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Volume One

# 90年代中国人群的 膳食与营养状况

(1992年全国营养调查)

THE DIETARY AND NUTRITIONAL STATUS  
OF CHINESE POPULATION

(1992 National Nutrition Survey)

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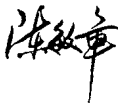
## 序

联合国国际营养会议通过的“关于营养问题的世界宣言和行动计划”指出：获得营养充分和安全的食物是每个人的一种权利。中国面临着人均耕地资源相对不足和食物需求不断增长的严重挑战。建国以来，政府针对我国国情制定和执行了促进食物生产，保证合理供给的多种政策和措施，成功地使用约占世界7%的耕地养活占世界五分之一以上的人口。近十几年来由于执行了改革开放政策，我国的食物生产得到了较快发展，居民的收入和消费水平有了明显的提高，膳食构成和营养状况有了可喜的改善，基本上解决了近12亿人口的温饱问题。

吃饱以后，人民自然要求吃得更好一些，营养更合理一些。但世界上不同类型国家的经验证明，在社会经济发展的不同阶段，会发生不同类型的营养问题。我国的实际情况表明，在一些较贫困地区，某些营养缺乏病还相当多见，同时在一些较富裕的地区和人群中，与营养过剩有关的一些慢性病正日趋发展。因而在我国人民由温饱向小康生活转变的阶段，是调整食物结构，指导食物消费和进行营养干预的关键时期。

为全面了解人群的膳食营养状况，预测未来的发展趋势，为政府提供决策的科学依据，从而制定符合我国国情的食物发展策略和营养政策，提高我国人民的健康状况和身体素质，于1992年进行了我国第三次全国营养调查。这次调查包括了全国各省、市、自治区各类人群的膳食营养状况，调查内容较广，技术要求较高，在卫生部、农业部、公安部及国家统计局共同领导下，发挥了中央和地方两个积极性，并得到了国际机构的有力支持，按计划完成了任务。调查资料由中国预防医学科学院营养与食品卫生研究所整理，汇编出版。它提供了全国不同地区，不同年龄及不同家庭经济状况人群的膳食与营养状况的详细数据，是一部很有价值的参考资料。

卫生部部长



## PREFACE

"The World Declaration and Plan of Action on Nutrition" passed by the International Nutrition Conference of the United Nations indicated that: "Acquiring adequate, nutritious, and safe food is the right of every person". China is facing the serious challenge of relatively insufficient arable land and increasing food demand. After the founding of the new China, the government formulated and implemented many policies and measures promoting food production and ensuring reasonable distribution, using only 7% of the world's arable land to feed more than one fifth of the world's population successfully. In recent decades, in virtue of implementing reform and open policies, the food production is rapidly developing in China. The household income and consumption level of Chinese is rising significantly. The improvement in diet and nutrition is evident. The problem of providing clothing and food has been basically solved for a population of 1.2 billion in China.

After the stomach is full, people ask for better, more nutritious and sound food. But the experiences of other countries demonstrate that during different stages of social economic development, a variety of nutrition problems will occur. The practical situation in China shows that in some poor areas, certain kinds of malnutrition are rather common, while in some affluent areas and populations, certain over-nutrition related chronic diseases are developing. The Chinese people's life is converting from simply providing clothing and food to pursuing greater well-being. This is a key time for adjusting food patterns, instructing food consumption and conducting nutritional intervention.

In order to approve the health status and well-being of people, we must formulate strategies and policies for improving food supply and nutrition in line with the national conditions. Nutrition survey data will allow us to understand the current status, to predict trends and to provide a scientific basis for making policies.

The Third Nationwide Nutrition Survey in China was carried out in 1992. It examined the dietary and nutritional status of various populations living in all provinces, autonomous regions and metropolises. The survey was carried out under the joint leadership of the Ministry of Health, the Ministry of Agriculture, the Ministry of Public Security and the National Statistics Bureau. By bringing the initiatives of all central and local professionals into full play, and getting strong support from international organizations, the task was completed on time. The survey data was sorted and analyzed by the Institute of Nutrition and Food Hygiene and compiled for publication. This book provides detailed data on the dietary status of the Chinese population with different ages and household economic conditions. It is a valuable reference work.

