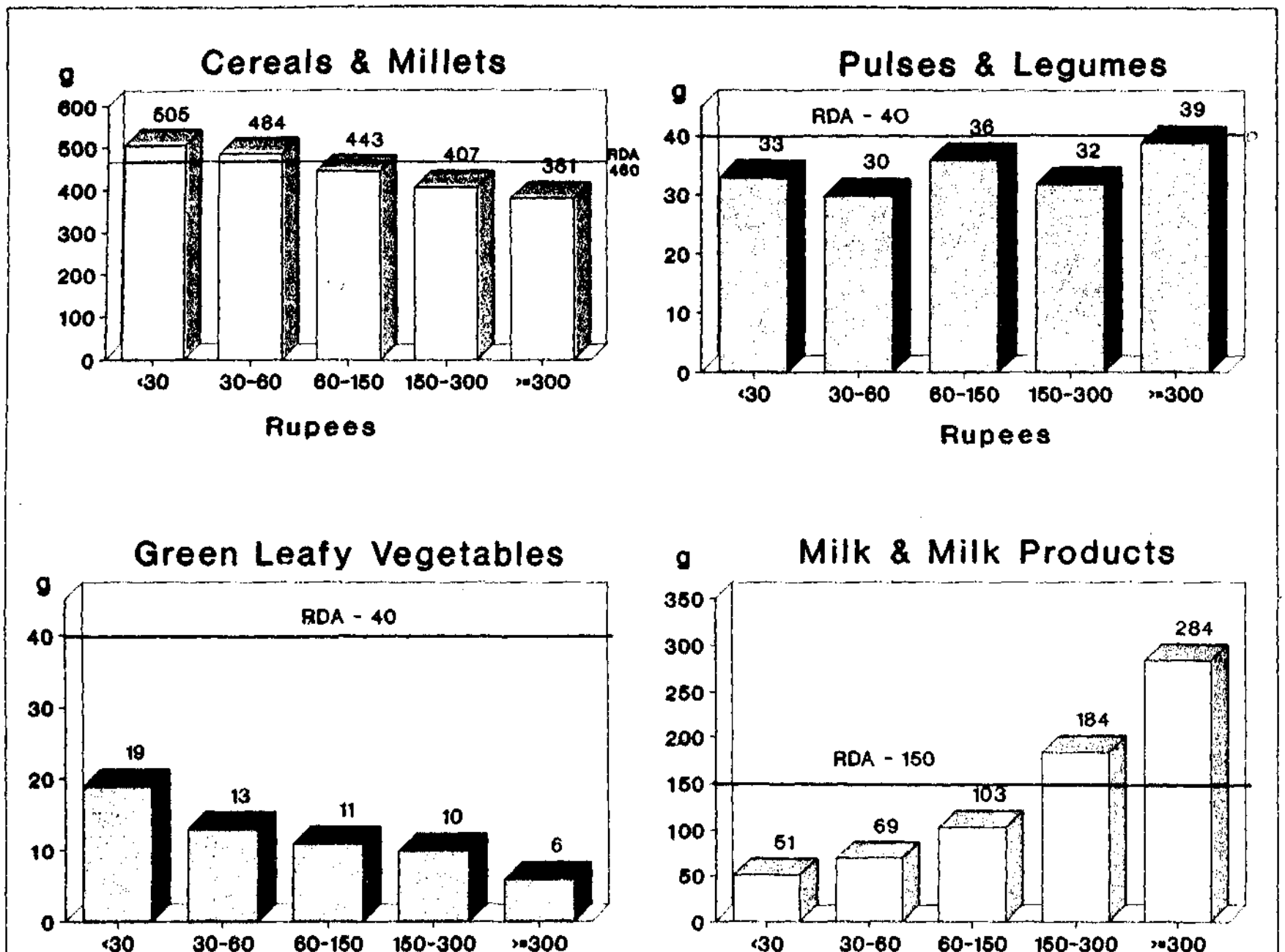
In general, the intake of all the nutrients, except protein, was the lowest in landless households. Though the nutrient intakes were higher in the households having 5 acres or more, the differences between other groups were small, except with respect to vitamin A and riboflavin.



6.4 PER CAPITA MONTHLY INCOME

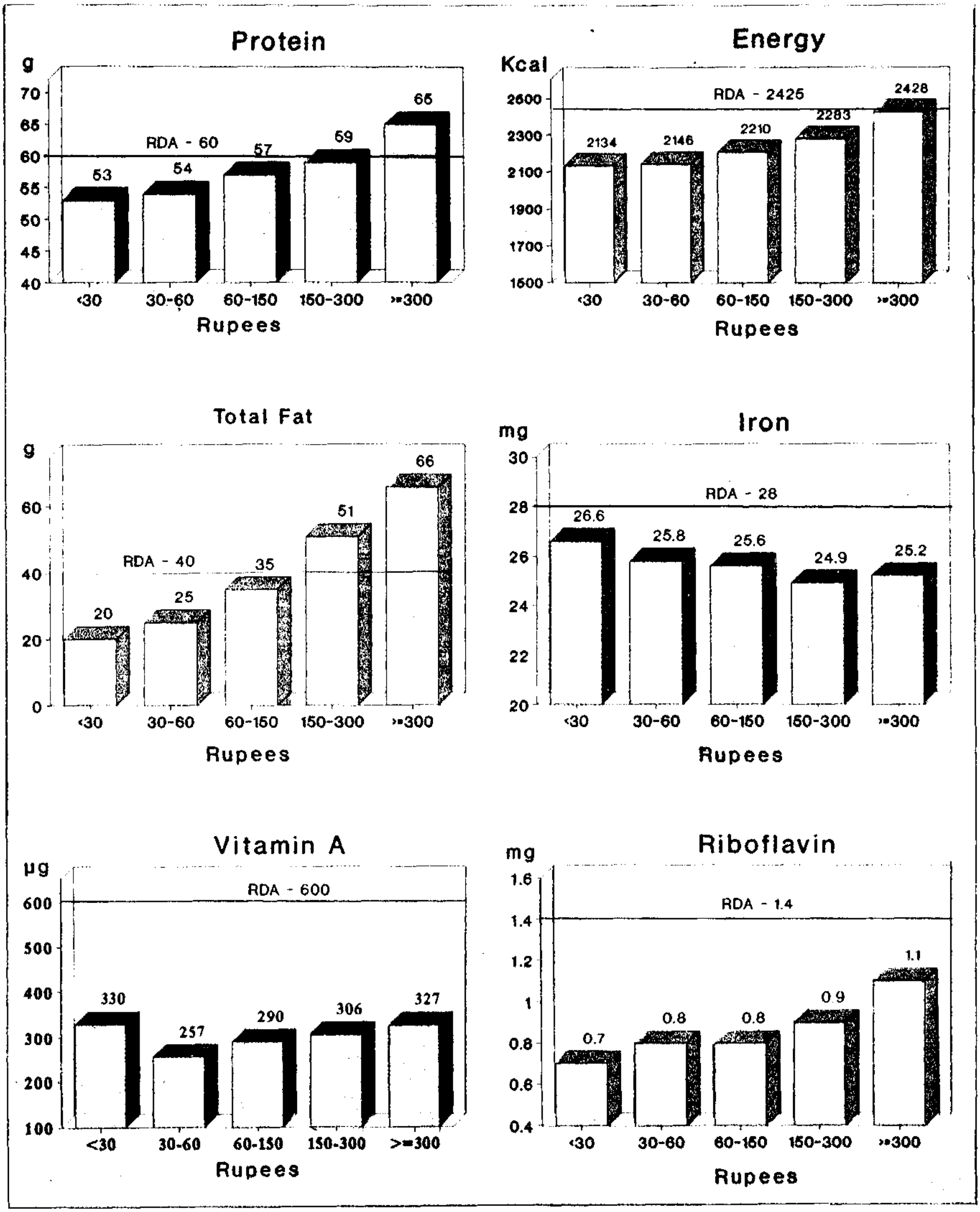
6.4.1 Intake of Foods (CU/Day)

The consumption of cereals & millets and GLV decreased with increasing income. In the case of other foods, reverse trends were observed.



