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lines of the "Credit Agricole," for the purpose of supervising and co-ordinating the activities of its member societies.

(d) The most urgent measure is perhaps statutory "regulation of the markets" which are to be controlled and supervised by a Committee in which the producers (small, middle and big farmers) will be fully represented. The business of assembling, weighing, standardisation, etc., can thus be checked and supervised and the farmers assured a fair price whenever he brings his produce to the market. These regulated markets will form a part of the co-operative marketing which has already been recommended. It is a recognised fact that malpractices in weighing, arbitrary market charges, etc., which go to reduce the farmer's share of the retail value can be stamped out only with the help of regulated markets. After all is said and done, it must be remembered that even the smallest increase in the farmer's share should not be taken too lightly, because it is indeed a difficult task.

The war and the consequent dislocation has given a rude shock to the old system of normal trading. The traditions, honesty and efficiency of the traders have now become a thing of the past. It is very doubtful whether these will come back again. Slowly but steadily we are moving away from the era of "laissez faire," in distribution to that of state control and management. If the state wants to recede from this field, as it is likely to do, some sort of responsible and efficient organisation must be entrusted with this business. Co-operation, fully developed and supported by the Government, seems to offer the only alternative. Regulated markets and the existing Government godowns will form the basis of this system of organised and responsible marketing. This suggestion will sound all the more reasonable in the perspective of a dangerously chronic position of rice and other food supplies in India in the years ahead.

WORLD POPULATION AND AGRICULTURAL OUTLOOK

by

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Since Malthus proclaimed that population tends to exceed food supply, world has been fearing overpopulation and this apprehensive state of mind has been aggravated in our times by the danger of declining world resources¹. It has given rise in many quarters to a demand for adoption of a world policy to stabilize.

1. Cf. "Modern man has perfected two devices, either of which could annihilate civilization. One is atomic war, the other is world soil-erosion. Of the two, soil-erosion is the more insidiously destructive. War disrupts or destroys the social environment, which is the matrix of civilization. Soil erosion destroys the natural environment, which is its foundation."

(*Food or Famine* by Ward Shepard).

population by checking drastically its rate of growth. This approach is at variance with experience of history as a whole and looking ahead over a long period we find that even otherwise world population will first stabilize itself and then may decline and die out. A decline in the rate of population increase has already set in several parts of the world where it had been rapid. In other parts, too, after a transitional stage of growth a stationary and later a diminishing population may be in the offing. World is going to be underpopulated as a whole not on account of increasing pressure on diminishing resources and the consequent famines, starvation and deaths but, primarily because, while birth-rate has no lower limit, death-rate has. Soil-erosion and indiscriminate *mining* of important mineral deposits create problems which cannot lightly be brushed aside. At the same time advances in science and technology have opened up new and unexpected sources almost to the point of surfeit. And this is only a beginning. Unless, therefore, a unison is brought about between human needs and market demand by removing economic bottlenecks, farms and factories over considerable areas will find their lines jammed by over-production while consumers of their products will continue to experience shortages sometimes so acute as to cause actual famines and deaths. Paradoxically enough, human poverty will continue, might even grow, amidst increasing plenty. The problem posed is not basically of increasing numbers or of diminishing resources. It is of underemployment and under-consumption.

Increasing at an average rate of 7 millions per year over the entire period since 1700, world population is now increasing nearly three times more rapidly than before or at an average rate of 20 millions per year. At this rate fifty years hence there will be an additional 1,000 million people to be fed, clothed and sheltered. The rate of growth of population in various parts has not been uniform in the past nor do the present trends suggest that it is going to be so in the near future. It will be wrong to say that the people of a particular country, race or tribe are more prolific than those of another. There are no such biological differences between man and man and nowhere and at no time has the inherent power of multiplication been realized in full. Man everywhere has multiplied according to his opportunities and hence the non-Asiatics and the white races have multiplied since the close of the 18th century more rapidly than the Asiatics. Of late, people in Asia too have been succeeding in removing their shackles and realising fresh opportunities. Consequently its rate of population increase which had been falling since 1700 is now gathering momentum although it is still the lowest. The following estimates, although not statistically accurate to the same extent throughout, indicate well the significant secular trends:—

*Estimated Rate of Increase in Population**(Increase per year in millions)*

	1700—1750	1750—1800	1800—1850	1850—1900	1900—1950	1920—1947
Asia	2.41	3.1	2.9	3.8	6.4	10.6
Europe	0.43	0.94	1.6	2.7	3.8	4.0
Africa	-0.1	-0.1	0.1	0.5	1.5	2.1
Oceania	—	—	—	0.08	0.1	0.1
America	—	0.24	0.7	1.7	3.6	3.7
Total outside Asia ..	-0.33	1.04	2.4	4.98	9.0	9.8
World Total	2.74	4.14	5.3	8.78	15.4	20.4

