

THE FOOD SITUATION IN INDIA

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Food planning in wartime is one of the most urgent needs of every nation involved in the present world turmoil. In this article Dr. Aykroyd discusses food control in Great Britain and Ceylon and its implications with regard to the food situation in India.

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WAR, famine, pestilence—how often has the sequence recurred in the dismal story of mankind ! In modern times the third monster is less to be feared—its claws have been clipped and its teeth drawn—though indeed some think that the formidable pandemic of influenza which afflicted the world in 1918-19 was in some way, not fully understood, a result of the war. But war still leads inevitably to famine. At the end of the last war there was widespread starvation in Europe and a little later social disintegration led to terrible famines in Russia. In the present war there is already famine in Greece, and Italy and various parts of occupied Europe are feeling the pinch. The invasion of Russia and the overrunning of the rich granary of the Ukraine may cause serious problems of food supply even after the invader has been expelled.

In comparison with many countries, India is in a fortunate position as regards her food supplies. She has not been invaded and land under cultivation is producing its usual quota of crops. In England, where previously imports amounted to no less than 70 per cent of total food supplies, the war has produced the most far-reaching changes in the national diet. This has not been the case in India. But India cannot hope to escape altogether the impact of the world war.

IMPORTS.—Food imports and exports in normal times are small in relation to total indigenous food production; that is to say, India is largely a self-sufficient country as regards her food supply. Her self-sufficiency is, however, not absolute. Within recent years Burma rice, and, to a lesser extent, rice from Indo-China and Thailand, has been imported to make good a shortage in home production. Rice imports in recent years have amounted to about 4-5 per cent of the rice supplies of India as a whole; in the Madras Presidency the percentage of imports to total supplies was higher, probably from 10 to 15 per cent.

In normal times there is a small import of expensive products, such as tinned and cold storage foods, but the use of these is confined to a small section of the population and they may be disregarded in considering the situation as

a whole. There is no great hardship in doing without imported marmalade, biscuits or breakfast cereals. One or two imported foods, e.g., dried milk powder and cod liver oil, are of importance from the standpoint of nutrition, but of no quantitative significance. Skimmed milk powder from New Zealand in normal times a relatively cheap product, has been of value in supplementing the diet of children in institutions unable to afford or obtain fresh milk. Within recent years the use of somewhat expensive dried milks (not skimmed) in the feeding of infants and young children has been growing in popularity among the sections of the community able to afford it. Such milks are convenient, reliable in quality and free from infection or contamination, while in many parts of the country fresh milk of good quality is difficult to obtain. The popularity of imported dried milks is fully understandable. There is, however, no reason why infants and children should not thrive without their use, should imports be cut off, provided mothers who have previously relied on them exercise care in the choice, preparation and modification of locally produced milk.

Cod liver oil, imported mainly from Norway before the war, is a medicine or food of great value because it is rich in vitamins A and D, and ill-health and disease due to insufficiency of these factors in the diet are very prevalent in various parts of India. Fortunately a liver oil rich in vitamins is not a monopoly of the cod; it is, indeed, a characteristic which the cod shares with most fish that swim in the sea. In India a substitute for cod liver oil has been found in shark liver oil, which is now being produced in reasonable quantities at various coastal centres and widely used in hospitals and dispensaries. There is at the moment a world shortage of fish liver oils and this new industry may prove a valuable asset to the country.

A passing reference may be made to imported vitamin preparations—i.e. pure synthetic vitamins, vitamin concentrates and tonics. Such preparations have their place in clinical medicine in India; for example, the administration of pure vitamin B₁ is the most effective form of treatment of acute beriberi in infants and adults; pure riboflavin (a member of the B₂ group of vitamins) is needed for treating certain eye and tongue conditions; vitamin A concentrates are of value in the treatment of keratomalacia. Vitamin preparations are indeed often prescribed unnecessarily, e.g., to patients who are not suffering from vitamin deficiency. They may also be taken by people who could easily obtain all the vitamins they need from a well-balanced diet. Some vitamin preparations are in short supply, or will be before the war is over. England is naturally chary of exporting vitamins at present; there is no sense in sending valuable food out of a beleaguered city. While a shortage of imported vitamins will undoubtedly make the treatment of certain deficiency

diseases less effective, it is difficult to regard it as being of major importance in relation to the food situation as a whole. To some extent use can be made of substitutes—e.g. of dried yeast instead of marmite—or limited supplies can be reserved for patients in serious need.

