Our Natural Resources

(Contributed)

FOR a country of its size, India is probably as well endowed by nature as any country in the world. It has large areas of fertile alluvial plains well watered and with excellent facilities for development of irrigation, high water power potential and fairly large deposits of a number of important minerals, besides forests of considerable size and rich fishing grounds along its coasts and rivers. But the country also has a population of close on 350 million which is increasing at the rate of approximately 1 per cent, per annum. It is against the needs of this large and growing population that the natural resources of the country have to he considered. Because this is not always done, there is so much controversy about the abundance or inadequacy of our natural resources. The really important question for us is not how much of a particular resource is available in the country, but how much of it is available *per capita.* Are the natural resources of the country sufficiently large to support an economic development which would ensure a certain minimum standard of living and provide employment to the people?

Agricultural Land

Among our diverse natural resources, undoubtedly the most important is our agricultural land, which gives employment directly to about two-thirds of the population, and indirectly to a sizeable proportion of the remaining third. Exactly what proportion of the total land area can be used for agricultural purposes, we do not know yet. At the present time, nearly a third (245.6 million acres out of a total land area of 781.4 million acres) is reported to be under crops. This means that there are nearly 0.7 acres of crop land for every person in the country. This acreage of crop land per capita is much lower than that in most of the newly settled countries of the world, and is even lower than those in most of the agricultural countries of Asia and Europe. In USA, for instance, crop land *per capita* is nearly five times as high as it is in India today. In France and Yugoslavia, it is nearly twice as high and even in Italy, which is considered to have a serious population problem, it is about 50 per cent, more than in India. Only in some of the highly industrialized countries of North-Western Europe like Great Britain, Germany or Netherlands which rely upon imports for most of their needs of foodstuffs and agricultural raw materials, or in densely populated countries of the Orient like Japan and China, is crop land per head of the population lower than it is in India.

But if crop land per head is not high, neither are we making the best use of the land which is available. The yield of most of our crops arc very low compared with countries where agriculture is advanced. Rice is our most important crop, 25 to 30 per cent, of the total cropped area being devoted to its cultivation. But the yield of rice in India is very low in comparison with countries like Japan and Italy where it is grown on small farms by peasants, as in India. It is also lower than in USA, where rice is cultivated with the help of machinery and the farmer does not devote more than a small fraction of the time and energy to an acre of rice which the Indian cultivator does.

The yield of rice in 1938-39.
in lbs. per acre

Italy . .	2,903
Japan . .	2,276
Egypt	2,153
USA ..	1,469
Burma . .	959
Siam ..	943
India . .	728

The same holds true in the case of other important crops like wheat, cotton and sugarcane. Our yield is far below what it is in countries where cultivation is intensive or where the latest scientific techniques are used; even though cultivation may be extensive.

The reasons for these low yields and the measures that are necessary for raising them, are well-known and nerd not be repcated here. What should be stressed in an assessment of our natural resources is that in most parts of the country, low yields are not due to an unfavourable physical environment, but to other reasons and can be easily rectified if better methods *of* cultivation are adopted. There arc undoubtedly areas like Rajasthan or the dry interior of the Deccan Plateau where rainfall is low and uncertain, and possibilities for irrigation limited. Only crops like millets can be grown in these areas and their yields will most probably remain low and fluctuating. But the greater part of the cultivable area does not come under this category. Most of our croplands are in the plains—the Indo-Gangetic plain of Northern India, the plains along the East and West coasts, and the deltas and valleys of the major rivers of Peninsular India. Soils in these plains are quite fertile, as they are derived from river-borne alluvium and are being continually renovated by fresh additions of alluvium. Drainage is good and because of the level topography. these plains are very suitable for agriculture.

The deficiency, if any, is that of moisture. In some parts like Assam, West Bengal, and Travancore-Cochin, moisture is sufficient for crops throughout the year. But in most parts, it needs to be. supplemented by irrigation, more so because rainfall is concentrated within a short period of four to six months leaving the rest of the year dry. But facilities for irrigation are extremely good in most parts of these plains., and there are many large irrigation works, besides innumerable diversion channels and wells. The major part of the 50 million acres of irrigated lands of the country are situated in these plains. There is considerable scope for further development of irrigation also, as there are still large areas whose productivity could be greatly increased, if they had an assured and adequate supply of water.

The needed water can be made available by storage works on the major rivers.

Considered as a whole, the physical environment in our plains is quite favourable for agriculture, and is better than in most countries where yields are very high. In Japan, for instance, high yields of rice are obtained from soils which are inherently of low fertility (being acidic) and have to be fertilized and manured heavily for maintaining such high yields. In the countries of north-western Europe also the soils are mostly poor and have to be similarly manured and fertilized. A century ago, crop-yields in north-western Europe were not much higher than what they are in India today. It is application of manures and fertilizers and development of scientific agriculture that have brought up yields

to such high levels in these countries. There is no reason why the same cannot be done here.

