

A Brief Reminiscence

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SUMMARY

Estimation of hunger and malnutrition was Sukhatme's one of the major studies. Intraindividual variation was considered as important as between individuals. Sukhatme was the first to demonstrate that most of the households which have inadequate protein intake are also calorie deficient. He concluded that when the food intake is sufficient to meet the energy (calorie) needs, the protein needs are usually met. Protein malnutrition is the fundamental aspect of poverty.

Key words: Bivariate frequency distribution, Hunger and malnutrition, Intraindividual variation, Protein deficiency, Calorie deficiency, Poverty.

1. Introduction

When Sukhatme took over the direction of the Statistics Division of the FAO the organization had already published two World Food Surveys, one in 1946 and the other in 1952. In both these surveys, for indicating the extent of undernutrition, little more was done than comparing countrywise for caput average food supply against the per caput calorie intake considered adequate in those days. While the first survey used a flat rate of 2600 calories per day, the second survey incorporated estimates of national calorie requirement taking into account age, sex, body weight and environmental temperature. It was tempting for the common reader to assume that the entire or majority of the population of a country having less than the prescribed average calorie intake, was under nourished. This led to many controversial statements about the extent of hunger in the World. Opinions were expressed even at very high levels that more than 50 percent of the world population could be under nourished.

It is not surprizing that Sukhatme felt quite embarassed. However, little could be done at that time to present a more reliable and dependable scenario. His first priority was the promotion of data collection activities through censuses and sample surveys, besides continuing and improving the coverage of the work FAO had taken over from the International Institute of Agriculture of publishing the yearbooks on agricultural production, trade, livestock numbers and means of production, on the basis of national aggregate data supplied by the countries

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themselves. The development activities of census and surveys were considerably facilitated by the provision of funds from the United Nations Technical Assistance Program. This made possible organization of group country training centres, and even more important, direct assistance to requesting countries by appointing experts in the countries under the overall supervision of the Statistics Division. The experience of crop surveys which Sukhatme had pioneered in India, came very handy in this effort.

Sukhatme turned his attention to the problem of estimating hunger and malnutrition after initiation of The Freedom from Hunger Campaign in 1959-60 by B.R. Sen the then Director General of the FAO. A new study and documentation was imperative to serve as a technical basis for the campaign. This was a challenge, and Sukhatme accepted it, working almost alone on the study. He first presented his study before a session of the Royal Statistical Society in London. As distinct from the earlier Food Surveys of the FAO, his paper attempted to analyse the pattern of food distribution between households within countries. Another novel feature was the introduction of the concept of variation of requirement amongst individuals based on the FAO requirement scale. The paper did not go without severe criticism from some of the fellows of the Royal Society, mainly pointing out the lack of sufficient data for the analysis presented. However in subsequent written contribution to the discussion, Yates and Finney strongly defended the paper as at least providing the orders of magnitude of the extent of hunger and malnutrition in the World. Sukhatme's paper [1] was published in 1961, and based on its findings FAO's Third World Food Survey was published in 1963.

In his paper, Sukhatme first introduces the concept of a bivariate frequency distribution $f(x,y)$ for intake x and requirement y , and states that the proportion u of the population undernourished can be formally expressed as

$$u = \iint_{x < y} f(x, y) dx dy \quad (A)$$

Since data on the joint distribution is not available, he makes certain assumptions of independence and perhaps of normality. It is, however, interesting to note that despite these assumptions, he makes no attempt to evaluate the double integral. He simply evaluates

$$\int_{x < K} g(x) dx \quad (B)$$

where K is a sufficiently low value of requirement.

As I have shown elsewhere [2] to search for the undernourished over the entire range of the intake distribution leads to obviously unacceptable results. The distribution of calorie intake is in general known to be skew, and the bivariate normality of x and y becomes a very doubtful proposition.

A noted critic of FAO's World Food Surveys was Prof. Colin Clark of the University of Oxford. He considered the extent of hunger and malnutrition pictured therein as grossly exaggerated but he has little to comment on the methodology. The most severe, though silent, critic of the analysis in Sukhatme's paper was Sukhatme himself, and he continued his studies to delve deeper in the problems of estimating hunger and malnutrition. He eventually gave up the approach behind the double integral noted at (A) for defining undernutrition. Also he could not reconcile himself to the idea of a fixed calorie requirement for an individual. The intraindividual variation was considered no less important than that between individuals. The development of this subject together with the theory of homeostatic is however beyond the scope and purpose of this note.

Another major development in Sukhatme's work in subsequent years was that concerning the estimation of protein deficiency. By adopting the very simple device of classifying households according to whether the diets are deficient or not deficient for calories and proteins, and presenting the data in the form of a 2×2 table, Sukhatme was in a position to demonstrate that most of the households which have inadequate protein intake are also calorie deficient. To the best of my recollection Sukhatme was the first to demonstrate this objectively using data from some developing countries, though similar opinions might have been expressed by others at the same time. This led to the conclusion that when the food intake is sufficient to meet the energy (calorie) needs, the protein needs are usually met. In other words the dietary problem is often due to inadequate energy which causes the body to catabolize the protein eaten. Protein malnutrition thus becomes a fundamental aspect of poverty and will persist as long as the purchasing capacity of the poor does not permit them to buy enough food to meet their energy needs. This is quite at variance with the analysis and recommendation contained in the Third World Food Survey, which mentioned the United Kingdom as providing a standard of nutritional quality of diet to which less developed countries should seek to raise the level of quality of their diet!

The Fourth World Food Survey published in 1977 and prepared under my own supervision did not consider the problem of protein deficiency. To evaluate undernutrition in each country we used again the formula (B) given

above. The value of K was, however, somewhat different from that used by Sukhatme.

REFERENCES

- [1] Sukhatme, P.V., 1961. The World's hunger and future needs in food supply. *J. Roy. Statist. Soc., Series A*, 124, Part 4.
- [2] Narain, R.D., 1984. On the lower tail of calorie intake distribution. *Impact of P.V. Sukhatme on Agricultural Statistics and Nutrition, Ind. Soc. Agril. Statist.*, New Delhi.