EXPORTS.—Food exports previous to the war were small; for example, exports of rice amounted to less than one per cent of the total crop. It follows that loss of overseas markets does not have the effect of greatly increasing food supplies within the country. Actually the quantity of grain required for export has been increased as a result of the war. Wheat has been sent overseas to feed armies and civil populations. Ceylon, cut off like India from supplies of Burma rice, has to be provided with food. Previous to the war exports of rice from India to Ceylon amounted to some 88,000 tons, a very small fraction of the total production of about 29 million tons. The population of Ceylon (6 millions) is only 1.5 per cent of the population of India and great efforts are being made in Ceylon to increase food production. Nevertheless, the requirements of Ceylon will add to the rice shortage. The loss of markets for groundnuts and certain other cash crops allows land hitherto producing such crops to be turned over to food production.

INCREASED INTERNAL FOOD REQUIREMENTS.—Orr and Lubbock¹, discussing food resources in Great Britain in the first year of the war, make the following comment:

"It must be remembered in planning our food supply that there will be an increase in gross requirement for food. Men in the Fighting Forces need about 4,000 calories per day, an increase of between 25 and 30 per cent over the requirements of men in peace-time occupations. Before the War has finished, we may have between three and four million men under arms. There will also be a larger number of men engaged in the heavy industries. The food requirement of every man who was formerly unemployed will be increased by 30 per cent or more. Hence, the total national energy requirement will be increased by between 5 and 10 per cent."

It is clear that in India any increase in the "total national energy requirement" resulting from the war will be of a much smaller order, but not altogether negligible. Some five hundred thousand refugees have entered the country from Burma and elsewhere. Armies have to be maintained and men in military service require and obtain more food than civilian industrial and agricultural workers generally. Industry is booming, and the number of industrial workers employed, particularly in heavy industries engaged in war production, has considerably increased. This inevitably means an increase in food requirements, for hard work cannot be carried out unless the worker

¹ Feeding the People in War-time. Macmillan, 1940.

receives sufficient fuel (calories) to make good his energy expenditure. If the price of food remained constant, a general rise in wage levels, such as has taken place within the last two years, would mean increased consumption of food on the part of the wage-earners concerned. It has been repeatedly found in diet surveys that low paid industrial and urban workers have a calorie intake below normal requirements. Any increase in real income will increase their consumption. At the present time, however, the increase in wages (dearness allowances, etc.) must be largely offset by the increase in the cost of food and other necessities.

MARGIN OF SAFETY.—It has been said that India is largely self-sufficient in food supply. This statement demands closer scrutiny. Even in normal times the food supply of India plus imports does not cover requirements in the sense that the population is abundantly or satisfactorily fed. The diet of large sections is deficient in quality and quantity and below generally accepted standards of adequacy. Because of the existing bare minimum level of diet, there is little "margin of safety" to allow for further restriction. Some years ago (11)37) the author attempted to calculate the total food production of the Madras Presidency and compare it with food requirements. While the investigation was difficult and on the whole unsatisfactory, owing to the absence of adequate statistical data, it provided an indication of the state of affairs. It was calculated that the total food available, including imports, was just sufficient to cover total calorie requirements, reckoned on the basis of 2,500 calories per consumption unit daily, provided it was evenly distributed. The conclusion was as follows: "It seems clear that there is no appreciable excess of supply over requirements, and that the imports of rice and other foods are necessary to supplement internal production." The above conclusions as regards "lack of margin" can probably be applied to the whole of India.

One way of meeting food shortage is to "tighten the belt." The metaphor is inappropriate in India, where belts are not generally worn. It is also inappropriate in the sense indicated in the preceding paragraph. There is no surplus girth to be reduced.