6.4.2 Intake of Nutrients (CU/Day)

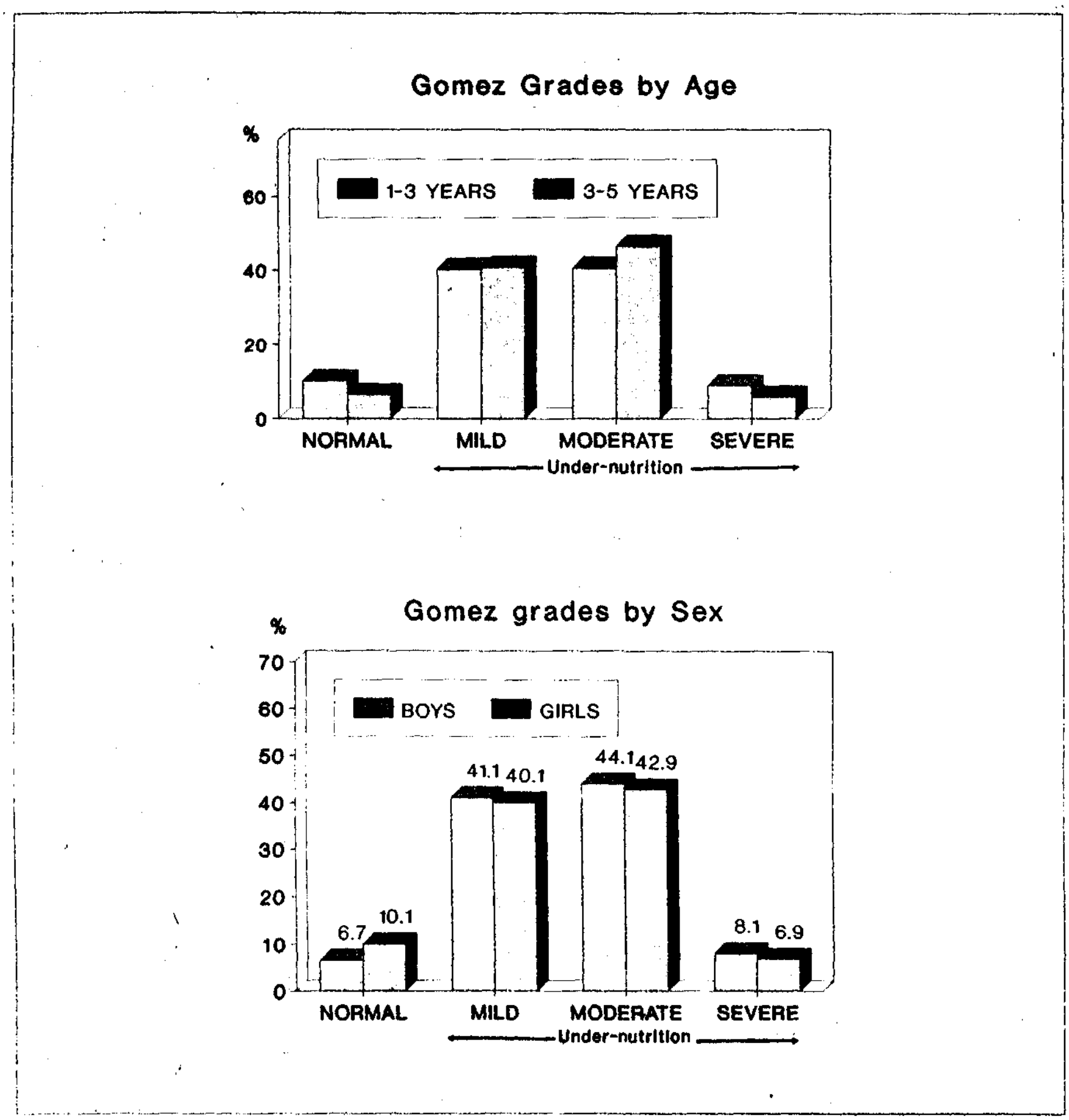
The consumption of protein, energy, total fat and riboflavin increased with improvement in income. No such trends were observed in the case of iron and vitamin A.



6.5 NUTRITIONAL STATUS OF PRESCHOOL CHILDREN (1-5 Years)

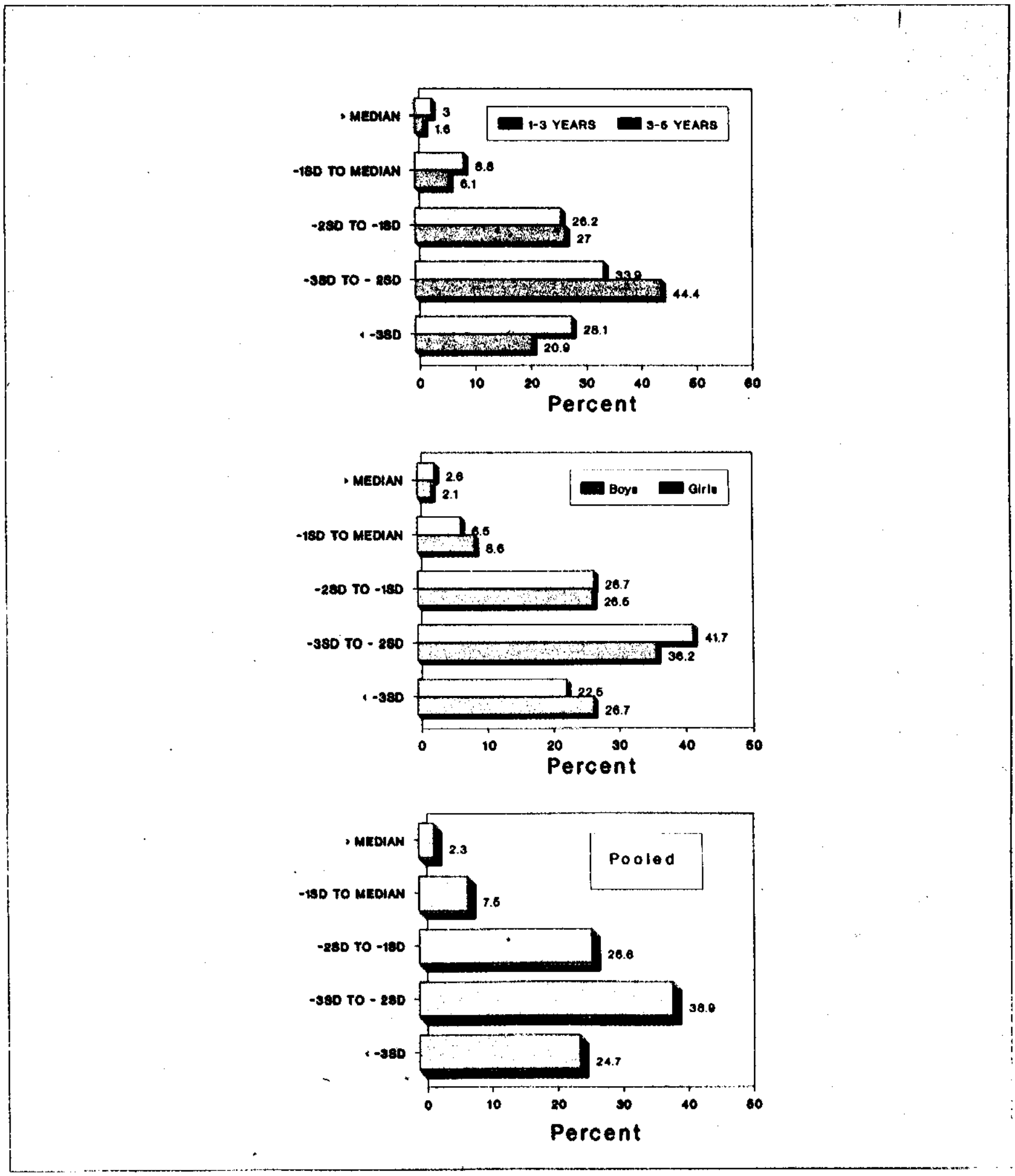
6.5.1 Weight for Age (Gomez Classification)

A higher proportion of younger children were severely undernourished, as compared to the older children. The distribution of children according to nutritional grades was essentially similar between the sexes.



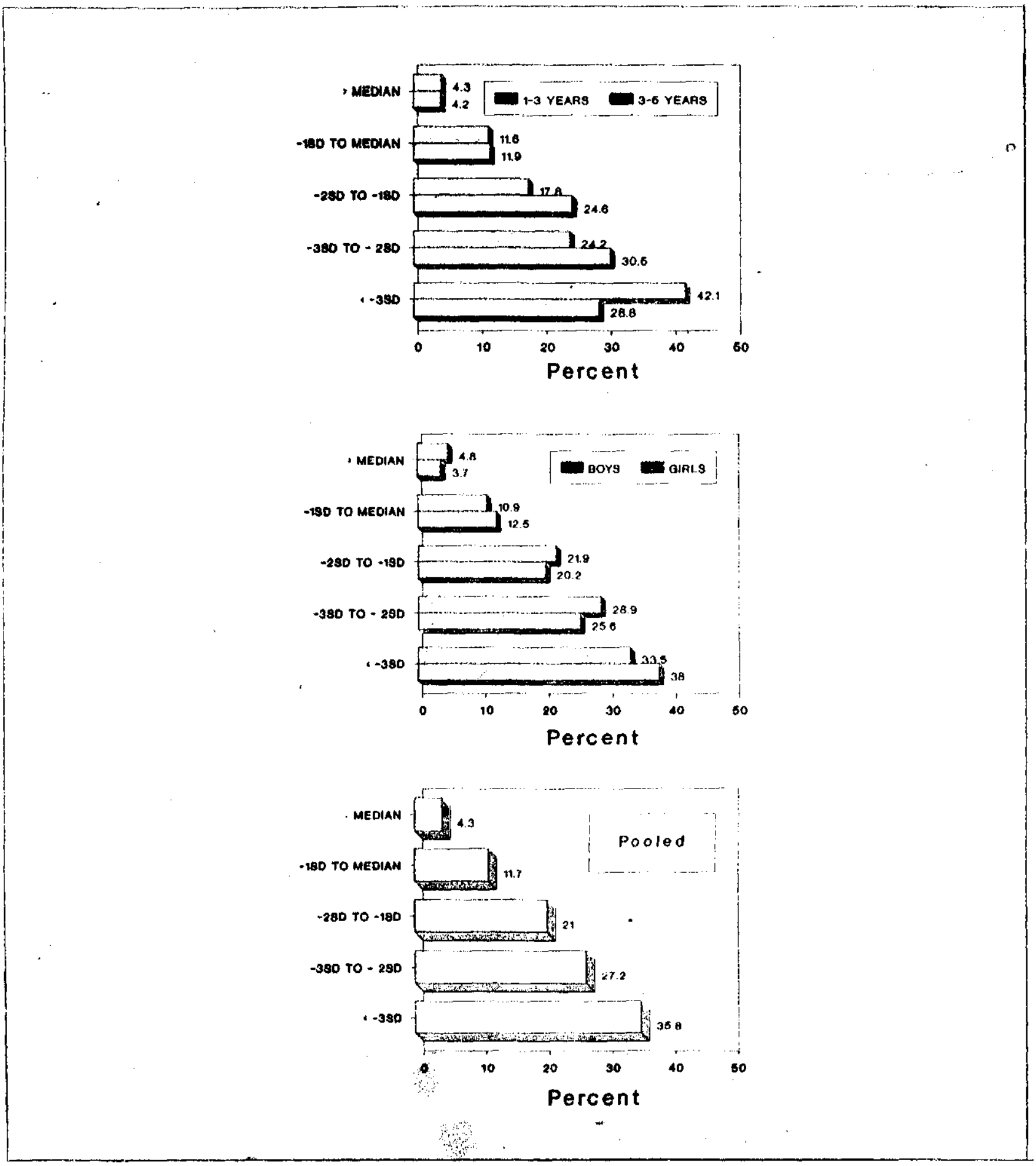
6.5.2 Weight for Age (SD Classification)

The prevalence of severe undernutrition was more in younger age group, but was comparable between the sexes. About a quarter of the children were severely undernourished.