**Chen Minzhang**  
Minister of the Ministry of Health

# 前 言

人群的膳食营养状况在一定程度上可以反映一个国家的经济发展和文明程度。世界上大多数发达国家及若干发展中国家都在有计划地开展国民膳食或营养状况的调查工作。我国曾于1959年和1982年分别进行过两次全国性的营养调查工作。随着我国改革开放政策的不断深入和社会经济的发展,人民生活水平有了明显提高,膳食组成优化,营养状况得到改善。为及时了解十年来我国各类人群膳食营养状况发展趋势,研究当前存在的问题,对食物生产、加工进行政策干预和对群众进行消费引导提供依据,于1992年组织了我国第三次全国营养调查。

## 一、调查工作的组织与实施

第三次全国营养调查是卫生部下达的“八五”期间重点工作。为了开展此项调查,卫生部、农业部、公安部和国家统计局联合下发了“关于进行第三次全国营养调查的通知”(附件),并由上述四部、局成立了领导小组。日常工作由卫生部主持,技术指导工作由“第三次全国营养调查技术指导组”担任,办公地点设在中国预防医学科学院营养与食品卫生研究所(营卫所)。各地的调查工作由各省、自治区、直辖市卫生厅(局)组织实施。为了保证调查工作质量,设立了“专家咨询组”负责技术咨询和审核工作。

为了推动此项工作,卫生部于1992年向各省、自治区、直辖市卫生厅(局)下发了《1992年全国营养调查方案》(卫监发(92)第09号)。卫生监督司在哈尔滨召开了“全国营养工作研讨会暨第三次全国营养调查动员大会”,要求各省市按照统一计划要求认真完成此项重要工作。

中国预防医学科学院营卫所接到此项任务后,分别于1990年7月和1991年4月在北戴河和杭州组织两次全国范围的“营养调查方法讨论会”。初步确定了抽样方案,调查内容和有关技术、方法。会后又分别在北京和浙江两地进行了预调查,对设计、操作及调查表格进一步修正和完善。

1992年3月就初步调查方案召开了“全国营养调查专家论证会”。会议由卫生部卫生监督司主持,有卫生部、农业部、商业部、轻工部、国家民委、国家统计局、社会科学院等有关单位的领导和专家到会,对调查方案、抽样方法、预调查结果等进行了充分的讨论,提出了许多重要的修改意见。

为有效地实施调查方案,营卫所负责编写了“1992年营养调查工作手册”,对调查工作的技术细节作了明确规定。随后于1992年5-6月在成都、银川、庐山和北京分别组织了四个培训班,对全国30个省(区)市的调查骨干进行培训。

各省、自治区、直辖市一般由卫生厅(局)负责,农业、公安和统计厅(局)共同参与,按统一要求组织了领导机构,建立了专业调查队伍,组织制定了本地区的营养调查工作计划,于1992年秋冬季节完成了现场调查工作。

在现场调查期间, 营卫所派员参加了大部分省(区)市的工作, 共同发现和解决调查中遇到的实际问题, 保证了工作质量。各地的调查资料由各地分别进行分析总结。全国性的资料分析工作由营卫所负责进行。西藏自治区是首次参加全国营养调查工作, 填补了这方面的空白。辽宁省因故没有进行调查。

为了保证此项工作的进展, 卫生部拨出了专项经费, 各省、市、自治区政府也相应地提供了专项补助经费支持此项工作。此次调查还得到了国际机构的重视和支持, 联合国粮农组织、加拿大国际开发研究中心及世界卫生组织都提供了一定的技术或经费援助。