TRANSPORT.—Transport difficulties are an important factor in the food situation. The railways are overburdened and owing to the great demand for rolling stock for carrying war materials there is a shortage for other purposes. Petrol for lorries is in short supply. Now it is clear that the food supply of village communities which habitually grow, prepare and consume their own food will be relatively unaffected by dislocation in transport. What proportion of the population falls into this category? The percentage living in "rural" areas is given as 89 in the 1931 census report. But the economy of rural areas may not be the simple one of direct dependence on their own produce. Food crops may

be essentially cash crops, the villager selling the grain he produces and buying for his own needs grain of different kind or quality produced in some other part of the country (or, before the Japanese war, in Burma).²

The admirable reports of the Agricultural Marketing Adviser to the Government of India on wheat and rice provide some rough indication of the proportion of the total supply of each grain, which is respectively prepared for consumption by domestic means and processed in mills. About 28 per cent of total rice supplies in British India (excluding Burma rice) is machine-milled. The remainder, except for 2 per cent handled by the professional dehushing class, is "dehushed into rice in the producer's homes by hand-pounding." In the case of wheat it appears that about 11 per cent of the crop is processed in roller mills. Of the remainder about half is ground by hand in the villages and the other half ground in power driven *chakkis* in towns and cities. The millets, of great importance as a staple food crop in India, are in all probability directly consumed by those who grow them, to a greater extent than in the case of wheat and rice. In general, the consumption of cereals processed in power-driven mills will involve more use of transport than the consumption of cereals pounded or ground in the home, or within the village.

Cities and industrial areas, areas producing cash crops, tea plantations, etc., are of course dependent on food supplies which may normally be obtained from food-producing areas a considerable distance away. Madras City, for example, is not situated in the centre of a large food-producing area and is consequently dependent for its food supply mainly on imports by rail and sea. During the last few months there has been a shortage of almost all food-stuffs in Madras, whereas in Tanjore, Trichinopoly and Tinnevely, situated in the midst of large agricultural districts, conditions have been *relatively* normal.

India has thus moved far from simple and direct dependence on *locally produced* food. A complicated marketing system for staple food crops, based on modern transport facilities, has grown up. Clearly any move to un-complicate the system—i.e., in the direction of greater dependence on crops produced in the neighbourhood of the consumer—will help to save transport and ease the food situation, and must be regarded as an essential part of a rationally planned war-time food policy. No doubt under stress of circumstances there has been some change in this direction already.

MORE FOOD NEEDED.—At present it is difficult to estimate how serious the food shortage is, or is likely to be.³ There does not appear to be any real

² Malabar, a densely populated largely rural area, cannot produce enough rice to feed itself and has for some years past relied on local or foreign imports.

³ According to an announcement made by the Hon'ble Member for Education, Health and Lands, Government of India, on July 15th, 1942, the net deficit for 1941-42 is 2,100,000 tons of rice and 400,000 tons of wheat.

information about existing stocks—a point of essential importance. A few years ago the Laboratories studied the possibility of increasing the use of home-pounded or under-milled rice in place of machine-milled rice. One of the points for consideration was the keeping qualities of the former, which are unquestionably inferior to those of the latter. We reached the conclusion that the more rapid deterioration of home-pounded or under-milled rice was not of paramount importance, because "under ordinary circumstances, rice, with or without its husk, is not stored for more than a few months. The province lives, as it were, from hand to mouth as regards its food supply."* This refers to Madras.

In times of food shortage people invariably assume that the scarcity and high price of food are due to the villainy of middlemen, and that somewhere, stored away in secret hoards, there are abundant stocks of food. Beyond doubt there is much profiteering and some stocks are being held back in hopeful anticipation of famine prices. But we must avoid the idea that the solution of the problem is entirely a matter of price regulation, the dispersal of stocks, and so on, and that all would be well if a few profiteers were dealt with according to their deserts and the remainder intimidated by the wholesome example. Transport difficulties are important, but ways and means can be found of circumventing them to a considerable extent. Behind the problems of distribution and price there is the undeniable fact that for a number of years India has been importing rice and that this food came into the country because it was needed. Other facts about food supply and requirements have been discussed in earlier sections. It is safer to assume that there is, or will be, a genuine shortage of food, perhaps not of very formidable proportions, but still a shortage, and take the necessary steps to produce more food.