6.5.3 Height for Age (SD Classification)

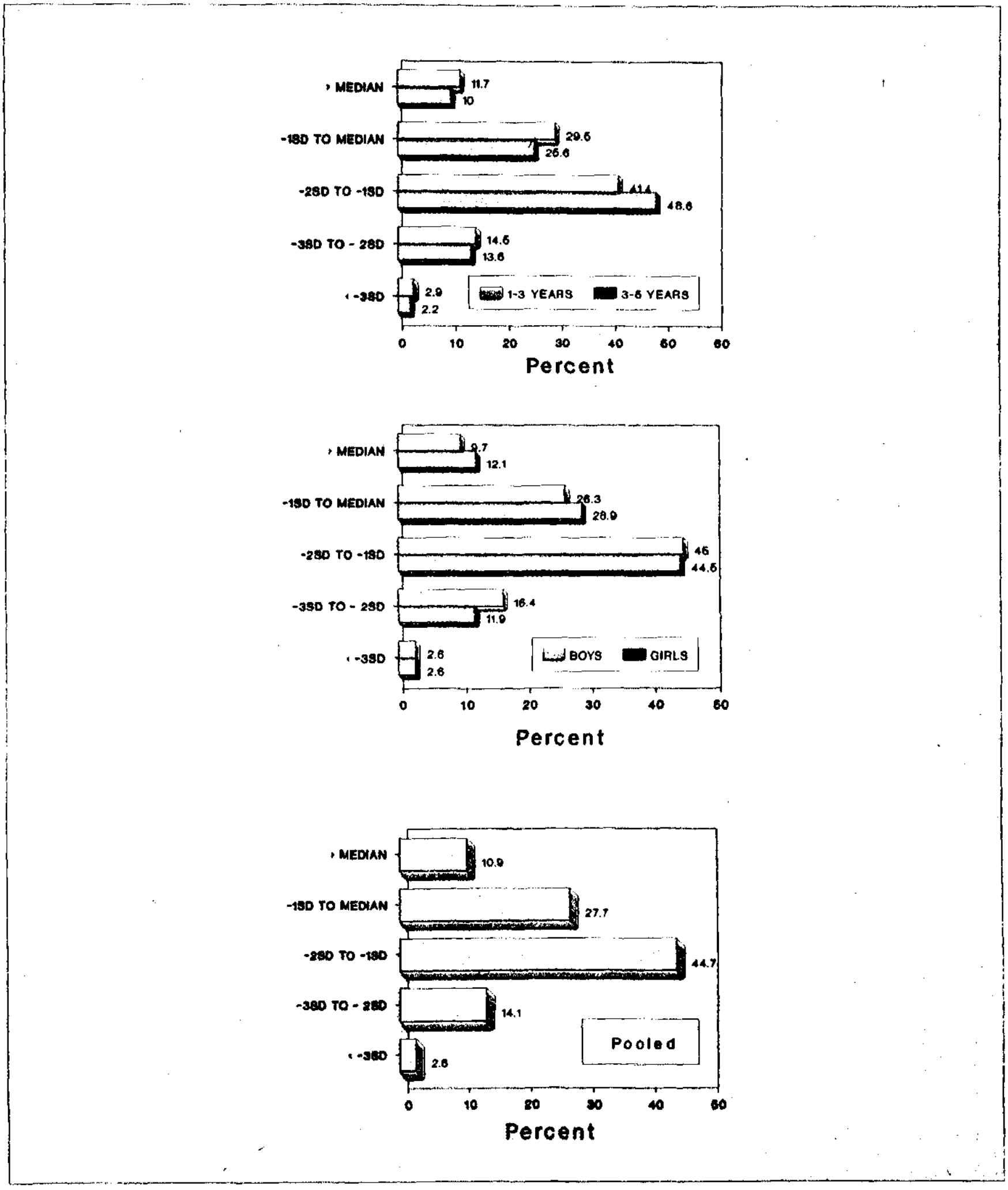
The prevalence of severe stunting was higher in younger age group. No sex differentials were observed. About 36% of the children were severely stunted, indicating chronic undernutrition.



6.5.4 Weight for Height (SD Classification)

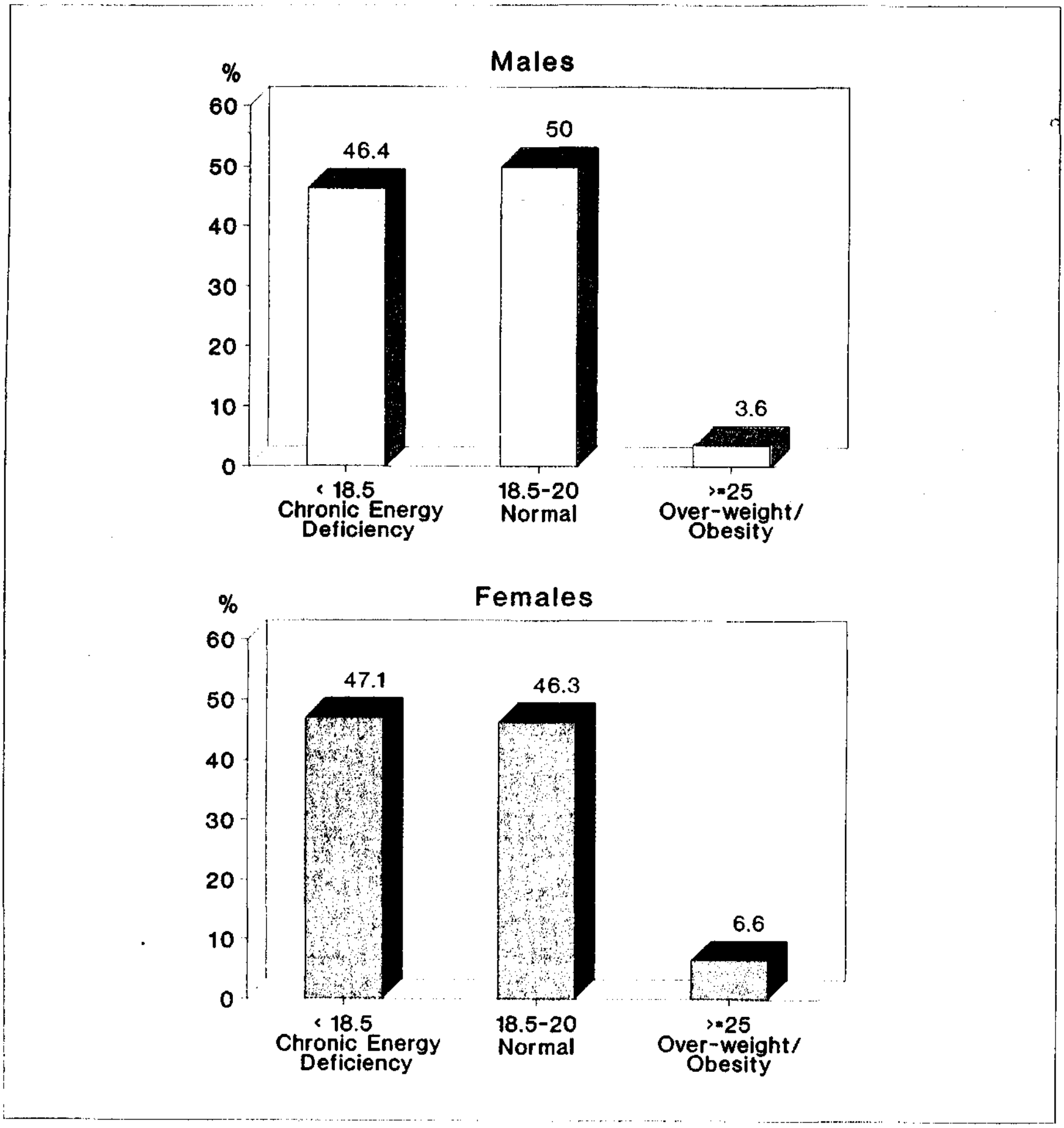
The extent of wasting was similar between the age groups. However, the proportion of wasting in girls was slightly lower than the boys.

About 17% of the children were wasted.



6.6 DISTRIBUTION OF ADULTS ACCORDING TO BODY MASS INDEX

The prevalence of overweight/obesity was higher among females. There were no differences in the extent of chronic energy deficiency between the sexes.