Percentage increase during the period

	1700—1750	1750—1800	1800—1850	1850—1900	1900—1947	1920—1947
Asia	36.4	33.8	24.4	25.1	32.0	30.0
Europe	17.8	33.6	42.2	50.8	44.4	22.4
Africa	-5.0	-5.3	5.5	26.3	59.1	41.5
Oceania	—	—	—	200.0	100.0	33.3
America	-4.6	100.0	143.0	144.1	115.3	48.3
Total outside Asia ..	7.0	21.7	39.0	59.0	62.9	32.2
World Total	6.6	29.3	29.3	37.3	44.9	31.0

Apparently the rate of population increase reached its peak in Europe, Australia and America towards the close of the nineteenth century and has now tended to slacken whereas in Asia and Africa it is now on an upward course. During the period 1937 to 1947 the annual increase has been 1.1 per cent in the U.S.A. and Canada, 0.7 per cent in Europe, 0.9 per cent in Australia, 1.3 per cent in Africa and 0.8 per cent in Asia. A rising rate of population increase in the past has been associated rather with a fall in death rates than an increase in birth rates. In fact as death-rates fell, birth-rates also declined but there was a lag which raised the rates of natural increase. Consequently, in areas where population increase has been rapid the lowest birth and death rates occur and gradually their population approaches a pattern at which reproduction rates tend to fall below the replacement-level.

Dr. Kuczynski calculated that with fertility and mortality remaining at the present level, population of the larger countries in Europe was doomed to die out. An estimate by Dr. Enid Charles shows that if fertility and mortality continue to decline at the present rate England and Wales may have only 4.4 million people in 2035. The population of the U.S.A. will tend to decline after 1980 and according to the estimates of Notestein and others north western and central Europe may have in 1970 twelve million less than the estimated population of 1950. The "age pyramids" reveal "younger" populations in countries with high vital rates in Asia, and southern and eastern Europe, Latin America and Africa. An increase

in the rate of population growth is indicated here, which as elsewhere will follow a reduction in birth and death rates. With prolongation of life and fewer births the proportion of children will decrease and that of persons above the reproductive period will increase. Finally, these populations may also suffer from 'ageing' and then begin to decline.

In general, therefore, world population will stabilise itself and then decline and even die out. How soon will it happen depends on the fall in vital rates, a function of opportunities which cannot be foreseen with our present knowledge. Hence any estimates of future world population are no better than rough guesses but the probability is that in the near future we shall continue to increase rather more rapidly in the underdeveloped and congested regions than in the industrially advanced countries. A recent estimate puts the south-east Asian population of 938 millions of 1940 at about 1700 millions in 1990 under the existing trend. The southern and eastern Europe including the U.S.S.R. may probably have an additional 80 million people. At the same time there are no prospects to relieve this growing inequality of pressure upon resources by migration.

To maintain their growing population the backward countries will be compelled to improve their respective economies by drastic changes in allocation of their resources, particularly of man-power. Their efforts will be directed to improve their comparatively very low individual productivity. Economic progress of the backward regions will simultaneously force further technological advance in areas already technologically advanced where margin of employment invariably depends on external markets. Due to peculiarity of income-elasticity of demand of primary goods world agriculture under these conditions will soon be faced with surplus stocks and shrinkage of markets. Production might still lag behind needs which require a large expansion of world output. For instance, according to the FAO estimates, world food needs in 1960 are matched to an increase over prewar supplies, of 21 per cent in cereals, 27 per cent in roots and tubers, 12 per cent in sugar, 34 per cent in fats, 80 per cent in pulses, 163 per cent in fruits and vegetables, 46 per cent in meat and 100 per cent in milk. But much before production reaches these targets market supply may exceed market demand and then a bewildered world may, once again, as in the thirties adopt restrictionist economy. 'Thus on the one hand there is danger of a return of unmarketable surpluses of certain agricultural commodities, resulting in a disastrous break in prices which would have widespread repercussions throughout the economy and lead again to heavy pressure for restriction of farm output; and on the other, a need to expand production in order to raise levels of health and standards of living throughout the world'.*

The magnitude of this problem is evidenced by the gap between known and realised productive capacity in agriculture. At present, output of food per man is ten times greater in the advanced compared with that in the poorer countries. In some countries a fifth of the population produces a diet of 8,000 original calories

* (FAO—*World Food Survey* 1946 p. 307).

