

Urf, Winfried; Ahrens, Heinz

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Objective Indicators of Large-Scale Food Shortages?

Some Remarks on Their Purpose and Limitations

by Winfried von Urff, Heinz Ahrens, Munich-Weihenstephan*

In the past, a rather late realization of acute and large-scale food shortages often contributed to insufficient preventive or remedial action. Against this background a Working Party set up by the FAO Committee on World Food Security has suggested a number of "objective indicators" which are hoped to enable the FAO to make a rapid preliminary judgment of the overall food situation and of the nature of food shortages. Are these hopes justified?

The recent development of the world food situation and the hunger and threat of famine looming over Africa today, have amply demonstrated that acute and large-scale food shortages are not a remote and theoretical problem but indeed a very real and serious one. The situation is aggravated by the dramatic effects of the last years' oil price rises on the developing countries' balance of payments. These effects, combined with those of a slow growth of exports, limited external assistance by developed as well as OPEC countries, and the rising costs of commercial loans in the international capital market, make for an extreme scarcity of foreign exchange in many developing countries. A sudden deterioration of their food situation may, in the future, require much larger amounts of food aid and other remedial action than was necessary in the past. However, it is extremely doubtful whether this would really be forthcoming.

Clearly, this dilemma makes it even more imperative for the national governments concerned and the international community to get prepared for the eventuality of large-scale food shortages in developing countries. What is important above all is to discern any impending disaster as early as possible. In the past, a rather late realization of acute and large-scale food shortages often contributed to insufficient preventive or remedial action, adding to human suffering and loss of lives.

It is against this background that the FAO Committee on World Food Security set up an Ad Hoc Working Party on Preparedness for Acute and Large-Scale Food Shortages in the spring last year, to examine – among other things – the “formulation of *objective indicators* to signal acute and large-scale food shortage situations” and the arrangements for consultations and coordination among donors, both bilateral and multilateral, to cope with (such) shortages in developing countries. In its meeting from October 27 to November 7, 1980, the Working Party made several suggestions to be submitted to the Committee on World Food Security for policy consideration¹.

Before discussing these suggestions, it should be pointed out that there have, in the past, been similar attempts at defining “objective indicators” in other fields of international concern. First, a need was felt at the end of the sixties to determine objective indicators signalling the advent of the famous “fundamental disequilibrium” in the balance of payments justifying a change in the pegged exchange rate under the Bretton Woods System². Secondly, the seventies have seen attempts

¹ Cf. Food and Agriculture Organization of the United Nations, Committee on World Food Security, Ad Hoc Working Party on Preparedness for Acute and Large-Scale Food Shortages (Rome, October 27 – November 7, 1980): CFS: WP/80/Draft Report, Rome, November 7, 1980.

² Cf. T. G. Underwood: Analysis of Proposals of Using Objective Indicators as a Guide to Exchange Rate Changes, in: IMF Staff Papers, Washington, March 1973, pp. 110-117.

* Technical University of Munich.

at establishing an "Early Warning System" with respect to imminent debt crises for developing countries, also based on objective indicators³. In both cases the suggestions, though not translated into reality, gave great inspiration to the analysis of the pertinent problems.

The main purpose of formulating objective indicators is to pinpoint for special surveillance a limited number of key factors which are typical early symptoms or causes of acute and large-scale food shortages. The Working Party hopes that these indicators may help to enable the FAO to make a rapid preliminary judgment of the overall food situation and of the nature of food shortages. For this purpose, both national and global indicators are suggested.

National Indicators

National indicators, signalling national food shortages, are grouped under five headings:

- (1) Severe production problems;
- (2) Severe marketing problems;
- (3) Severe import constraints;
- (4) Refugees or displaced persons;
- (5) Serious nutritional problems.

To the educated reader, the importance of the first four points is self-evident. Concerning the first, the Working Party emphasizes the following indicators: (a) unfavourable weather, serious outbreaks of pest attacks, man-made disasters and animal diseases, and (b) a deterioration in producer incentives. Severe marketing problems may result, e.g., from (a) transportation bottlenecks and (b) hoarding and smuggling. Severe import constraints may be due to (a) a sudden increase in world food prices, (b) an unexpectedly large real food import deficit, or (c) a serious deterioration of the balance of payments, caused either by lower export earnings or rising prices of other essential imports.

The fifth point, i.e. the existence of serious nutritional problems, is evidently not an indicator signalling shortages *in advance*, but one *reflecting* long-standing food scarcities. Nevertheless, advance knowledge on which will be the most vulnerable groups with the greatest nutritional problems in case of a food shortage, may certainly help remedial action.