"Enough food" takes precedence over "the right kind of food"; calories over proteins and vitamins. When increase in the total supply of calories, the solid bulk of food, is the primary and most urgent consideration, attention must be given to any *crop* which gives a large and rapid return, irrespective of its nutritive value and the habitual preferences of the population. When there is a real food shortage, people will not spurn unfamiliar food. A few examples may be given in illustration. Tapioca is of low nutritive value because of its low protein content and in normal times the replacement of rice or other cereals by tapioca is most undesirable. The nutrition worker has no affection for this starchy root. Tapioca, however, gives a large and rapid return—an acre under tapioca will yield 2-4 times as many calories as an acre under rice or wheat—and it is a dry crop. In the circumstances the extension of tapioca production in suitable areas would be

⁴ **The Rice Problem in India, *Ind. Med. Res. Memoir No. 32, 1940.***

justified. Maize, when consumed as the main ingredient in the diet, may lead to the disease pellagra because of some defect in its chemical composition. It is, however, a highly productive cereal and if its cultivation can be rapidly increased its qualitative defects should be overlooked. The millets—bajra, jowar, Italian millet, etc.—are usually considered inferior as foods to wheat and rice. Actually their nutritive value, in comparison with that of other cereal grains, is in general satisfactory. If they can be produced in greater quantities, they can replace equivalent quantities of wheat and rice without disadvantage from the standpoint of nutrition. In certain parts of the Northern Circars the consumption of millets in place of highly milled rice has had a good effect on health. Owing to the high price of the latter the poorest classes are eating one meal of millet daily. As a result the incidence of acute beriberi in adults and infants has fallen.

Vegetables. During the war a great and successful effort has been made in Great Britain to increase the production of vegetables. Gardens, allotments, golf links and plots of waste ground generally have been made to yield their quota. A carefully planned scheme to ensure a steady supply of vegetables from small plots throughout the year was drawn up by the Ministry of Agriculture. Gardens of about 15x20 yards in area are producing the following quantities of vegetables in the different seasons:

	Gross weight			
	lbs.			
Spring	17
Summer	19
Autumn	19
Winter	26

The possibility of increasing the production of vegetables in India by such means is obviously much smaller, but something could be done in this direction. Boarding schools and other institutions receiving government grants can be compelled to create vegetable gardens, or extend gardens already in existence. Institutions already producing vegetables for their own use, such as jails, can increase output by 100 per cent. Owners of suitable compounds can be encouraged or compelled to grow vegetables. No doubt there would be difficulties in supplying enough seed for a widespread and rapid extension of vegetable growing, and any increase in production immediately feasible would amount to only a tiny fraction of the additional food required. Garden vegetables are in general foods of low calorie content, and do not add very materially to the energy value of diets. They are, however, a good source of certain vitamins and of value as "health-giving" foods.

Orr and Lubbock (*loc. cit*) make the following comment about the potato, with reference to war-time food problems in Great Britain :

"The potato is of special value for health. An acre of potatoes gives twice as much food as an acre of wheat. It is the surest first crop off ploughed-up old pasture. *The potato is the best insurance crop against food shortage.* Potatoes should be subsidised for increased consumption."

The potato is one of the staple foods of the British army. Unfortunately the areas in which it can be cultivated in South India are limited and there are likely to be very serious difficulties about fertilisers. But the sweet-potato thrives in a tropical climate. This root is of considerable value as a supplement to ill-balanced rice diets and its cultivation could be extended with advantage. The production of yams could also be increased.

The Food Production Conference which met in Delhi in April, 1942, recommended that "as an insurance against a shortage of staple foods and with a view to improving the nutrition of the people, all available lands adjoining homesteads should be used for the production of vegetables and quick-growing fruits, such as papayas, bananas and melons and green fodder crops for increased production of milk".

More food from cereal grains. In England the use of wheat flour of 85% extraction has recently been made compulsory—i.e., the population is to be fed on brown instead of white bread. The effect of this is to increase the nutritive value of the staple food of the country, but at the same time to reduce the amount of food for livestock available and hence supplies of milk, meat and eggs. Shipping space will be saved by importing less wheat, the reduced quantity available being made to supply an amount of human food equivalent to that supplied by the previous larger imports. A given quantity of grain or grain product fed directly to human beings supplies much more energy (calories) than the same amount of grain fed through animals and returned as meat, dairy products, or eggs. The effect of the change, as has been pointed out, will be to reduce supplies of these foods, but presumably it is hoped that the improvement in the nutritive value of the staple cereal will make up for losses in other directions.