Looking to the future, it appears that the major increase in our agricultural production must come through higher production on the lands already under cultivation, and not through increasing the cultivated area. There are undoubtedly considerable areas which are not being cultivated at present and which could be cultivated. But they are not very large and the rate at which they can be brought under cultivation cannot be fast enough to make up the existing deficiencies of agricultural production and also to provide for the needs of an expanding population. Much increase in cultivation can take place on lands which arc at present classified as " current fallows" and "other uncultivated lands excluding currem fallows ".

Current fallows total 54 million acres, and a portion of them can undoubtedly be cultivated. But there are obvious limits to the reduction of fallow land as our soils receive very little of manure and no chemical fertilizers, and allowing them to remain idle for a period is the principal method of restoring their fertility lost from continuous cultivation. The " other uncultivated lands excluding current fallows'' total approximately 81 million acres. Of this 16 million acres arc reported to be " culturable," most of it is in Madhya Pradesh and Madhya Bharat. 'The 3 million acres of land which are being currently reclaimed with heavy tractors form part of such " cultivable waste." But even if all these 16 million acres are brought under the plough it will add only 7 per cent, to the present cultivated area and even if this is done within the next seven years, it will make little difference to the agricultural production per head as population will also have increased by 7 per cent, during the period.

Mineral and Power Resources

Coal and Iron ore: No country in the world is self-sufficient in supplies of minerals. The requirements of modern industry are so varied and so large that even USA and USSR, which are the richest among the nations of the world in mineral resources, have to depend upon imports for some of their most essential minerals. The USA, for instance, is dependent upon imports for most of its needs of minerals like tin, tungsten, manganese, mica, nickel and antimony. Besides it imports large quantities of copper, iron ore, aluminium, petroleum and other minerals. . which she herself produces in large quantities. The most important point to consider when assessing a country's mineral resources is whether there are adequate supplies of basic minerals like coal and iron, of good quality and suitably located for the establishment of a core, of heavy industry. India may be said to pass this test. She has supplies of coal and iron ore of qualities suitable for the iron and steel industry, and they are located within relatively short distances, 150 to 200 miles of each other. The main coal fields are in a narrow belt extending from Raniganj in West Bengal to Karanpura in Bihar. The major deposits of iron one arc found to the south *of* the coal fields in Singhbhum district of Bihar and adjacent areas in Orissa. The steel works at. Jamshedpur are located between the coalfields on the north and the iron ore mines on the south, somewhat closer to the latter. The other essential minerals, like dolomite and manganese, needed for steel production also occur within short distances of the works, which is an added advantage.

The iron ore deposits of Bihar and Orissa are of very good quality, their metal content being over 00 per cent. Also, it is generally agreed that the reserves are quite large.

Estimates of reserves vary between 3,000 and 20,000 million tons, while present production is only about 3 million tons per annum Besides these, there are fairly large deposits of high quality iron ores in Madhya Pradesh, Salem and Trichinopoly districts of Madras and in Mysore. The last one is being utilized by the small plant at Rhadravati. but the others are not being exploited at all. '

The position, regarding coal, however, is not so bright, though total reserves of coal of all grades are quite large. Estimates of reserves, as in the ease of iron, vary widely, depending on the method of computation, but there is no doubt about the large size of the total reserves. The reserves of high grade coals, however, and of coking (metallurgical) coal in particular, are small. The latter, which is an essential raw material for the iron and steel industry, have been estimated at between 750 and 1,200 million tons in recent years. This supply can last us a few decades if the consumption remains at its present level of 10 to 12 million tons per year of coking coals. But if the consumption goes up, as one would expect with increasing industrialization, they would be exhausted much earlier unless, of course, conservation is practised. And, it is not impossible or even very difficult to conserve cokirg coal. A large proportion of the present production is being used outside the metallurgical industries. where other coals could well be substituted. This raises some technological problems, which will have to be solved. For one thing, it will be necessary to make certain modifications in the designs of locomotives so that non-coking coals can he used in them because the railways are one of the largest users of coking coal. The expense and effort involved is worthwhile. as coking coal is an essential material for the most basic of all industries, and its supplies are very small. This question of conservation of coking coals has engaged the attention of the Government for some time. A committee was appointed to study the question in detail some time ago and its report is at present under consideration.

Other Minerals

Alter iron, the most important metals are the so called non-ferrous metals like copper, lead, zinc, tin silver and aluminium and the ferro-alloy metals like manganese, chromium, tungsten, nickel, venadium and molybdenum. The non-ferrous metals find a variety of uses in modern industry. Of them, copper is undoubtedly the most important, although aluminium is fast gaining in importance because of of the wide range of its uses. With the exception of aluminium, India is deficient in supplies of all the important non-ferrous metals, and this is one of the major deficiencies in our mineral resource position. These deficiencies, however, are not such that they cannot be remedied. Latest advances in metallurgy have now made it possible to develop some of the less known minerals of which we have ample reserve to develop non-ferrous metal industries which will go a long way to meqt our present deficiencies in minerals.

Deposits of copper are found in Singhbhum District of Bihar, in Sikkim State and in Rajasthan. Only the Bihar deposits are being worked at present, and the produc-

tion meets about to per cent, of our annual requirements of copper. The balance is met by imports.