Global Indicators

Global indicators are of two types: one group is to signal the likely occurrence of global shortages while the other refers to food shortages in low-income developing countries. Amongst the former, the Working Party enumerates

- (1) Substantial excess of prospective world import requirements of cereals over total export availabilities (at current prices);
- (2) Substantial and sudden increases in cereal export prices;
- (3) Low cereal supplies (opening stocks plus current production) of exporting countries in relation to their "normal" domestic consumption and export needs;
- (4) Fall of world cereal carryover stocks below a minimum safe level;
- (5) Substantial cereal production shortfalls in importing countries.

The possible relevance of these factors to the emergence of large-scale food shortages is too self-evident to require any comment. The Working Party tells us nothing new. It attaches particular importance to the first indicator since it is based on *forecasts*, signalling a potential food shortage *well in advance*. Similarly for the second indicator which reflects market *expectations* of the development in the global supply/demand situation.

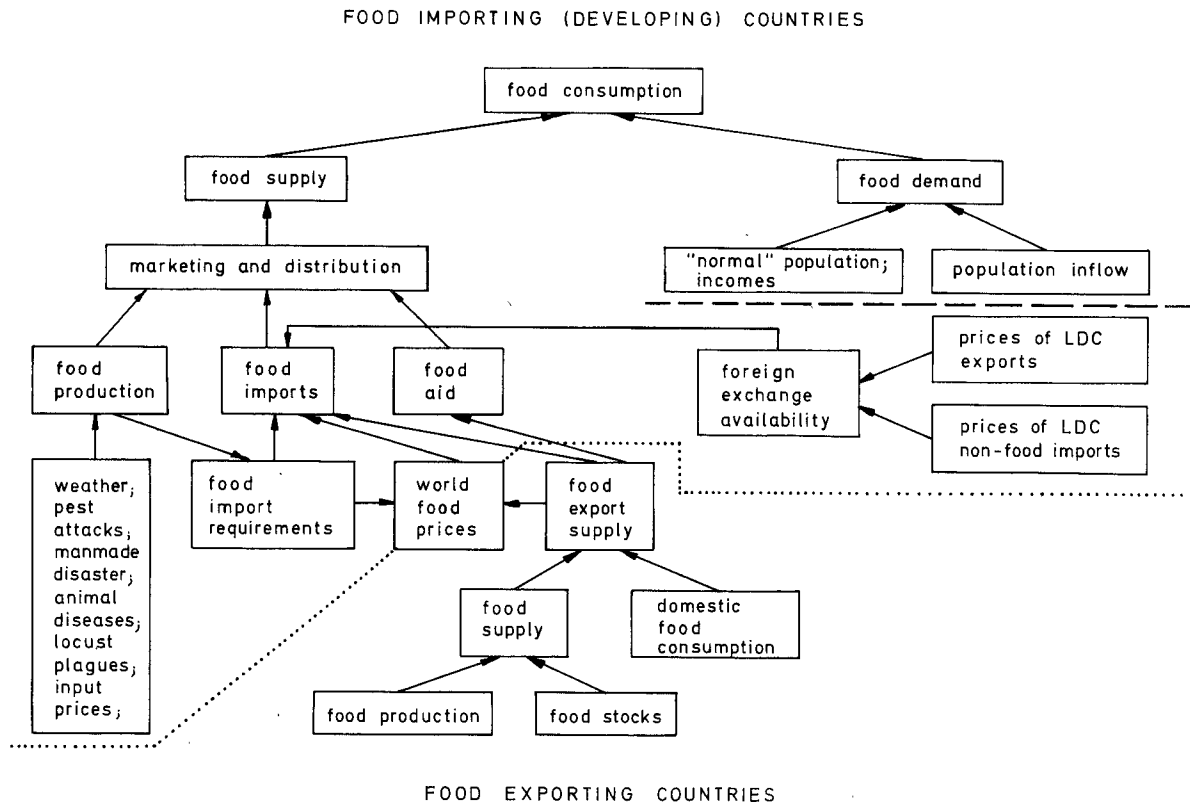
Food shortages in low-income developing countries (LICs) often require coordinated international action of an exceptional nature. According to the Working Party, they may be signalled by the following objective indicators:

- (6) Substantial aggregate (all LICs) foodgrain production shortfall;
- (7) Excess of prospective aggregate food aid requirements over aggregate food aid availabilities;
- (8) Exceptionally large rise in prospective aggregate commercial import bill of cereals;
- (9) Substantial decline in world prices of commodities largely exported by developing countries;
- (10) Substantial and sudden rises in world prices of fertilizers and other agricultural inputs;
- (11) Locust plagues.

The Working Party belabours the significance of these indicators at great length while the reader will find

³ Cf. e.g. H.-J. Petersen: Debt Crises of Developing Countries: A Pragmatic Approach to an Early Warning System, in: Konjunkturpolitik, Vol. 23 (1977), pp. 94-110.