## 二、调查方法概要

本次调查是全国性家庭抽样调查, 调查内容包括住户状况调查、膳食调查、体格测量、血红蛋白测定及社区情况调查等。

(一)方法与样本 本调查采用分层多级整群随机抽样。各省(区)市分别为一总体, 参照国家统计局城、乡调查队抽样系统按城、乡分层。城市分大、中、小和镇四个子层, 农村按经济情况分成若干子层, 选用四级抽样方案。原则上每一总体抽8个一级单位, 16个二级单位, 32个三级单位, 每个三级单位抽30户作为调查对象。在实际抽样过程中, 个别省根据实际情况有所增减。最终全国30个省(区)市(不含台湾省)共抽取一级单位225个, 共约27 000户。城市住户约占1/3, 农村住户约占2/3。

(二)膳食调查 膳食调查采用称重记账法调查住户三天的食物消耗量, 并记录家庭成员的用餐情况, 算出家庭平均每人日摄入各类食物的量。同时对家庭每一成员进行24小时回顾调查, 连续进行三天, 取得每个体的进食量。

(三)体格测量和生化检验 体格测量使用统一校正过的测量器具, 由经过专门培训的测量人员进行, 并按照标准化的要求由省调查队对测量结果的精密度及准确度进行抽检, 以控制质量。

血红蛋白测定是用氰化高铁法。现场专人取样后送至各省(区)市特定的实验室进行。测定质量由营养与食品卫生研究所提供的质控标准样品进行控制。

## 三、调查资料的处理

膳食调查资料按住户食物消费及个体食物摄入两个方面资料分别进行计算。食物的营养素含量按中国预防医学科学院营卫所编著的食物成分表计算。热能及各种营养素的供给量标准采用中国营养学会1989年的推荐值。

(一)膳食调查资料 住户食物消费调查的结果是以平均每标准人日为单位表示。

食物的消费量及营养素的摄入量以平均每标准人日表示, 即被调查户的所有家庭成员均按其性别、年龄、生理状况和劳动强度等因素及进餐次数记录, 根据热能供给量标准的折合系数折合标准人日数, 计算出每标准人日的平均食物及营养素摄入量。鉴于各种营养素的供给量标准并不均与热能的供给量标准相平行, 故在计算各种营养素的平均供给量标准时均按调查人群的实际组成分别进行计算, 因而除热能外, 各种营养素的结果往往不等于每标准人日的供给量标准。

膳食调查资料以每一省、自治区或直辖市为独立单位进行整理。每一独立单位的被调查户分成城市户和农村户两个层, 每一层再按家庭收入分成三个组, 即把层内所有被调查户按家庭收入水平自高至低排列, 进行三等分, 收入最高的1/3构成高收入组, 中间的1/3和收入低的1/3分别构成中及低收入组。每一独立单位按收入分组时, 则将该单位的城



市层和农村层的被调查户混在一起，按收入重新进行排队并三等分。全国平均值则由各省、自治区及直辖市的资料用加权平均法求得。

个体食物摄入资料的处理原则上与住户食物消费资料相同，但不折合成标准人日计算，而是分成年龄段，以每一个体为单位进行摄入量及达到供给量标准百分数计算，然后进行平均。

(二)体格测量资料与生化测定 学龄前儿童(0~5岁)的身高、体重结果全国分城市和农村进行计算。以世界卫生组织建议的标准(NCHS参考值)，计算出各年龄组儿童营养不良及肥胖的发生率。6岁以上各年龄组，则计算其均值及百分位分布。20岁以上的成年人，除全国平均外还分省、区、市进行了计算。

血红蛋白测定结果按世界卫生组织建议的标准进行判断，即0~5岁 $<110\text{g/L}$ ，6~14岁 $<120\text{g/L}$ ，15岁以上男性 $<130\text{g/L}$ ，女性 $<120\text{g/L}$ 诊断为贫血。同样20岁以上分年龄进行全国性统计，成年人又分省、区、市进行统计。