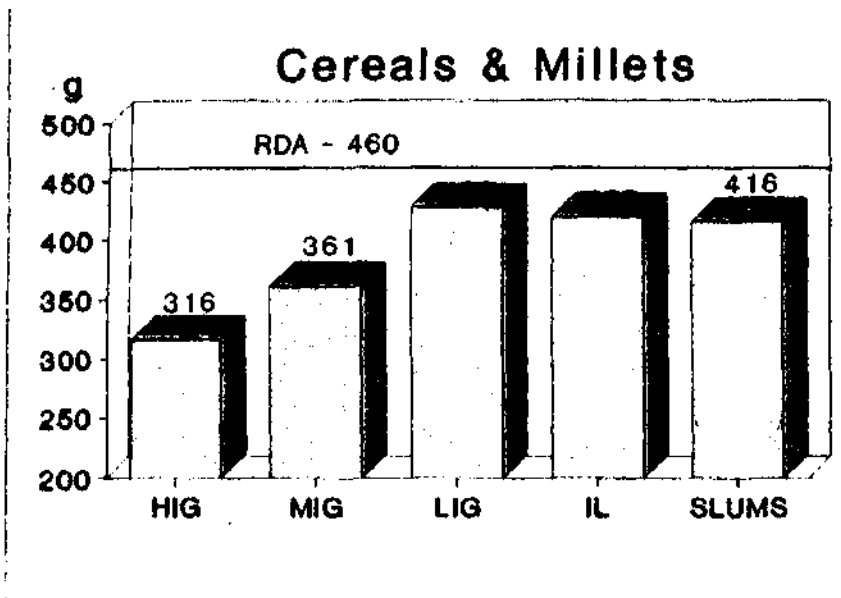
7. FOODS, NUTRIENTS AND NUTRITIONAL STATUS - URBAN

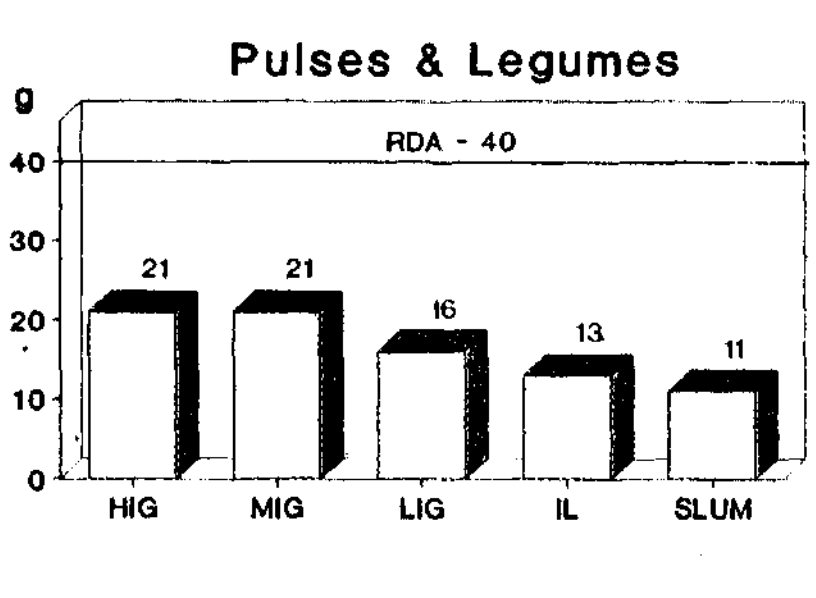
7.1 INTAKE OF FOODS (CU/Day)

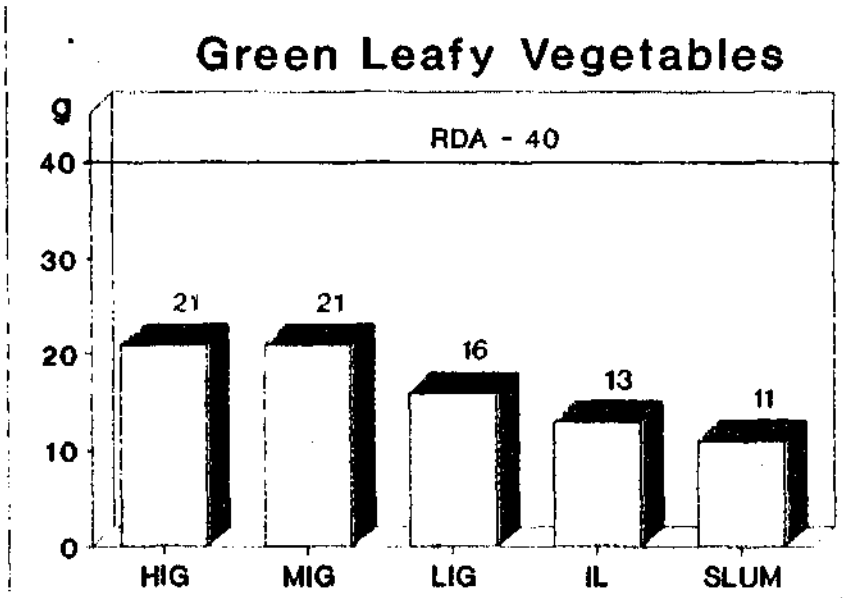
The average intake of cereals showed an increase with decrease in income levels.

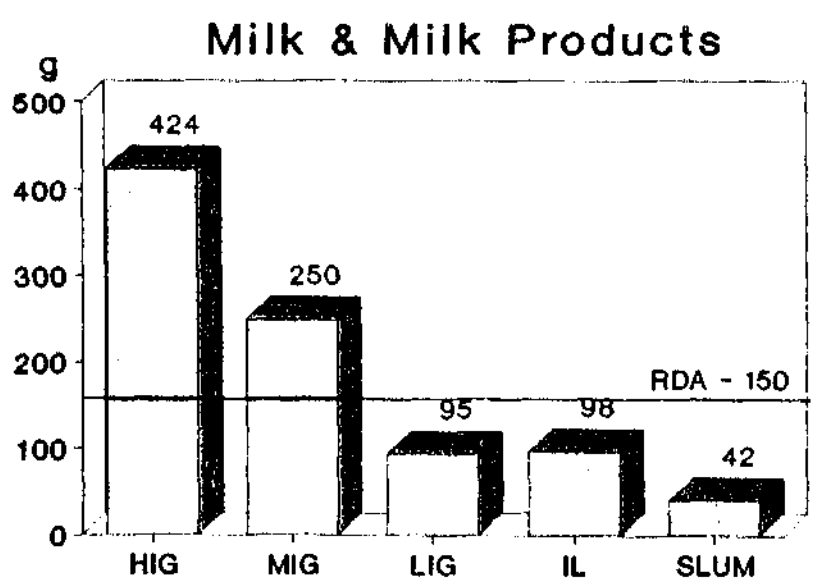
In the case of other foods, particularly milk & milk products, and fats & oils, the consumption improved with increasing income.

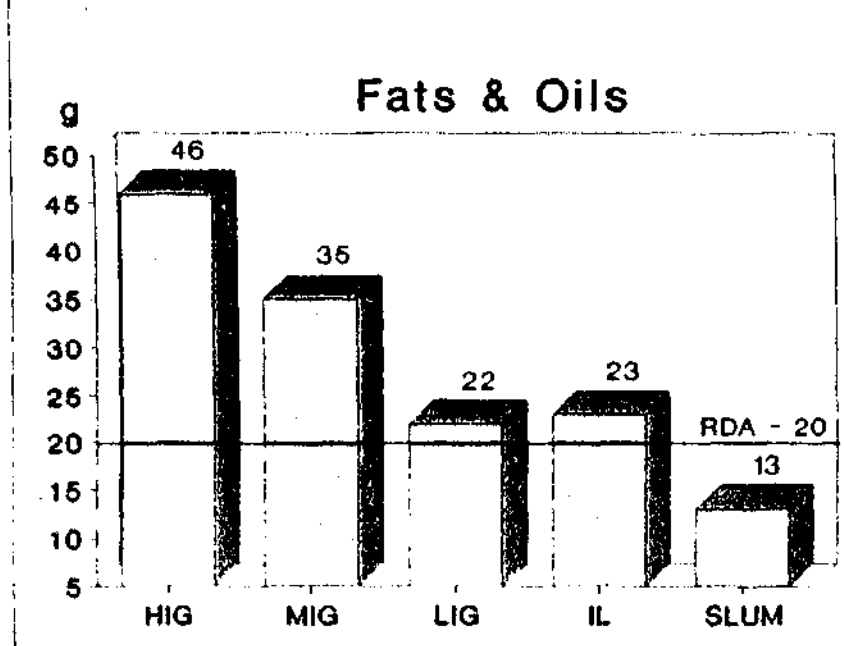
The intakes of cereals and millets, pulses and legumes, GLV were less than RDA in all the income groups, while that of fats & oils and sugar & jaggery was satisfactory in all the groups, except slum dwellers.

