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It is needless to emphasize that an agricultural census should bring together in one publication all statistics relating to agriculture and allied subjects and thus succeed in putting an end to the chaos arising out of number of publications brought out by many departments connected with agriculture in one way or other, each giving publicity to a set of figures specially compiled from its own view point or for a specific purpose. Statistics of cultivated area, crop acreages, yields, etc., will remain an annual feature, as at present, while information on other aspects may be published quinquennially. Incidentally this reform will end the difficulty of reading the statistics comparatively because of variations in the forms of various departmental publications. Earlier we have referred to the need of expanding the scope and work of the Statistics Section of the Department of Agriculture into a full fledged Agricultural Statistics Bureau, which should be the proper body to receive all returns relating to agriculture, land and allied matters from the taluka officials and corresponding authorities of the Public Works, Forest, Registration, Co-operative and Land Records Departments. Being in charge of proper presentation and timely publication of unbiased agricultural statistics, it will be in a position to insist on getting the returns in time and in this way eliminate the delay about all the annual reports and periodical crop forecasts which is a feature today. With the creation of the Bureau and the appointments of the Agricultural Statistics Inspectors who will be under its direct control both for inspection of data collected and for helping the Bureau with details on certain aspects, most of the irregularities at the source will disappear.

OUR FORESTS AND FOREST POLICY

by

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INTRODUCTION

Forests are aptly described as the 'hand-maids' or rather the 'foster-mothers' of agriculture and, in fact, the economic patterns of some of the great regions of the world are characterised by forest economy as against agricultural, industrial, pastoral or mixed economies. Forests influence the climatic conditions, regulate the flow of rivers and streams, protect soil from erosion due to winds, floods, etc., and stabilise condi-

tions of agriculture. Besides the physical, climatic and aesthetic values of forests, their economic and social utilities are immense. They provide fodder and shelter for the cattle, fuel and timber to the people and a host of other minor products are obtained from forests or extracted from wood such as fibre, pulp, sugar, alcohol, synthetic rubber, explosives and chemicals, cattle feed and even protein food. Unsystematic denudation of forests was a powerful factor in rendering vast expanses of land unfit for human habitation or utilization which led to the decay of some of the ancient civilisations. The great shelter belts in the U.S.A. and Russia were said to be raised largely from an agricultural view-point rather than from the view-point of a prospective yield of timber. We find, however, on the other side that mal-utilisation and forest demolition having been going on at an alarming pace for decades due to a number of causes of which private ownership and inadequate forest management may be pointed out to be the major ones in India. Thus today, in India and elsewhere, the rehabilitation and development programmes such as housing, construction of railways and roads, repair or establishment of new industrial installations as well as the levels of employment in building trades are seriously handicapped partly due to want of structural woods. Fuel scarcity is largely responsible in parts of the Far and the Middle-east for burning cattle-dung and agricultural refuse, which if used as manure would increase the output of food-crops by at least 10 per cent. In this sense it must be reckoned as an integral part of the "Food Problem" since about two-thirds of the people in the world use wood for cooking. In short, no attempts for reorganisation of agriculture in India will be effective unless the forests are reorganised at the same time.

Forest Resources — Situation in India and the World

With regard to forest resources, Brazil, Argentina, Peru, Columbia, Mexico, Chile and S. Africa may top the list. The jungles of Brazil although richer in standing timber as compared to other countries, remain largely unexplored, particularly in the interior and near the North Amazon. About 80% of British Guinea (a mandatory of Australia) is covered by forests, while in Mexico the forest produce is counted as very important next only to the value of her mineral wealth. It is well known that forests play a significant role in the economies of Sweden, Norway and Finland. In the South and East Asia, Burma, Siam, Malaya, French Indo-China and East Indies are more or less self-sufficient to meet their domestic requirements and have a little balance of their forest products for export, whereas China, India and Japan are deficient in many products which are made good by imports. For example, the forests in China cover only 8.4% of the total area which, besides,

are remote and inaccessible. In spite of the great demand for forest produce during World War II, the forest situation of the world generally speaking does not appear to be sound. Out of 4,000 million hectares under forests, only 300 million hectares are properly managed, 2,000 million hectares are still left untouched, while 1,000 million hectares are being exploited without ensuring their continued productivity, and 500 millions have been so denuded that they are rendered not only valueless but even a source of danger to good cultivation. Excessive cuttings in Europe during war were estimated as 121% of the tree growth with the result that the continental countries are faced with wood deficit to meet the needs for their rehabilitation programmes.