In India the position as regards wheat is quite different. The great bulk of the wheat crop is stone-ground in village homes and small mills, and consumed whole or nearly so. The production of refined wheat flour (maida) in roller mills amounts to only 4,00,000 tons, or approximately 4.5 per cent of the total wheat supply. Clearly, prohibiting the manufacture of white flour would have a negligible effect on the quantities of wheat products available for human consumption,

Bice. Some 27 per cent of the total paddy crop is machine-milled, **the**

remainder being prepared for consumption by hand-pounding. The total quantity of machine-milled rice produced amounts to about 7 million tons. Hand-pounding removes the germ and a proportion of the pericarp; home-pounded rice is not equivalent to husked whole rice with all the integuments of the grain intact. Taking home-pounded rice as the standard, what would be the effect if all the rice produced in India were consumed in the same state? A given weight of paddy would yield about 6 per cent more rice for consumption. If all paddy were home-pounded, or milled only to the same degree as home-pounded rice, an additional 420,000 tons of rice or thereabouts, amounting to about 1.6 per cent of total rice supplies, would become available.

It would be reasonable to encourage the use of home-pounded rice as a method of extending available food supplies. People used to consuming highly-milled rice are, however, usually very loath to change over to under-milled rice, and even if by some miracle of propaganda the change could be rapidly brought about, it would not greatly influence the situation as regards total supplies of rice. The same is true of any compulsory measure prohibiting the milling of rice beyond a certain degree.

Similar problems do not arise in the case of the *millets*, which are not subjected to milling processes which remove the most valuable parts of the grain.

MEASURES TAKEN IN CEYLON⁵.—The Government of Ceylon has recently issued a Food Production Order (Estates). Under the terms of this Order, all estates over 35 acres in area are required to place under food crops an area of land proportionate to the cultivated area of the estate. In the case of tea estates the proportion is 24 per cent if the food crop is grown interplanted with the tea; this is reduced to 12 per cent if land outside the tea-producing area, wholly planted with food crops, is utilised. A list of foodstuffs approved under the Order has been issued. This, curiously enough, does not include green vegetables, but it is likely to be amended so as to permit the cultivation of green vegetables on 25 per cent of the prescribed area.

To help in the organisation of food production work on estates, a Central Co-ordinating Committee has been set up under the Chairmanship of the Deputy Director of Agriculture. This includes the Food Production Officer (Estates) and the Directors of three Research Institutes. Its functions are "to collect as rapidly as possible information in regard to the variety of foodstuffs which can possibly be grown in different areas, the methods and the type of cultivation required and to disseminate such information to estates by the issue of frequent circulars. The Committee will likewise investigate and

⁵ The following section is based on an article by Roland V. Norris, *The Tea Quarterly*, 25, March, 1942, p. 1.

advise in regard to the storage and utilisation of the crops produced and the damage which may be caused by pests and diseases. It will also act in an advisory capacity in regard to possible amendments which may be required from time to time to the Food Production Order as experience on food production as accumulated."

Norris points out that there will be difficulties in obtaining and distributing supplies of fertilisers. "Every effort should therefore be made to make use of all available cattle manure and waste materials which should when necessary be composted. This will apply likewise to the residues from the crops produced."

How far the scheme will be successful, only time and experience will show. In Ceylon, unlike India, estates form a high proportion of the total area under cultivation and the introduction in India of a compulsory measure similar to the Ceylon Order would have a much smaller effect on the food situation. Again, Ceylon is threatened with a more serious food shortage than India. The Ceylon scheme is nevertheless of interest and significance to us here in India, as representing a *planned effort* to increase food supplies.

FOOD PRODUCTION AND CONTROL IN INDIA.—Increased production of food is the first consideration. How is this to be accomplished? No doubt "grow more food" propaganda has its value, though a limited one. More concrete incentives are required. Such an incentive exists in the high and rising price of food grains, which must stimulate the agriculturist to produce and sell as much food as he can. Provincial and State governments can assist by such measures as supplying more seed at cheap rates to cultivators, supplying manure or grants for its purchase, reducing irrigation charges, remitting revenue on land now brought under cultivation with food crops, and so on.

Whether it is possible to increase food production rapidly under war conditions by such means, only experience will show. The favourability or otherwise of weather conditions for the next few harvests will probably have more influence on the food situation than the achievements of "grow more food" campaigns. The amount of land suitable for cultivation not already under crops must be very small in relation to the area already under cultivation. The supply of manure will be limited by failure of imports and transport difficulties. On the other hand, some land producing nonedible cash crops for which the market has disappeared will become available. The cultivation of vegetables on "available lands adjoining homesteads" can certainly be increased.