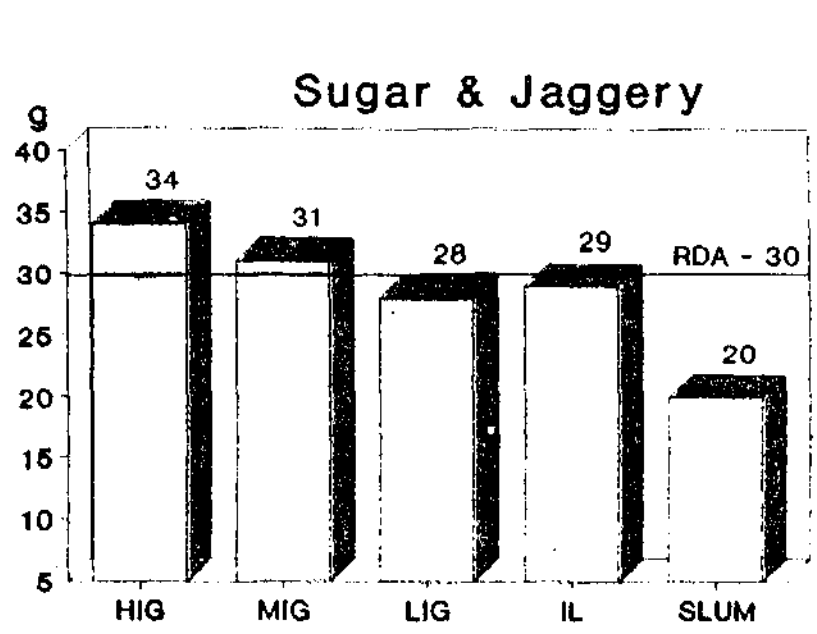








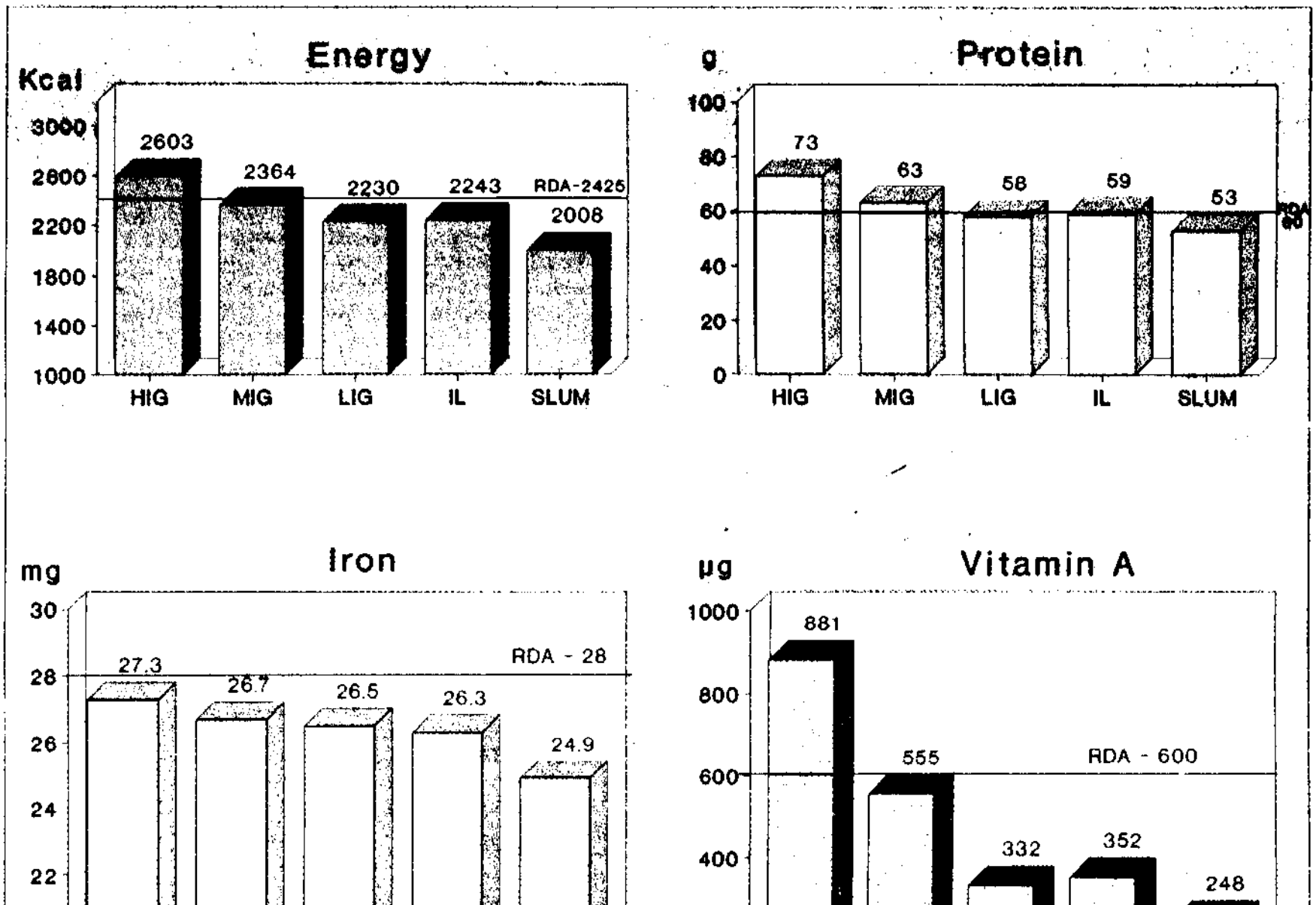




7.2. INTAKE OF NUTRIENTS (CU/Day)

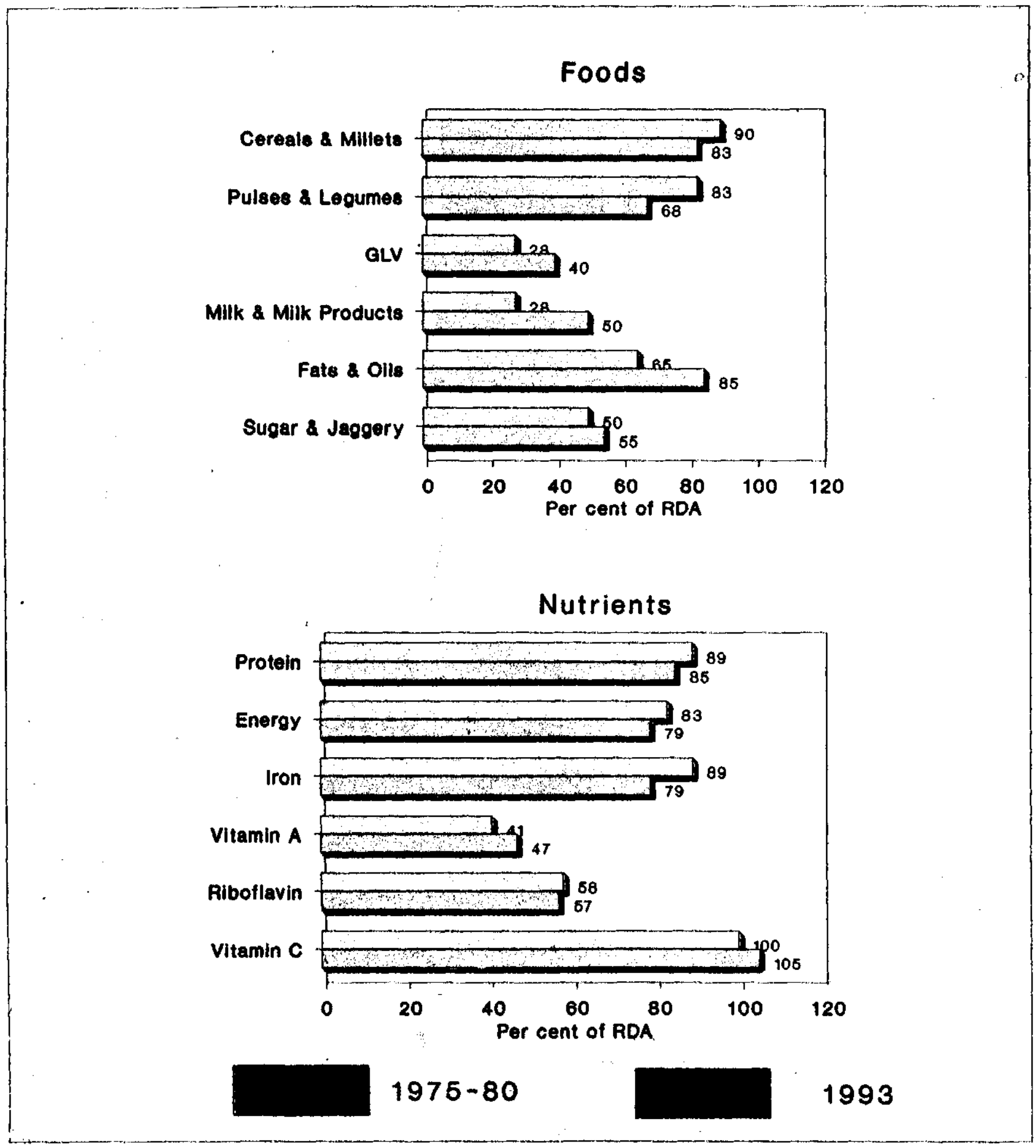
The average consumption of all the nutrients was satisfactory in the households of High Income Group.

The intake of protein and vitamin C was above the RDA in all the groups, while that of iron, riboflavin and vitamin A was less than RDA in lower income groups. The lowest intakes were observed in slum dwellers.