Though India is relatively better off than China, the position is far from satisfactory, since the proportion of forests to the total area of British India in 1940-41 was only 11.4%, while 20% is regarded as the minimum area required to be under forests.

It is obvious that the area under forests is very small except in the Provinces of C. P. & Berar and Assam where the proportions are 20% and 40% respectively. In Bihar, Sind and N.W.F. Province it is less than 3%, in Orissa, the U.P. and Punjab less than 7%, while it ranges between 9% and 14% in Bengal, Madras and Bombay. In addition to the low percentage of the area under forests, their distribution is uneven and their location not so economic. About 80% of the forests in the U.P. are found in the Himalayas or just below them on the plains and only 20% are distributed in the province, largely on its extreme southern border. In the C.P. and Berar, the position is somewhat better, the forests being distributed in the four corners of the Province, on the Vindhya and Satpura ranges on the north, on the Ajanta hills in the west and Sihawa in the east, in the basins of Wainganga and Indravati in the south and lastly a few are scattered in the plains of Berar, Nagpur and Chhattisgarh. Only about half the forest area of India is deemed accessible and profitable for exploitation. It is gathered that the most valuable forests in India lie in South Kanara district in Madras Province and in Chanda district in the C.P.

Main types of Forests and their Features

The world's major forest regions are located in the North temperate zones and the tropics. The forests of the temperate zones are considered valuable because they contain timbers of superior variety and are accessible. Consequently, they have been considerably exploited and large deforested areas have been put to cultivation and other uses. The tropical forests are situated in S. America, Africa, in some parts of S. Asia and its adjacent islands, are far more varied than the former and have relatively few useful species.

Table No. 1 showing the extent of forests and outturn of forest produce for some important provinces (1940-41)

Province	Area of Province sq. miles	Forest Area				Proportion of Forests to the total area of Province %	Outturn of Produce		Rs.
		Reserved Forests sq. miles	Protected Forests sq. miles	Unclassed State Forests sq. miles	Total sq. miles		Timber & fuel (in 000 c. ft.)	Minor produce	
Assam	55,445	6,655	70	16,116	22,841	41.2	17,653	704,557	
C.P. & Berar	98,573	19,432	....	....	19,432	19.7	44,975	1916,329
Bombay	96,026	10,560	160	....	10,720	14.1	53,831	2692,775
Madras	125,163	15,330	304	....	15,634	12.5	22,760	1374,885
Betgal	78,708	6,339	877	....	7,216	9.2	26,007	478,136
Orissa	32,398	1,395	871	1	2,267	7.0	7,425	340,570	
U.P.	106,248	5,241	527	432	6,200	5.8	65,261	2261,444	
Punjab	96,830	1,487	3,209	823	5,519	5.7	38,649	2073,574	
Bihar	69,348	1,355	662	2	2,019	2.9	7,001	290,568	
Sind	47,155	1,043	92	....	1,135	2.4	11,695	108,751
N.W.F.P.	13,099	266	....	12	278	2.1	4,675	104,021
† Total for whole of Br. India	858,375	72,936	6,772	18,550	98,258	11.4	3,06,479	125,10,731	

1. See: Forestry and Forest Products (World situation—1937-46) by the Food and Agricultural Organisation of the United Nations, August 1946, Part I.

The statistics may not necessarily represent the wooded areas, since unclassified state forests or 'public forest lands' as they are often called, include in many provinces all unoccupied waste, often entirely devoid of trees vide Statistical Abstracts for British India 1937-39 to 1940-41; Government of India Press, 1948, p. 392.