Figure 1
Major variables in a "Food Situation Model"



them to be remarkably similar to the national indicators quoted above. Points (6) and (11) represent "severe production problems"; points (8) and (9) are "severe import constraints". What is new is the insistence on food aid and fertilizer prices. Apparently, the delegates were thinking in terms of granting additional food aid and subsidizing fertilizer imports in case of low-income developing countries being afflicted with large-scale food shortages. The lack of subsidized fertilizer might, of course, contribute to perpetuating a difficult food situation.

A "Food Situation Model"

We may define the above-mentioned "objective indicators" as "unfavourable values – or changes in values – of variables determining the food situation". In a more general context, the variables themselves may be thought of as components of a formal food situation model. The basic structure of such a model, whose mathematical specification would be beyond the scope of this paper, is sketched in simple form in figure 1.

Quantification of the prospective values of the variables would give a rough idea of the near-future food situation. Clearly, whether the model signals a deterioration or an improvement in per-capita food availability, the result would be produced by the *combined effect of all variables*, not of one or two behaving in a particular fashion.

How Objective are "Objective Indicators"?

In such a context, there is little room for "objective" indicators signalling a large-scale food shortage, if these are to be understood in the sense defined above. A large-scale food shortage need not be due to spectacular developments in one or several determinants. Conversely, the effects of such developments (e.g. of a fall in production in an importing country) may be offset by those of changes in other variables (imports, improvements in marketing, ex-ante food aid). "Objective indicators" would only make sense in an – unrealistic – *ceteris paribus* context where such offsetting forces do not exist. Each of the

indicators enumerated by the Working Party is the more "objective" in signalling a food shortage, the greater the changes in the variable to which it pertains, in relation to those in all other variables. Intuitively, the Working Party speaks of "substantial production shortfalls", an "exceptionally large rise in the prospective commercial import bill of cereals", and "substantial and sudden rises in world prices of fertilizers and other agricultural inputs".

The problems involved here may be shown using the Working Party's third global indicator. A low ratio of the major exporters' total supplies to their "normal" requirements for domestic consumption and exports may be largely offset by favourable harvests or the use of stocks in food importing countries. The Working Party mentions the fact that this ratio fell considerably before and during the last world food crisis, from 1.46 to 1.24 for wheat from 1971/72 to 1973/74, and from 1.24 to 1.10 for coarse grains from 1971/72 to 1975/76. Seen in isolation, however, it may not be very meaningful.

Even more doubtful is the ninth global indicator. Substantial rises in world prices of fertilizers may, or may not, signal a large-scale food shortage, even if they did hamper a rapid increase in agricultural production during the world food crisis of 1973-75.

"Critical Values"

It should be stressed here that the Working Party seems, on the whole, to have been well aware of the limited use to which the objective indicators may be put. In some passages of its report, the emphasis is more on listing possible determinants than on looking at them in isolation. In particular, there was no full endorsement of the Secretariat's suggestion to assign to each global indicator a "critical value" at which it would signal a potential food shortage.

The Secretariat had proposed the following critical values:

- Indicator (1): An excess of import requirements over export availabilities of wheat and rice of 10 %;
- Indicator (2): For wheat, an increase of 20 % in the weekly price index of the International Wheat Council over a two-week period compared with the average of the preceding four months; for rice, an increase of 15 % in the current FAO Index of Export Prices compared with the average of the preceding four months;
- Indicator (3): A ratio of major exporters' supplies to their prospective "normal" consumption and export needs of 1.25 for wheat and 1.10 for coarse grains;

- Indicator (4): A minimum safe level of world cereal carryover stocks of 17-18 % of the annual world consumption of cereals.

Only the last of these "critical values" was accepted by the Working Party. It may be added that it has been in use by FAO for several years in its assessments and was agreed by the Committee on Food Security some years ago. Concerning all other indicators, the Working Party suggested that these need to be "used cautiously since, whether global or national, they (reflect) only a *partial view of the situation*. . . . A large variety of combinations of critical factors and developments (are) conceivable which no predetermined set of indicators, however sophisticated, (can) predict with sufficient accuracy to serve as a signal of the need for specific remedial action."

Problems of Quantifying Key Factors

What remains is the possible need for governments, FAO and other organisations to assess continuously the development of major variables in our imaginary formal food situation model – or, put differently, to give permanent surveillance to the key factors of the world food situation, with a view to facilitate sound and differentiated judgments on the dangers of an imminent and acute large-scale food shortage.