It is anticipated (by the Hon'ble Member for Education, Health and Lands) that as a result of the food production drive an additional 9,600,000 acres will be put under food crops, giving an additional outturn of nearly

2,200,000 tons of grain, consisting of 830,000 tons of rice, 470,000 tons of wheat, 830,000 tons of millet and 50,000 tons of gram.

There appears to be some anxiety on the part of governments lest the campaign for the increased production of food should lead to a glut of certain staples, with consequent fall in prices. It has been suggested that the cultivator should be insured against such an occurrence by the fixation of *minimum* prices and a guarantee that the government will purchase surplus crops. From the commercial point of view, there may be some sense in the word "surplus" as applied to staple foods in India; there is none from the standpoint of nutrition. An increase of 20 to 30 per cent in food production would be absorbed if the entire population had enough to eat, and it must also be recalled that the population is growing rapidly.

A central organisation which is fully informed about the situation in all parts of the country is obviously necessary. The Food Production Conference recommended that "when there is a deficit of a particular commodity in the country as a whole the distribution should as far as transport facilities permit aim at an equality of sacrifice on all consumers of that commodity". This is admirable in principle, but scarcely in tune with practice. The natural tendency of Provinces and States is to grab all the food they can. The Government of India has recently set up a Central Food Advisory Council whose functions include the following :

(1) To pool, study and disseminate all available information regarding food and fodder production ; (2) to plan on an all India basis the food and fodder production programme for the different regions and tender advice in regard to its execution; and (3) to advise the authorities responsible about the equitable distribution of the available food stocks.

This body will naturally be largely dependent on data supplied by Provincial and State governments. Within each Province, a special officer with a small staff could be deputed to obtain and collate information about the situation in various areas.

With regard to the control of available food supplies, the present situation (July, 1942) is peculiarly chaotic. The fixation of maximum prices tends to be inoperative because dealers either evade the regulations or withhold stocks if they think the fixed price is too low. A "black market" readily develops. Appeals and threats are alike ineffective. It may therefore become necessary, if the situation worsens, for the government to take over the purchase, distribution and sale of certain food products, at any rate in certain areas where scarcity, distress and profiteering are rampant. In England the government either directly or through its agents has become the wholesale purchaser of food, and fixes the price at which it is sold to the retailer.

In Madras, during the recent food shortage, the Triplicane Urban Co-operative Society, assisted by the Government, played a most useful part in organising an emergency supply scheme. The situation was complicated by the evacuation, shortage of local transport, etc. The Society was able to supply the public with food at a reasonable cost when most of the retailers had left the city and those who remained were charging exorbitant prices. Twentyfive depots were opened in addition to the 33 branches of the Society previously in existence.

The Food Production Conference recommended that the present food production drive should be used as an opportunity of instructing the cultivator in ways and means securing a more balanced diet for himself and his family. It is possible that the campaign for rapidly increasing food supplies may prove of benefit to India after the war has been won. War sometimes leads to reforms and developments which may take a generation or so to effect in peace-time.

To the nutrition worker, the food situation in India is thoroughly unsatisfactory in normal times. A nation-wide "grow more food" campaign would have been appropriate in 1938, before the war started, and will be appropriate in 1945, when, let us hope, the war will be over. The majority of the population lives on a diet far remote from the most moderate standards of adequate nutrition. If India depends entirely on what she can herself produce, a very large increase in the production of various foods is necessary to raise existing standards to a satisfactory level. Some of these may be roughly indicated as follows : cereals, thirty per cent increase; pulses, one hundred per cent; milk and milk products, three or four hundred per cent; meat, fish and eggs, several hundred per cent; vegetables, particularly green leafy vegetables, one hundred per cent or thereabouts. There is plenty of scope here for the application of scientific methods to agriculture, animal husbandry and fisheries. On a broader view, there seems no reason why India should, in a well-organised world, be entirely self-dependent as regards her food supply. The mind of man, even amidst the present perplexity and confusion, is slowly groping its way towards the conception of a planned world economy in which the enormous resources which the application of science can create will be distributed according to the *needs* of each group within our species.