#### 四、结果编排

本次调查的结果分编为三卷。第一卷包括总体情况，调查方法，全国及各省、自治区、直辖市住户食物消费调查及体格测量和生化测定的结果。第二卷和第三卷是个体调查的结果，按年龄组处理，第二卷包括全国城乡及各地区儿童及青少年的膳食营养状况，第三卷则是成年人，分青壮年及老年人的膳食营养状况。

本出版物旨在向政府部门，食物生产、加工部门，学术界及国际社会提供我国人群膳食营养状况的详细资料，供各界为改善我国居民的膳食营养状况进行研究和参考。由于水平有限，错误在所难免，望读者不吝赐教。

在编辑出版过程中得到卫生部、农业部领导的关怀，卫生部卫生监督司给予了具体的指导和帮助，联合国粮农组织给予了经费资助，这些对本书的问世都有不可缺少的作用。

# INTRODUCTION

The dietary and nutritional status of a population, to a certain extent, reflects the degree of economic development and the social civilization of a country. Most developed and several developing countries are regularly carrying out dietary or nutrition surveys. Two nationwide nutrition surveys were conducted in 1959 and 1982 respectively in China. Along with the deepening on reform and open policy and the social economic development, the living standard has increased significantly in China. Accordingly, the quality of dietary pattern and the nutritional status of Chinese Population have greatly improved. In order to understand developing trends of the dietary and nutritional status of different populations in the last 10 years, to investigate current problems and to provide a basis for future intervention, it is necessary to conduct this survey.

## 1. Organization and implementation of the survey

The Third Nationwide Nutrition survey is the key project during the Eighth Five-Year Plan assigned by the Ministry of Health. In order to carry out this survey, an "Announcement on Conducting the Third Nationwide Nutrition Survey" was jointly issued by the Ministry of Health, the Ministry of Agriculture, the Ministry of Public Security and the National Statistics Bureau. A leader group was organized by the above four ministries and bureau. The routine work was charged to the Ministry of Health. The technical work was guided by a "Technical Instruction Group of the Third Nationwide Nutrition Survey". The office of the group is located in the Institute of Nutrition and Food Hygiene (INFH). The surveys in different regions were organized and implemented by respective public health department of provinces, autonomous regions or metropolises. In order to guarantee the quality of the survey, an "Advisory Expert Group" was set up for technical advice and evaluation.

In order to promote the work, the Ministry of Health has issued "the Plan of the 1992 Nationwide Nutrition Survey" to the Department of Public Health of all provinces, autonomous regions and metropolises (Wei-jian-fa(92)No. 9). The Department of Health Supervision of the Ministry of Health conducted a "Symposium on Nutrition in China and the Mobilization Meeting for the Third Nationwide Nutrition Survey". They asked each province, autonomous region and metropolis to take this important task seriously based on the unified planning and requirements.

After the Institute of Nutrition and Food Hygiene accepted the assigned task, two nationwide symposia on "Nutrition Survey Methods" were carried out in July 1990 in Beidaihe and April 1991 in Hangzhou respectively. The sampling plan, contents of the investigation.

and related skills and methods were the main foci. After the symposia, pilot studies were carried out in Beijing and Zhejiang respectively, which demonstrated the design and operation of the survey and revised the investigation forms.

In March 1992, an "Expert Discussion and Verification Meeting" evaluating the preliminary survey plan of the nationwide nutrition survey was held. The meeting was chaired by the Department of Public Health Supervision of the Ministry of Health. The leaders and experts from the Ministry of Health, the Ministry of Agriculture, the Ministry of Commerce, the Ministry of Light Industry, the National Civil Administration Commission, National Statistics Bureau and the Academy of Social Sciences participated in the meeting. The investigation plan, sampling methods and the results of pilot surveys were discussed thoroughly, and many important suggestions and revisions were proposed in the meeting.

In order to make the survey plan more effective during implementation, the Institute of Nutrition and Food Hygiene compiled a "Manual for the 1992 Nationwide Nutrition Survey", which made clear the stipulations for skills and technical details. Four training courses were carried out in Cheng-du, Yinchuan, Lu-shan and Beijing in May and June 1992 for training key professional investigators of the 30 provinces (regions).