for the country as a whole while in less developed countries less than 3,000 calories are obtained by efforts of two-thirds or more of the population. According to one estimate 45.5 man-hours were required for the production of one quintal of rough rice in China in contrast to 3.3 man-hours in the United States. It is true that to some extent the low agricultural productivity per person in the less developed countries reflects the adverse relationship between population and cultivated land. In eastern Asia cultivated area per head is only 0.5 acres—some 50 yards each way, and in southern Asia 0.8 acres in contrast to 2.0 acres in the U.S.S.R., 2.7 acres in the United States, and more than 10 acres in Australia, Canada and New Zealand. This, however, may be responsible in areas with a heavy pressure of population on soil for a labour-intensive framework of cultivation and the fact remains that here in spite of it, yield per acre is also low. In southern Asia, with meagre land (0.8 acre of cultivated land per caput) food output is only 3,600 original calories per acre. In contrast, in western Europe with only 0.7 acre of cultivated land per caput 7,500 original calories per acre are obtained. Yields per acre are among the highest in western Europe and they are still rising. The U.S.S.R. with 2 acres per person raises the lowest amount of original calories per acre *i.e.*, 2,300.

Low per capita productivity is often associated with low yield per acre and an improved system of agriculture will raise both. Functionally, it would release in Asiatic countries and south-eastern Europe large proportions of populations engaged at present in agriculture for employment in industry and trade. The introduction of new technology will not be found feasible under peasant and subsistence farming. Both will require capital investment on a scale that is not practical without help from the advanced countries or without undue hardship that may give a violent shake to democracy. Agricultural progress will have to be dovetailed with and be limited by developments in secondary and tertiary industries in these countries.

Prospects of increasing productivity in backward areas are not simply hypothetical. Studies undertaken in some of these countries indicate that scope of improving farming efficiency is considerable and experimental farms are already obtaining very much higher yields than the average. For India, Dr. Burns estimates that per acre yields of grains could be increased by 30 per cent in ten years—5 per cent by the use of improved varieties, 20 per cent by manuring and 5 per cent by protection against pests. The total increase can easily be raised to 50 per cent by subsequent improvements. According to the same authority egg production could be increased from 50 to 130 per bird, *i.e.*, by 160 per cent and milk yield by 75 per cent in case of cows, 60 per cent for buffaloes and 50 per cent for goats. These projections will probably be magnified many times if full effects of scientific farming are taken into consideration and a proper land use is visualised. Crop competition results in the Uttar Pradesh this year indicate that

the best farmers obtain many times higher yield than the average. The following figures are very significant indeed:—

Crop	Maximum Yield per acre (in mds.)	Average yield per acre (in mds.)
Potato	687	150
Sugar cane	1950	350
Paddy	65	8.88
Maize	42.5	7.68
Juar	20.0	5.31
Bajra	18	4.67

Productivity even in the advance countries has by no means reached its full capacity. Highest yields are obtained in the United Kingdom and still within the last decade agricultural production could be increased by 35 per cent over the prewar level. Experts believe that it can be raised considerably further and of course it is still increasing. The average yield per acre of wheat in Argentina, Canada and the U.S.A. is less than half of that in the U.K.; in the U.S.S.R. and Australia it is only a little more than one-fourth. Further, area under wheat cultivation can probably be doubled in the near future in the major wheat exporting countries—in Canada another 45 million acres can be added to the 25 million under wheat at present. Since the last war the U.S.A. has become a substantial exporter of both wheat and rice. An increase in productivity in the advanced countries will take place probably sooner than in the less developed countries on account of the momentum of an early technological start. This may improve terms of trade further in their favour and give rise to protectionist agricultural policies throughout the East.

Agricultural production has nowhere reached its capacity or limits of cultivation. Not more than 5 to 10 per cent of the world's land area is yet used for cultivation and that too not to its fullest extent. A recent estimate by Pearson and Harper (1945) shows that of the 34 per cent of the total land area of the world receiving adequate and reliable rainfall measured by an annual precipitation of 15 inches or more, except, in the equatorial region where 40 inches are needed, only 4 per cent (1,400 million acres) is actually used to produce food crops. Taking into account all forms of cultivation the total cultivated area is about 4,000 million acres as against a total of 12,000 million acres of culturable land. Two acres of land can perhaps be added to each acre under cultivation at present but such scope varies in different continents—the less sparsely populated regions of the world having a proportionately larger capacity. The relative capacities have been estimated as follows:

Continent	Percentage of land area	
	Suitable for cultivation	Under crop
Asia	6—10	5.0
Europe	35—40	20.0
North America	10—15	6.0
Africa	3—10	2.5
South America	3—10	2.0
Oceania	3—6	1.5

Outside Asia and Europe it is largely an extensive type of cultivation that is practised. Everywhere, however, land resources can be increased, almost doubled, by breaking new land besides conservation and reclamation of once fertile land now lying barren, except in China among the major countries where some 350 million acres out of 482 million acres of cultivable land bear crops at present. An extension of the cultivated area is easier in regions with a low pressure of demand and will without shifts in population accentuate the distribution problem leading to gluts in world markets.