This task appears to be difficult enough. Some determinants of the food situation are basically qualitative in nature, particularly at the national level. For others, like the production of food crops, the basic data may be inadequate or subject to a large margin of error. Still other factors, like hoarding and smuggling, are practically impossible to quantify. The same is true for more important factors like the stocks held by the USSR and China; and even if they were known these countries' import levels would still be largely influenced by unforeseeable policy considerations. Commercial cereal imports; data for which are required to estimate the low-income countries' commercial import bill of cereals, are often difficult to distinguish from food aid.

There is also the problem of making the relevant assessments as early as possible, an important aspect which was neglected altogether in the previous discussion. The imaginary food situation model would have not to explain the current, but to forecast the future, food situation, based on more or less realistic expectations. The underlying assumptions are, of course, the more insecure the longer the lead-time. In the course of time, expectations may change, or be overtaken by real events. What is more, the implicit *ceteris paribus* assumption according to which all

factors not explicitly taken account of in the quantitative framework remain equal, may not always hold.

The Working Party seems to have had an intuitive understanding of the more fundamental problems involved in this context. Firstly, it lays emphasis on the need to consider individual food shortage indicators "along with *other* relevant information" and to make them "part of a detailed analysis of *all factors* impinging on the global food situation and outlook". For example, with respect to the eighth global indicator, a large rise in the prospective import bill of low-income countries, it is stated that it should be used in conjunction with information on these countries' "balance of payments position, debt burden and other financial indicators".

Secondly, the Working Party stresses the shaky nature of any comparisons of *prospective* import requirements with *prospective* export availabilities (first global indicator). Such assessments are already made periodically by the FAO intergovernmental Groups on Rice and Grains (for rice and coarse grains) and by the International Wheat Council (for wheat). In the view of the delegates, such estimates are "subject to a considerable margin of error, particularly at the beginning of the season when the early production forecasts underlying the estimates (are) still subject to considerable change". The indicator should therefore be regularly updated at short intervals throughout the season, as is in fact done for the above-mentioned assessments by the FAO and the IWC.

Underlying Philosophy

This raises a more fundamental problem, relating to the basic philosophy underlying the use of objective indicators in early warning systems. Apparently, the idea of defining objective indicators signalling an imminent food shortage originated in the Secretariat of the FAO; the Working Party seems to have put it into the proper perspective. Critics say there is an inherent tendency for large international organisations to succumb to an increasingly bureaucratic approach to the solution of the problems they are entrusted with. In this line of thinking, objective indicators and similar concepts might be interpreted to be the outgrowth of a well-meant attempt to tackle the problems of the world in rather an "administrative" way. "Surveillance", "monitoring" and "triggers" are facets of the self-same philosophy. Even the report of the Working Party still contains some traces pointing in this direction when speaking of the need to "monitor the condition of the crop at all stages of development from pre-planting until harvest"; the need to "monitor" typhoon and flood

warnings; "nutritional surveillance. . . (by) monitoring the purchasing-power of vulnerable groups"; the need for some developing countries to receive "technical assistance. . . to strengthen their national facilities to collect relevant data and to develop these indicators sufficiently"; the idea that the sixth global indicator could "trigger" consultations under the special provision for emergency needs contained in Article IV of the Food Aid Convention 1980; the suggestion to give this indicator a "precise specification" corresponding to the interpretation given by the Food Aid Committee to such terms as "substantial production shortfall"; and the "need to develop. . . (further) indicators at the national or regional level".

Need for an Improved Alert System

If we interpret the FAO's main intentions correctly, the attempts at developing "objective indicators" are not meant to be an end in themselves but are mainly aimed at providing the informational basis for an improved international alert system on acute and large-scale food shortages which could help to strengthen national and international preparedness and to develop more effective procedures for consultative arrangements.

In view of the particularly disastrous effects such food shortages might have in the future, any initiatives in this direction should be greatly welcomed. Apparently, a majority of the Working Party's delegations considered that any alert system should function in connection with the FAO's existing Global Information and Early Warning System. It would consist of two stages, i. e. an "alert" stage to be followed, if warranted, by an "action" stage. Within this framework, the Director-General of the FAO would call formal or informal consultative international sessions to evaluate the seriousness of the food situation and its causes, and to consider or recommend remedial action. Such action may include, among other things, additional food aid; aid to increase agricultural production, including the provision of fertilizer, pesticides and seed supplies; assistance for food storage and distribution; emergency financial assistance or credit arrangements for increased food imports; and the release of stocks. In all this, low-income countries are to be given special priority.

These plans typically reflect the great concern with which the FAO rightly views the possible future development of the world food situation. As such, they deserve to be taken as seriously as they are meant. Even if there still appears to be a gap between the intentions on the one hand, and the operational and political feasibility, on the other, the plans should certainly be pursued further.