† Totals include figures in respect of Coorg, Ajmer-Marwara, Andamans and Nikobars Islands etc.

The forests of India may fall into some of the following categories.

(i) The tropical wet evergreen forests. They are found in the Western Ghats of Bombay and Madras and in the strip lying south-west from Upper Assam through Cachar and southwards through the Chittagong hill tracts and along the Arakan coast, where the rainfall is over 100".

(ii) The tropical semi-evergreen forests: They are located in the western Ghats and are also extensively found in Assam and other lower slopes of the Eastern Himalayas constituting as a transitory tract between the evergreen and the moist-deciduous. (iii) Tropical moist-deciduous forests: They occupy the strip along the foot of the Himalayas and are also found on the leeway of the Western Ghats and round Chota Nagpur.

(iv) Tropical dry deciduous forests: They are found irregularly all over where rainfall is 40" to 50". (v) Tropical thorn forests: They exist in a big strip in the Indus basin in the South Punjab and Rajputana and Sind and large areas in the Upper Gangetic plain and the Deccan Plateau, where the rainfall is between 10" to 30": (vi) Tropical dry evergreen forest, covering a small area in the Carnatic Coast; (vii) Subtropical wet hill forests: They are found in the lower slopes of the Himalayas in Bengal and Assam and locally in Khasis, Mahabaleswar and Nilgiri Hills; (viii) Sub-tropical pine forests in the Central and Western Himalayas and other places in the Khasia hills; (ix) Sub-tropical dry evergreen forests: In a small patch in the north west corner on the higher reaches of the Indus and its tributaries: (x) Wet temperate forests: (xi) Moist temperate forests: They exist in the Central and Western Himalayas containing Conifers and Oaks, Deodar, Blue Pine, Spruce, Fir and Tsuga. (xii) Dry temperate forests containing Deodar, Pine, Jessuiper, etc : (xiii) Alpine forests: In the Himalayas over 10,000 ft. high containing fir, birch, rhododendron, etc. and; (xiv) The irrigated riverain forests of Sind containing Babul, Kandi, Ipe and *populous euphratica*.

Ownership and Control of Forests

Forests are owned both by private and public agencies, although in view of their economic and social importance, in recent decades the general trend has been for public forestry or substitution of private forestry by public, wherever possible. In Sweden the forests are largely public, yielding during the period 1909 to 1924 an average of about \$4.25 millions which would amount to 6% on their valuation. In Czechoslovakia, prior to World War II, about half the forests were owned by the State, and the rest by private individuals, co-operatives and public organisations, while about 90 to 95% of forest area in S. Africa belongs to the State. In India, however, the forest area under private ownership is not very large; it is about 23% as compared to 77% of the area under the control of the State—the Provincial and the Central Government.

The case for State ownership and management of forests is evident. In the first place, in the case of private ownership, the objective is usually to make as much money as possible for the owner and both investments and expenditures, if any, will be in relation to the expected returns. In fact, almost all the forests of the Zamindars, Malguzars, etc. in India have been depleted and brought almost to the verge of ruin by felling most of the trees without any efforts to replenish them or to operate them under some well-devised plans to sustain their productivity. By virtue of ownership, the political, social as well as economic life of the people in the forests or in their neighbourhood was largely governed by the zamindars and the malguzars in the past, thus their acquisition by the State would mean also the political and social emancipation as well as a rapid advancement of the status and welfare of thousands of people. But mere State acquisition of forests by itself would not bring about this result, unless it is followed by a well directed programme of their development with sufficient funds. Government regulation of private forests has been tried in many provinces but it is proved ineffective to promote good forestry, since many a provision is being by-passed in every possible way in various parts of the country by private owners. The C.P. Government have tried the experiment of taking on a 50-year lease some of the forests of the Ahiri Zamindari in the Chanda district and the results are reported to be encouraging. But it must be recognised that on principle, there is no justification to advocate encouragement of similar leases for other extensive private forests in the C.P. or in other provinces where the Congress Governments in power have pledged themselves to the abolition of the Zamindaris.