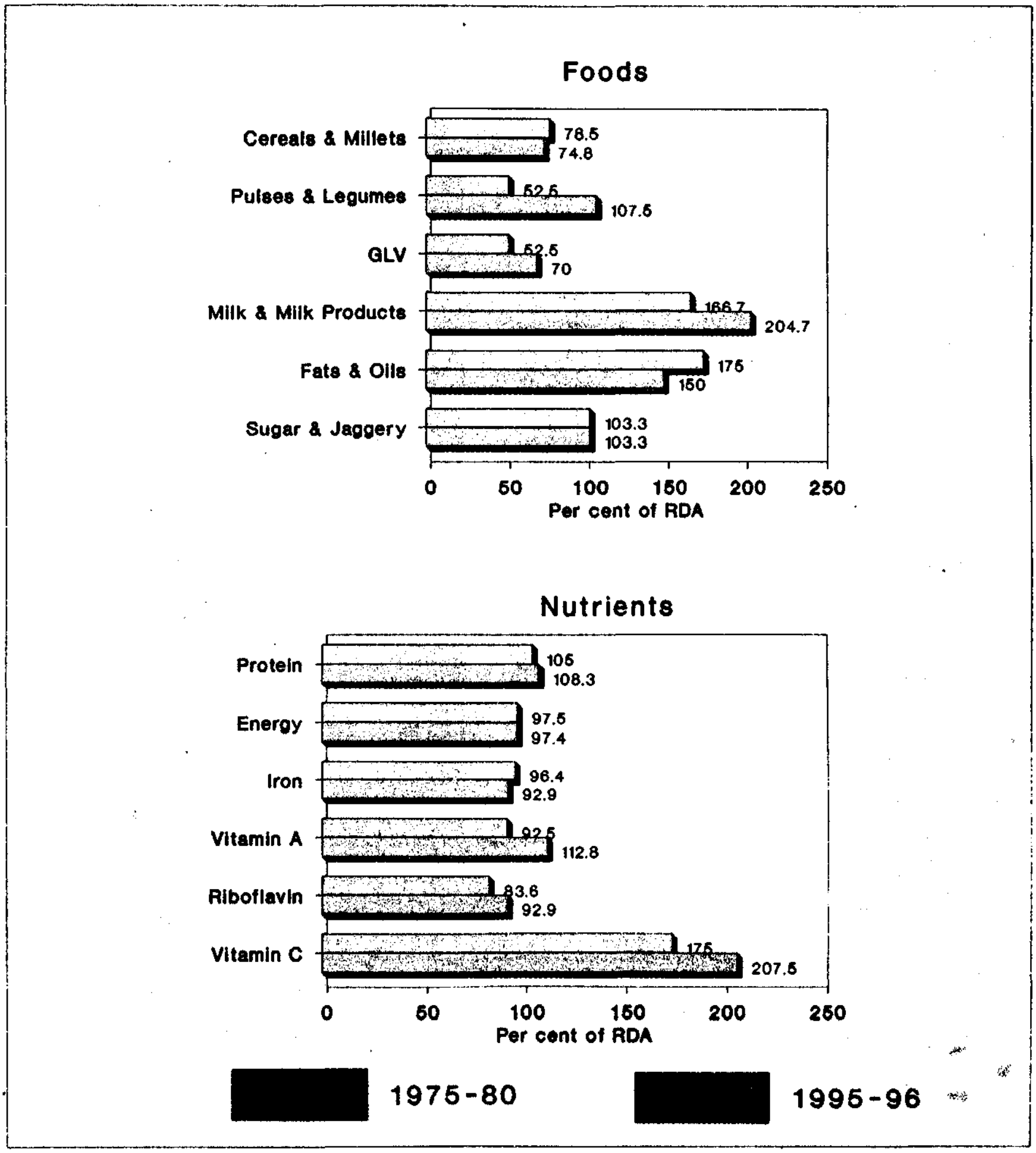
7.3 TRENDS IN THE INTAKE OF FOODS & NUTRIENTS (CU/Day) IN SLUMS - % RDA

The intake of cereals & millets and pulses & legumes, when expressed as % of RDA, showed slight decline, while that of other foods increased marginally during 1993 as compared to that observed in 1975-80. There were marginal changes in the intake of various nutrients.



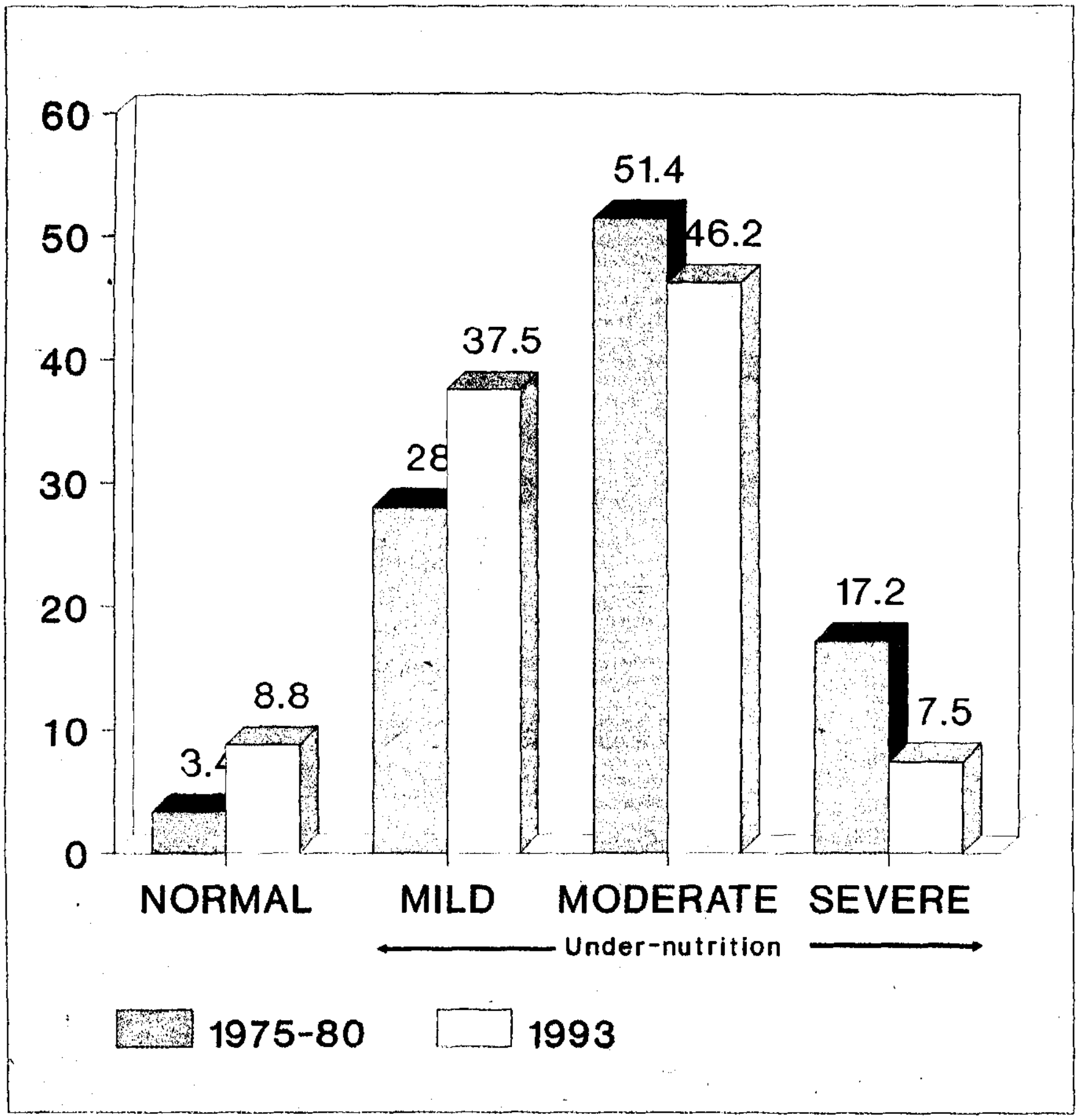
7.4 TRENDS IN THE INTAKE OF FOODS & NUTRITION (CU/Day) IN MIDDLE INCOME GROUP - % RDA

The intake of cereals & millets and fats & oils decreased marginally with time, while there was increase in the consumption of pulses & legumes, GLV and milk & milk products. Though the intake of vitamin A, riboflavin and vitamin C increased during 1995-96 as compared to that of 1975-80, the intake of other nutrients remained the same.



7.5 TRENDS IN WEIGHT FOR AGE OF PRESCHOOL CHILDREN

There was a considerable increase in the proportion of normal and mild undernutrition with a concomitant reduction in the prevalence of moderate and severe undernutrition.



8. FOODS, NUTRIENTS AND NUTRITIONAL STATUS - TRIBALS

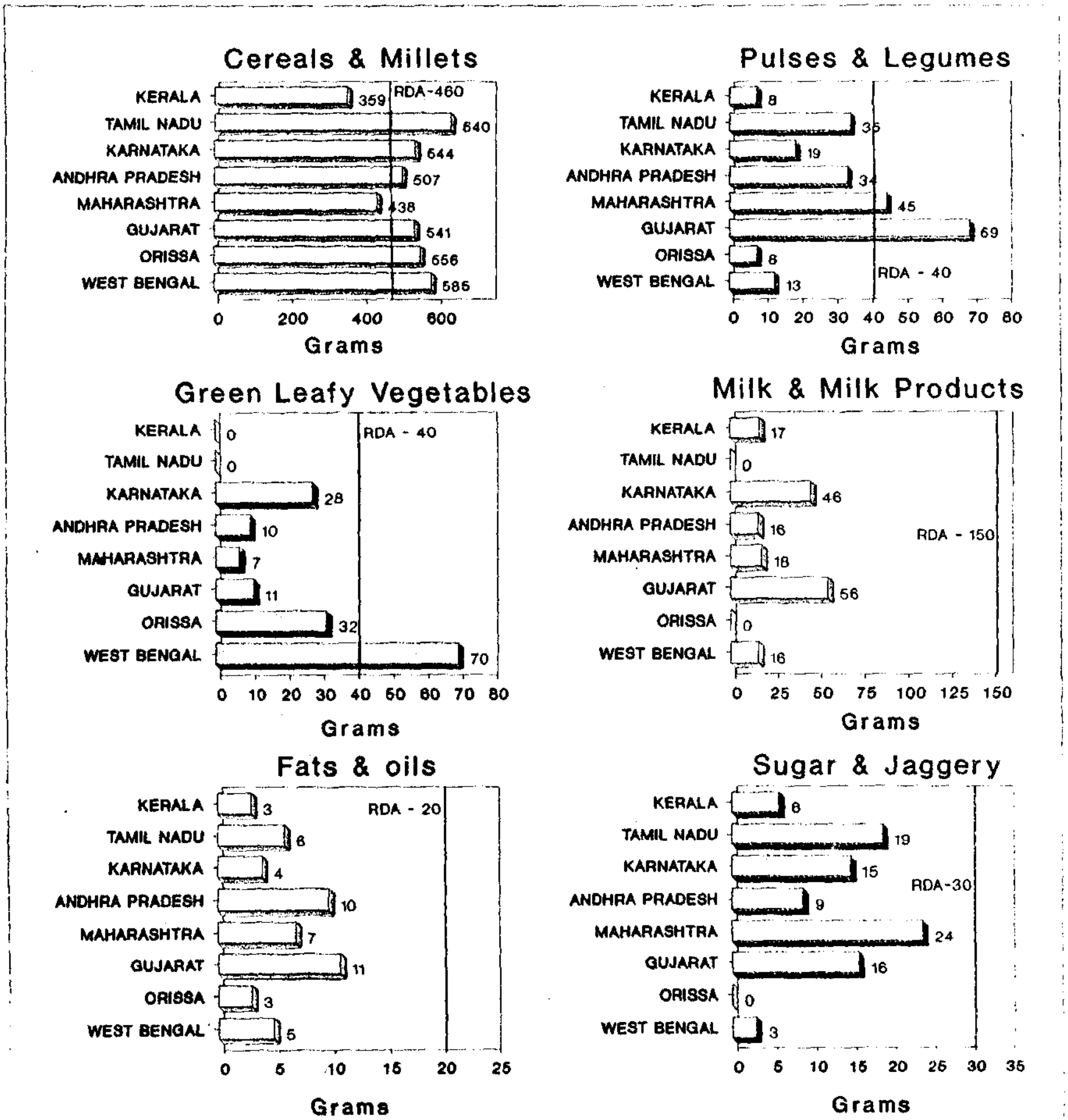
8.1 INTAKE OF FOODS LULLS (g/Day) - SEDENTARY ADULT MALES