The leader organs of each province (region) were organized based on the unified requirements of the survey. The local public health department was responsible, and the local agriculture, public security and statistics department participated to set up professional teams. Formulating the work plan and the field work of the survey was completed in the Autumn of 1992.

During the survey, in the investigation field, the INFH sent professionals to work in most of the provinces (regions), to discover and solve practical problems encountered. This was done in order to ensure the quality of survey in the surveyed regions. All data were analyzed and summed up by individual organs of the survey. The analysis of the nationwide survey data was carried out by the INFH. Tibet Autonomous Region participated in the nationwide nutrition survey for the first time. Liaoning Province has not carried out this survey for some reason.

In order to ensure the progress of this work, the Ministry of Health allocated special funds. Various local governments provided special subsidies to support the survey. Much attention and support was also obtained from international organizations. The Food and Agricultural Organization of the United Nations, The Canadian International Development Research Center and the World Health Organization provided certain technical and/or financial support.

## **II. The scheme of survey methods**

The survey is a nationwide household sampling survey. The contents of the survey include household condition, dietary survey, physical measurement, hemoglobin assay and a community condition survey.

1. Sampling methods and samples A stratified multi-stage cluster random sampling

method was used. People in each province, metropolis or autonomous region were grouped as a population to be analyzed. The stratified sampling system is similar to that adopted by the Organization of Urban and Rural Social-economic surveys of the State Statistics Bureau. There were four sub-strata for cities based on their size of the population (big, medium and small city and town) and several sub-strata for rural areas based on their social and economic situation. A four-strata sampling plan was selected. Principally, 8 first stratum units, 16 second stratum units, and 32 third stratum units were randomly sampled from each population, Thirty households of each third stratum unit were sampled as subjects of the survey. In the sampling process, the number of subjects was increased or reduced by individual provinces based on their practical situations. Finally the total number of 27000 households from 225 first stratum units, in 30 provinces (regions) and metropolises (not including Taiwan Province) was surveyed. City residents and rural residents accounted for 1/3 and 2/3 respectively.

2. Dietary Survey The dietary survey was done by combining weighing and recording methods to collect household food consumption data for three days. At the same time, food intake data of individual members of the household was collected using the "24 hour recall" method for 3 consecutive days.

3. Anthropometric Assessment and Biochemical Test All measurements were taken by well-trained special personnel with standardized equipment. The results were selectively examined by the provincial examining group for accuracy and precision, this was done in order to control quality based on standard requirement of the investigation.

Hemoglobin levels were determined by the cyanoferrihemoglobin method. The samples collected in the survey field were sent to and determined in standardized laboratories in each province. The quality was controlled by the Institute of Nutrition and Food Hygiene by standardized control samples.

### III. Data processing

The surveyed data were analyzed separately by food consumption of households and individual household members. The calculation of nutrient components of food were based on the Food Composition Table compiled and published by the Institute of Nutrition and Food Hygiene. The Recommend Dietary Allowance (RDA) for energy and various nutrients were adopted from the values suggested by the Chinese Nutrition Society in 1989.

1. Dietary survey data The results of household food consumption and nutrient intake are expressed by the average amount per reference man per day. Therefore, the sex, age, physiological status and labour intensity and the number of meals taken at home etc. of all household members were all recorded. According to the above factors, a specific conversion coefficient can be calculated for each household member based on one's energy requirement to standardize the household members as reference man. The food and nutrient intake of the household was converted into the amount per reference man per day. To estimate the "sufficient rate", the amount of energy intake per reference man is divided by the RDA per refer-

ence man, and expressed as percentage of RDA. Since the conversion coefficient for other nutrients is not all parallel to that for energy, therefore, for each nutrient a specific population RDA is calculated and used for estimating its "sufficiency rate".