Problems of Conservation and Utilization

The way in which the natural resources of the country are exploited either by private owners or by government reflects not only good or bad national morals in discharging their functions to the social or national advantage, but also how far they fulfil their obligations to posterity in leaving the resources in a condition rather enhanced and not impaired in value as a national heritage and indeed as a proud bequeathal of the present generation. Therefore, in the matter of exploitation of the national resources, a balance has to be struck between the demands of the present generation and those of the future, so that our resources will not be exhausted in a single generation but preserved and passed on from generation to generation with better systems of utilisation and improved methods of technology. The basic causes responsible for the unsatisfactory state of affairs of the Indian forestry at present are: colossal destruction of forests by the proprietary interests, inadequate protection from fire, plant-diseases, over-grazing of the cattle, incomplete utilisa-

tion of forest wealth due to lack of well conceived system of working plans, inadequate research with regard to utilization of forest produce and, above all due to want of adequate trained personnel for conserving and developing forest wealth. On account of these and other allied factors, the forests are sadly neglected which call forth urgent attention to check the wastage and to evolve a balanced and orderly system of forest management in relation to the needs of our industry, agriculture, transport and housing. Some of the problems of forest conservation and utilisation are outlined as below:—

(a) *Protection against Fire:* Several square miles of the Government forest area in the Dangs division of Bombay province were reported to be seriously affected by fire recently. In fact, forest fires are a major factor in destruction of government forests involving loss of several lakhs of rupees to the government. According to the Conservator of Forests, the C.P. & Berar, due to destruction of vegetation by forest fires, the dust storms formerly more or less unknown have become regular in the province. Since the introduction of the "early burning system" about 25 years ago as a measure of economy, it is observed that there has been a progressive devastation of our forests. Only about 1% of the total forest revenue is spent on fire-protection measures by the Forest Department of the C.P. It may be noted that the success of efficient management of the best teak forests in Allapalli (Chanda division) and Bori (Hoshangabad division) is ascribed partly to the effective system of fire protection enforced during the last 70 years. It follows, therefore, that more money has to be spent on fire protection (if not for insurance of forests against fires) and on propaganda to bring home to the people the vital importance of such measures.

(b) *Control of Grazing:* In regions of low rainfall, the forests are thinly spread with trees, covering the intervening patches. If grazing is allowed moderately, the forests suffer no damage and both grazing and forestry can be carried on without any serious loss to either. In fact, due to removal of grass, the young trees may grow better and may lessen the hazards of fire. But unregulated grazing inflicts serious damage to forests in many ways, e.g. direct damage to young trees, hardening of soil unfavourable to regeneration and tree growth, removal of vegetative cover leading to erosion, deterioration in the yield and quality of grasses and increase in losses due to fire. Hence the forests may be *opened to grazing by rotation* after a period of 3 to 5 years and in certain seasons, along with a proper classification of cattle for purposes of levy of differential or favoured rates and exclusion of others like goats which cause damage. It is observed that even the worst use of forests with controlled grazing can produce some 12 maunds fodder

more than under uncontrolled grazing. Cutting of grasses instead of grazing may be encouraged where possible.¹

(c) *Recreation and Management of wild life:* There cannot be anything more grand and more bewitching than the ways of Nature and its beauty. It is imperative, therefore, to preserve and maintain not only the flora and fauna of Nature but also its wild life such as the lions, the tigers, the wild buffaloes, etc., and birds which make forests their abode. But when on the outskirts of forests, there are cultivated tracts, it is essential to drive these animals into the interior or annihilate all those considered dangerous to human habitation or destructive to crops by employing a professional hunter instead of entrusting the work to amateur persons against awards. A revision of the existing shooting rules is also necessary. The preservation of wild life may be confined to the innermost recesses of the forests or preferably to national parks or Game Reserves as in the U.S.A. to provide 'game' and recreation. The recent statement made by the Central Government of India for establishing a National Park of about 150 sq. miles in Assam is commendable in this connection.