Technological advance in future may push frontiers of cultivation beyond the 15 inch rainfall region through developments in irrigation facilities and dry farming technique. Moreover, possibilities of extending cultivation to temperature ranges considered unsuitable previously are no more theoretical as the U.S.S.R., it appears, has already widened its range of cultivation.

On the whole, there seems to be little danger of world ever running short of land resources which, however, may remain unutilized to the extent required at any particular time due to shortage of capital. Acute scarcities are, therefore, likely to recur in low income countries with extremely limited capacity to save and invest. For this very reason *viz.*, the low purchasing power of the underdeveloped countries, production in countries with large capital and technical resources will soon rather than late exceed world demand at a very low level of consumption. Apart from welfare consideration such a state of the world will be undersirable as there will be incessant economic warfare leading to protectionist policies, shrinkage of market, restriction of output, unemployment and war.

Increasing world's purchasing power is the crux of the agricultural and population problems of our times. Food scarcity is only its obverse side, the real issue being poverty. An ever normal granary, freedom of international trade, differential prices and protection to 'vulnerable groups', all require serious consideration in formulation of a world agricultural policy. These, however, will not increase world's purchasing power, depending on a higher level of real incomes, *permanently*. Prosperity like peace being indivisible, it is in poorer countries where real income needs to be increased a great deal. Economics at present is hardly aware of any method of doing this without fresh capital investment. But low income countries have reached their capacity to save and any further effort in this direction is likely to seriously dislocate their economic system. To nurture world's purchasing power, therefore, capital from high income countries should flow to its natural level, the underdeveloped regions of the world.

Failing international movement of investment resources over-population will be apparent everywhere—in the form of unemployment in advanced countries, which, as a result, will be compelled to adhere to restrictionist policies defeating their own purpose and in actual starvation and mal-nutrition in the less developed countries which will lack the means to purchase the surpluses that the former countries will

be most anxious to sell. A precondition of movement of long term capital on an appreciable scale is that it should be free *i.e.* the lending countries should not fetter it by demanding safeguards and guarantees and thus turn it obnoxious and suspect while the borrowing country should not even indirectly attempt any discrimination. Capital will then not only move but *migrate* to the country of its choice, which from its view-point would represent 'empty spaces' of the world. Will there be free capital migration? There is a big question-mark and the challenge contained in it epitomises the world population and agricultural problem.

SOME FACTS ABOUT AGRICULTURE IN BIHAR

by

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The sources of information regarding agriculture in Bihar are the twin publications "The Season and Crop Report of Bihar" and "The Agriculture Statistics of Bihar". These are published annually by the Director of Agriculture, Bihar, and contain practically the similar information and may with advantage be combined into one publication. It is an admitted fact that our agricultural Statistics are defective and the "Guide to Current Official statistics" issued by the Government of India says, "In the permanently settled and unsurveyed areas, owing to the absence of a trained village staff, the figures for acreage are reported by the police chaukidar and are believed to be only rough estimate. This is true of the returns from Bengal (except the area under jute), Bihar and considerable portions of Madras and the United Provinces". Recently, however, a new organisation has been set up in Bihar under the Superintendent of Agricultural Statistics and crop statistics are being collected since 1945-46 by a large staff of karmacharies, circle inspectors and district supervisors by a process of complete enumeration of agricultural lands. It is hoped that under the new organisation the reliability of our agricultural statistics will improve considerably. In undivided India excluding the states, Bihar possessed about 8 percent of both the total area and net area sown in the provinces. Although she stood seventh among the provinces of India in respect of her net area sown, in point of acreage under the different crops her position was second in maize, barley and linseed, third in rice, gram, sugarcane, jute and tobacco and fourth in rape and mustard.

Roughly speaking it may be said that of the total area of the province, 15 percent is not available for cultivation (either because it is absolutely barren or uncultivable or covered by buildings, water and roads or otherwise appropriated for non-agricultural purposes), 15 percent is covered by forests, 15 per cent consists of culturable wastes other than fallow, 15 percent current fallows and the remaining 40 percent is under crops. It is, however, surprising to find from official statistics that while the proportions of land under the first three categories have remained