The average consumption of cereals and millets was more than RDA in all the States except in Kerala and Maharashtra.

The consumption of pulses was satisfactory in Maharashtra and Gujarat, while it was marginally deficient in Andhra Pradesh and Tamil Nadu. In the rest of the States, this was much below the RDA.

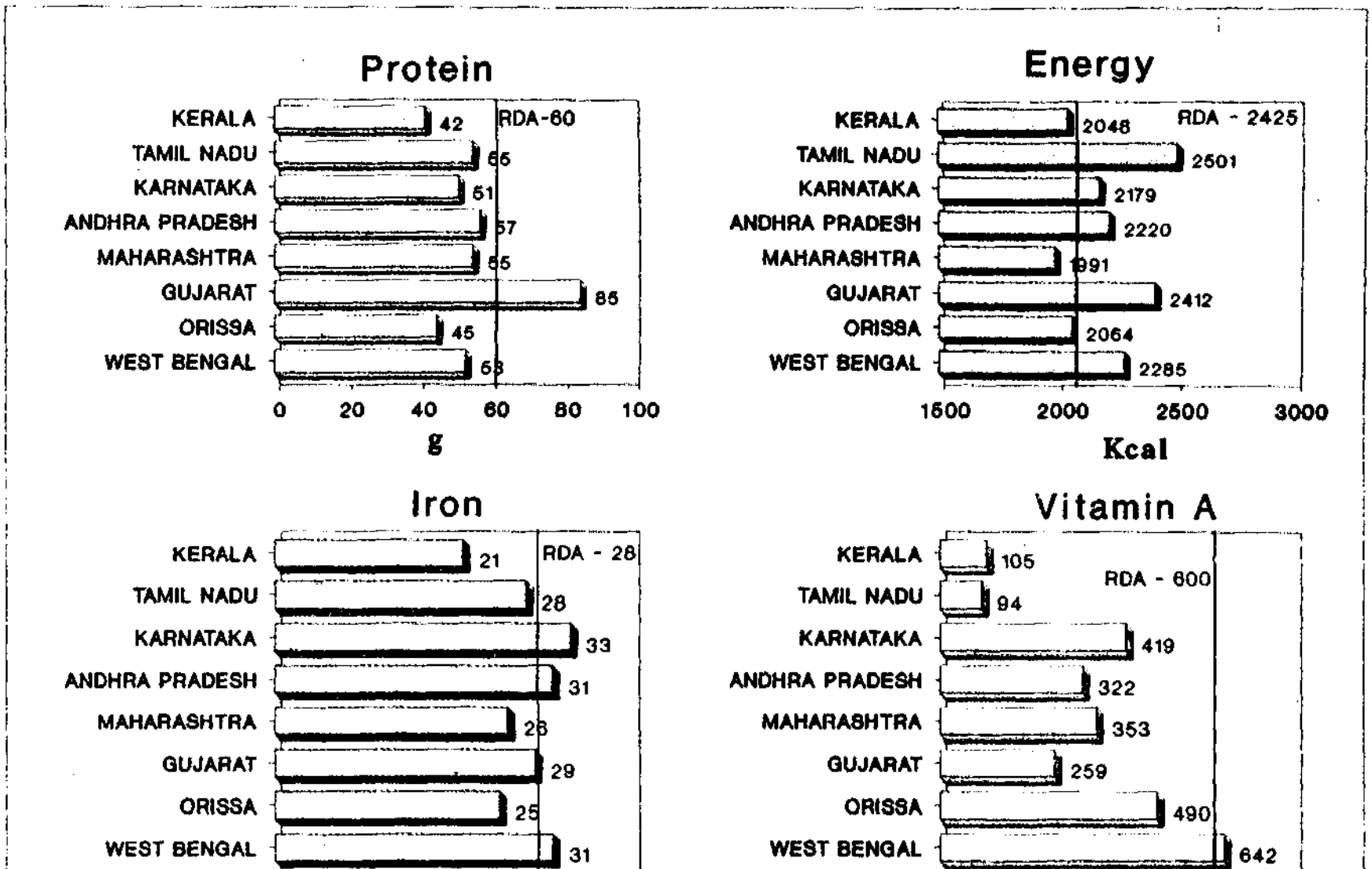
The intake of GLV was deficient in all the States, except in West Bengal and Orissa.

The consumption of milk and milk products, fats & oils and sugar & jaggery showed wide variations, and was less than 50% of RDA.



8.2 INTAKE OF NUTRIENTS (Per Day) - SEDENTARY ADULT MALES

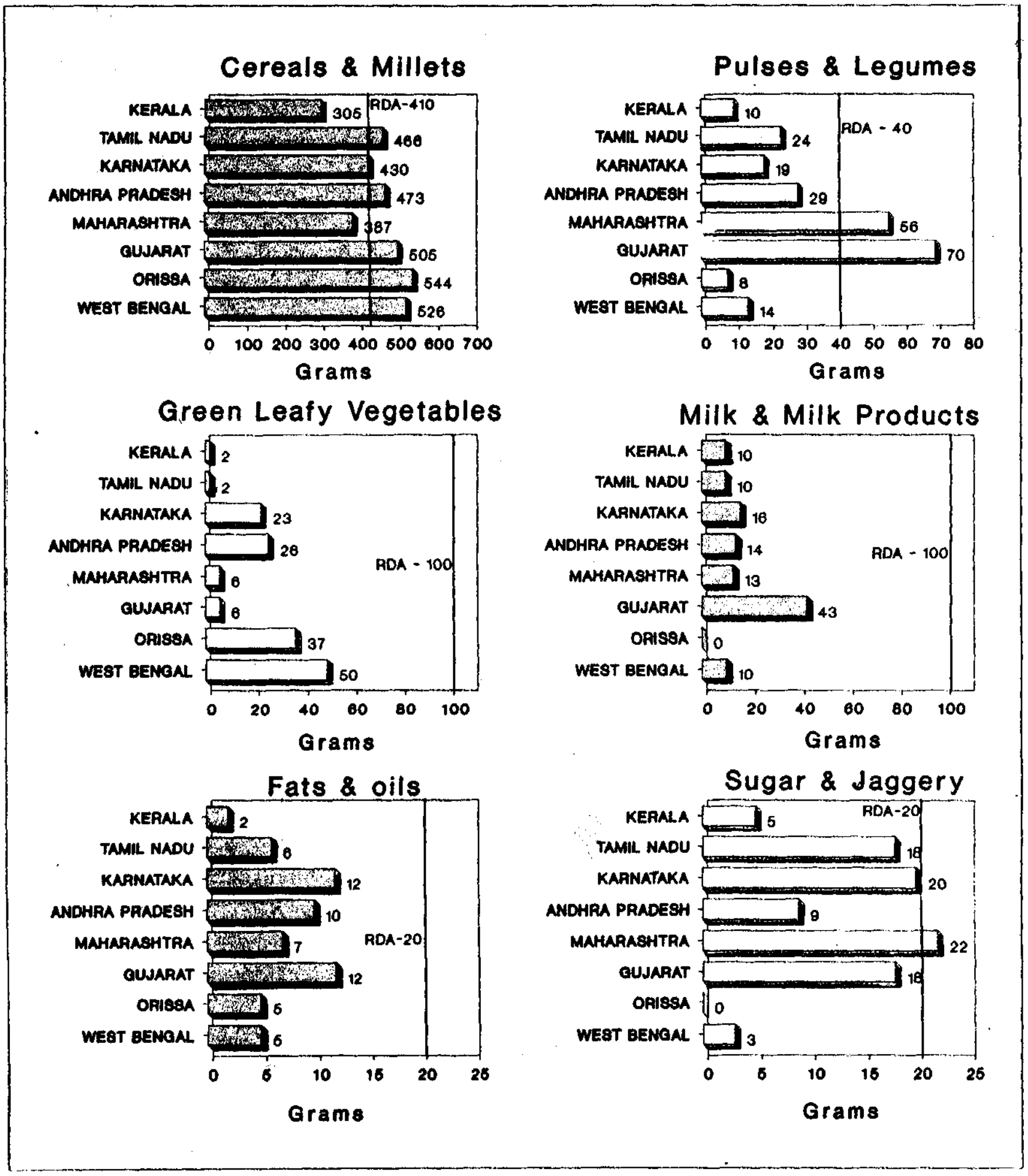
The intake of protein was less than RDA in all the States except Gujarat, whereas that of energy was comparable to RDA only in the States of Andhra Pradesh, Gujarat and Tamil Nadu. By and large, the intake of iron and vitamin C was satisfactory, while that of riboflavin and vitamin A was less than RDA.