Deposits of lead are known in Rajasthan and lead has also been produced in small quantities in recent years. But most of the requirements have to be imported. 'There is no domestic production of zinc or tin, nor are there any important deposits. Aluminium is the only non-ferrous metal of which India has large resources. Good quality bauxite (ore of aluminium) is found in Bihar, Madhya Pradesh, Bombay and at a number of other places in Peninsular India. Besides, in many of the Indian laterites (a common soil in India) concentrations of aluminium are large enough to be workable. This favourable position in aluminium is fortunate, as aluminium can make up many of our deficiencies in non-ferrous metals, especially of copper.

Ferro-alloy metals are used in steel making, in order to give steel certain qualities like resistance to rust, tough ness, ability to withstand rapid motions, etc. The- use of alloy steel has increased with amazing rapidity in recent decades, and these steels have become indispensable for modern machines As the alloy steel industry is yet in its infancy in India, there is very little demand for these metals at the present time. But. as the industry develops, their demand will increase and their shortage will be keenly felt for India has large deposits of only one of them manganese. The main deposits of manganese are in CP Bihar, Orissa and Bombay, though there are numerous smaller deposits scattered all over Peninsular India. Most of the production is exported, became domestic consumption can absorb only a small part of the total production. Chromite (ore of chromium) deposits are worked in Mysore, Bihar and Orissa. Before the war, most of the production was exported, but the exports have declined of late. 'The reserves however, art not large. There is no production of any of the other ferroalloy metals, although venadium deposits are known in Bihar and Orissa, and arc considered to be workable. We may mention here two other minerals—sulphur and mica- before we consider sources of power. Sulphur is needed for the manufacture of sulphuric acid which is one' of the most important materials in modern industry. It is unfortunate that there are no sulphur deposits of any size in the country, and nearly all our requirements have to be met by imports. Mica is used mainly in the electrical industry. India has a virtual monopoly of high quality sheet mica which is essential for certain types of electrical equipment.

Sources of Power

Coal, petroleum and hydro-electricity are the three major sources of power in the modern world. Of these, coal is the most important, though the other two have been steadily increasing in importance. Our resources of oil are decidedly meagre, and it appears likely that we shall continue to be dependent upon our oil-rich neighbours (especially Arabia, Bahrein. Iran and Iraq in the Middle East and Burma and Indonesia in south-east Asia) for most of our oil needs. The only known oil Held in India is near Digboi in Assam Production is about 80 million gallons per year, which meets less than 10 per cent, of our total requirements. Most of our imports are now coining from Middle East countries as the Burma oil fields from which most of the supplies came before the war, have not yet come back to production.

The water power potential of the country is believed to be high, of the order of 30 to 40 million kw., although no complete survey of the resources has been made so far. In view of the fact that resources of coal are none too large and those of oil are very small, our water power potential assumes a special significance. Suitable sites for power development arc available close to the centres of population, which is a great advantage. Finally, electricity can be supplied almost as cheaply to the small workshop in the villages as to the large factory in the industrial centres so that development of hydro-electricity can be a major factor in the industrialization of the countryside. The present development of hydro-electricity in the country is rather small. The total generating capacity of the existing plants is about 500,000 kw.; of this nearly 45 per cent, is in the three Tata plants which serve Bombay, The hydro-electric and multi-purpose projects which are under construction at present, when completed, will generate another 1,500,000 kw. of electricity.

To sum up our position in mineral and power resources: We art moderately well equipped with the resources for building up a modern industrial economy. Our principal assets are large deposits of high grade iron ore, aluminium and manganese, and a large water power potential. Total reserves of coal are fairly large, but those of coking coal are decidedly small and need careful conservation. Among our deficiencies, the most serious is that of oil, while deficiencies of non-ferrous metals, ferro-alloys and sulphur are also of major significance.

Air Services in Britain

Private operators have always (eared that the Corporations would eliminate this form of competition by undercutting their prices, so subsidising their charter activities out of State subventions. So far there has bevn only one charge of tin's nature and as the rate agreed for that charter by BOAC was not disclosed, the allegation must be regarded as unproved. Appvarances are beginning to suggest that the Corporations are glad to have, a reserve of carrying capacity in the private pool to help them in times of pressure.

For the present, at all events, that is convenient. BEA in particular makes the bulk of its revenue in the holiday season. If it could not call on private operators for help at those times it would have to equip itself with a bigger fleet of aircraft.

To give a good return on capita! outlay commercial aircraft have to be flown at least 2,000 hours a year. If a big proportion of their capacity is not tilled on each trip, they have to do 3,000 hours a year.

Because of the relatively short stages of BEA and the unwillingness of passengers to start or arrive in the dead of night, the average " utilisation " rate in that Corporation is 1,600 hours a. year and that is obtained only by dint of cheap fares to tempt passengers on to the early and late services.

The danger that private operators, allowed to operate certain routes for a period of five years, will come to regard themselves as having a vested interest in them is almost inevitable. Six routes operated this year by private companies are to be taken over by BEA next year. That has caused something of an outcry.

The private companies are asking that they should be given a larger measure of security. The Government has expressed 'no opinion but, assuming that the reserve pool of commercial aircraft is desirable, that plea may have to-be conceded.