The dietary survey data were sorted and analyzed by individual province, region or metropolis as an independent unit. The surveyed households were divided into two strata by city households and rural households. The households in each stratum were ranked and divided into three groups based on their income from high to low. The top 1/3 was the high income group, the medial and the lower 1/3 were median and low income groups respectively. In the calculation of the unit average based on income, all surveyed households including city and rural residents in each unit were mixed up and ranked by income, and then divided into three groups with equal numbers. The average value of the whole nation is calculated by the weighed average method from the data of individual province, region and metropolis.

The process for analyzing the food intake of individuals is similar to that for households but the data was not converted into reference man per day. The data were divided according to age. The nutrients intake and the proportion of RDA of individuals was calculated and averaged.

2. Anthropometric measurement and Biochemical Test The data on body height and body weight of preschool children were calculated separately in urban and rural areas. Based on the reference suggested by the World Health Organization (NCHS Reference), the incidence of malnutrition and obesity among children of different ages was calculated. The mean value and the distribution in children and adolescents were calculated. Adults over 20 years of age were calculated both on means of the whole nation and of individual province (region) or metropolis.

The results of the hemoglobin measurements were judged on the standard suggested by the World Health Organization. Anemia is diagnosed if the hemoglobin is <110 g/L for 0-5 years of age, <120 g/L for 6-14 years of age, <130 g/L for male, <120 g/L for female over 15 years of age. The hemoglobin of adults over 20 years of age was calculated both as means of the whole nation and of the individual province, region or metropolis.

#### IV. The compilation of results

The results of this survey were compiled into three volumes. Vol. I includes the comprehensive situation, investigative methods, average data of household food consumption, anthropometric measurements and biochemical tests of the whole nation and the individual province, region or metropolis. Vol. II and Vol. III include the results of individuals by age groups. Vol. I includes the dietary and nutritional status of children and adolescents of the whole nation and individual areas. Vol. II contains the dietary and nutritional status of adults divided into young and elder population.

The aim of this publication is to provide the government, academic, industrial and commercial circles, and international societies with detailed data on the dietary and nutritional status of various Chinese populations. The data provide materials and references for studying

the measures for improving the dietary and nutritional status of people. Because of our limited understanding, mistakes may be present. We hope to have comments and suggestions from readers.

In the process of compilation and publication, counsel and leadership have been given by the Ministry of Health and the Ministry of Agriculture. The Department of Public Health Supervision of the Ministry of Health gave us particular advice and help. The Food and Agricultural Organization of the United Nations gave the survey financial assistance. The publication of this book would be impossible without these contributions.

发展营养  
科学提高  
人民健康  
水平

何界生  
一九五五年四月



卫生部副部长何界生题词

发展食品生产，  
改善膳食营养，  
为增强我国人民的体质  
而奋斗。

张延喜

一九八〇年十二月

农业部副部长张延喜题词



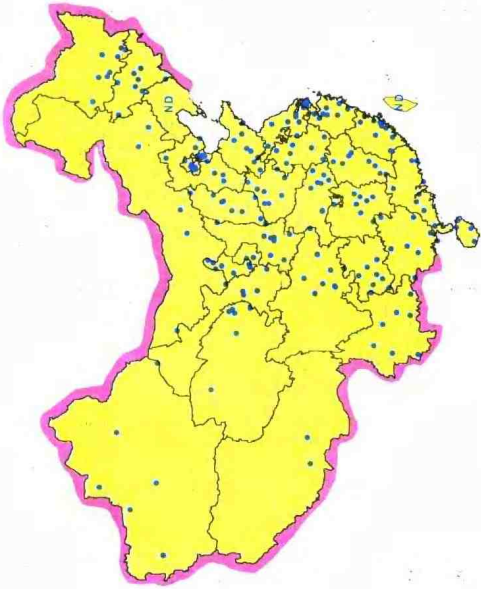


图1 1992年全国营养调查样本点分布  
 Fig1 The Distribution of Sampling Sites in 1992 National Nutrition Survey  
 ● 调查点 Sampling Site ND, 未调查 No Data