8.3 INTAKE OF FOODS (g/Day) - SEDENTARY ADULT FEMALES

The intake of cereals and millets was satisfactory in all the States except in Kerala and Maharashtra.

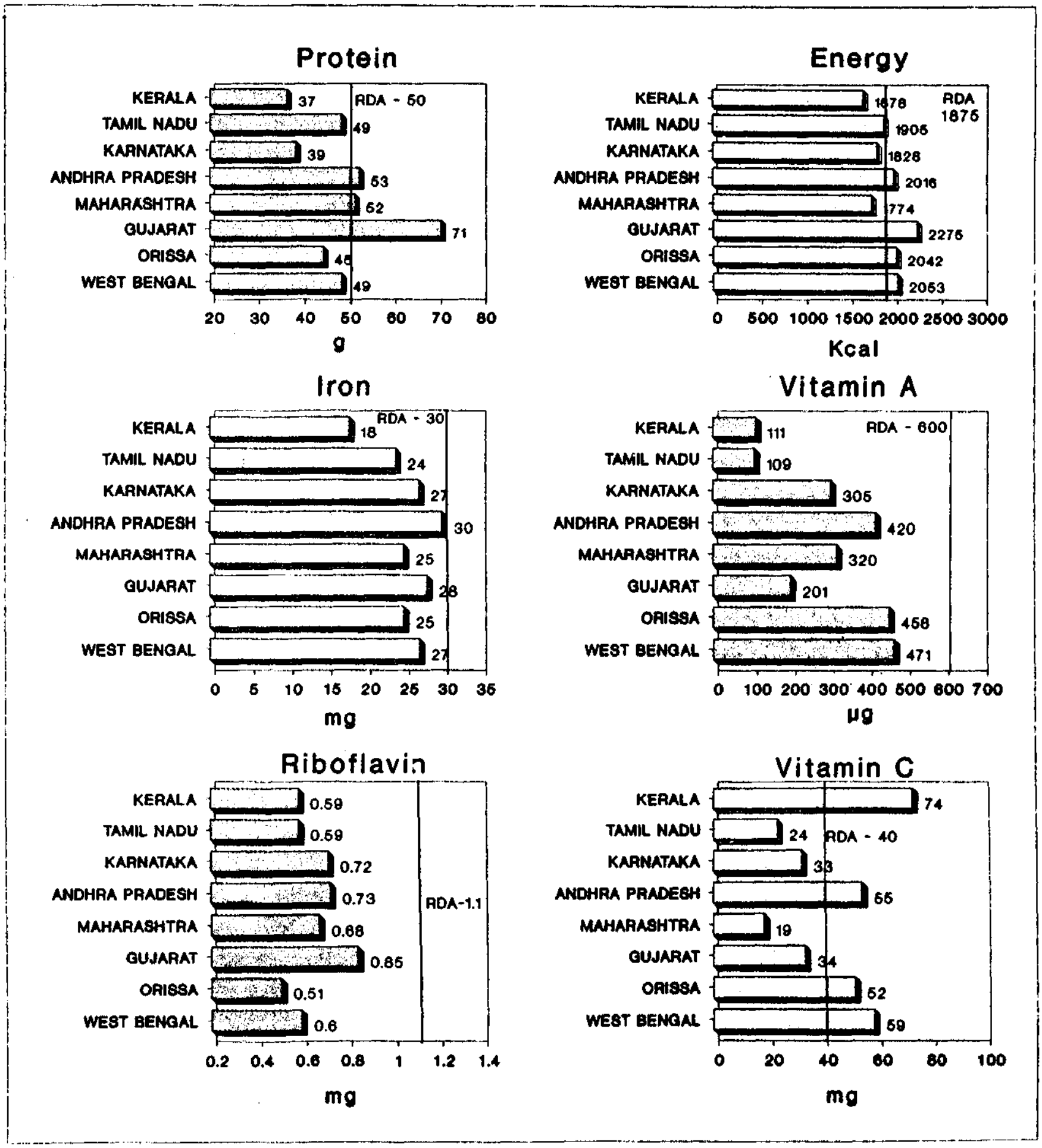
The consumption of pulses and legumes was less than RDA in all the States except in Gujarat and Maharashtra, while that of other foods showed wide variations and was below the RDA in all the States.



8.4 INTAKE OF NUTRIENTS (Per Day) - SEDENTARY ADULT FEMALES

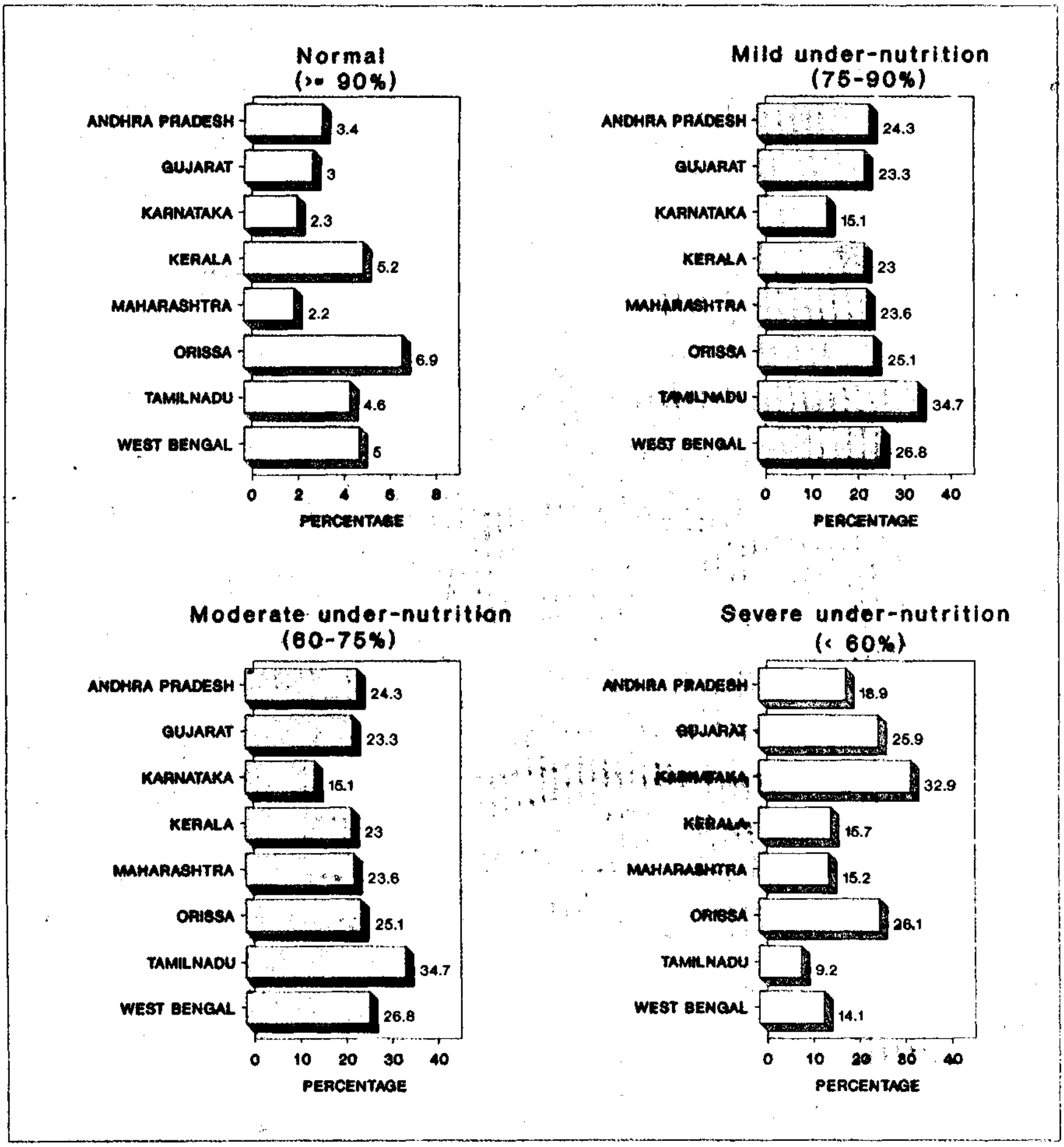
The intake of protein was deficient by 10-20% in the States of Kerala, Karnataka and Orissa, while that of energy was marginally less than RDA in the States of Kerala and Karnataka.

The consumption of iron was marginally inadequate, whereas the intake of vitamin A and riboflavin was 50% of RDA, showing wide variations between the States.



8.5 DISTRIBUTION OF PRESCHOOL CHILDREN ACCORDING TO WEIGHT FOR AGE

Distribution of 1-5 year old tribal children according to Gomez Classification indicated that the proportion of normals was less than 5% in all the States except Orissa. The prevalence of severe undernutrition ranged from 25 to 33% in the States of Gujarat, Karnataka and Orissa. The extent of severe undernutrition was the lowest in Tamil Nadu (9%).



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K. VIJAYARAGHAVAN	1995- 2003

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D. HANUMANTHA RAO	1989-	A. NADAMUNI NAIDU	1989-95
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A. LAXMAIAH	1993-	CH. GAL REDDY	1983-
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UTTAR PRADESH
DEOKI NANDAN
Avinash Kumar
Sanjeev Kumar Jain

WEST BENGAL
ROY CHOUDHURY

The post of Medical Officer is vacant

The posts of Medical Officer and Nutritionist are vacant.