(d) *Forest Produce and Forest Industries:* The total outturn and value of forest produce for different provinces are given in Table I. The average annual income from the State managed forests for 1929-31 was estimated at Rs. 4 crores approximately, which dwindled down to Rs. 2.75 crores during the years 1933-37, showing a decrease of about Rs. 1.25 crores on the average. It may be noted that these figures do not take into account the grazing facilities, fuel, etc. allowed freely or at concessional rates to the peasantry and to the forest tribes. Innumerable products can be extracted directly or indirectly from forests such as different kinds of wood and timber, bamboos, charcoal, various grasses, resins, lac, medicines, oils, artificial silk, tanning and dyeing stuffs, etc., which are not fully exploited or remain untapped. As a consequence, India has to import every year large quantities of foreign woods and wooden articles, textile machinery parts, tool handles, matches, pencils, newsprint, various classes of paper and cardboards and a host of others. In the year 1935-36 it was estimated that foreign woods and wood articles (in fact the value of imports of plywood of tea chests alone amounted to Rs. 53 lakhs) excluding teak, sandal and cabinet-wares were Rs. 18,37,185 and Rs. 25,60,442 respectively; besides 34,328 tons of newsprint, 77,875 tons of packing and wrapping papers inclusive of kraft papers and 28,175 tons of strawboards were imported from abroad. The value of imports of cheap varieties of papers and boards amounted to not less than Rs. 3 crores. It is not possible here to

1. Cf. Questionnaire of the Forest Policy Committee, C. P. and Berar (1948) pp. 14-16.

discuss in detail the possibilities of development of each of the forest products in India or to find substitutes for those imported.¹ But there is no doubt that there is a large scope for the development of each of the above mentioned industries through carefully planned research in utilisation and preservation. For instance, by improvement in preservation and seasoning of woods, our woods may be made more durable and more widely used including their use as railway sleepers replacing steel and iron to a great extent. It will be advantageous if departmental exploitation is more popularised.

(e) *Transport*: Due to lack of transport and inadequate development of forest industries, much of the cheap timber and other minor forest produce goes to waste. In fact about 43 per cent. of the forests managed by States are inaccessible, due to want of suitable means of transport and communications. Mechanical transport like motor lorries is not possible extensively in forests in absence of good roads. The only means of conveyance are the country carts and water transport. In fact, the latter is the cheapest and the most convenient form of conveyance, but the full benefit of it is not being realised in India, since most of the Indian woods do not float and also due to the rocks, etc. in the way of the streams obstructing a free passage for plying the boats or floating the timber. Unless suitable means of communication by removing the impediments for water transport and by connecting the major forest centres by railways are established, avoidance of wastes and full utilisation of forests would be impossible. If transport is possible by motor trucks in certain areas, the charcoal manufactured from forests may be used as fuel for the vehicles.

(f) *Conditions of Labour and Welfare of Forest People*: Government managed forests provide employment to about two million persons and in fact procuring adequate labour supply and settling of the nomadic forest tribes present a real problem in forest management. The practice of shifting cultivation variously known as Bewar, Dhya and Podu carried on by the hill tribes by felling the forests and burning the slash for raising crops so long a reasonable yield is obtained without manuring is a potent factor for destruction of tree growth. Therefore, the wandering tribes are settled in forest villages or colonies both to check deforestation and to ensure supply of local labour. In the C.P. and Berar, for example, there are 1,132 forest villages with a population of about 1,21,000, and the villages of Allipalli, Bar-Nawapara and Kalpi are some of the highly developed forest villages. With regard to the nature of tenure, the land of the forest villages in the reserved forests belongs to

1. For a detailed discussion see "Note on Forest Produce" by S. R. Sabharwal, I. F. S., *vide* Soil Conservation and Afforestation. (National Planning Committee Report), *opp. at.*

the State. The settlers have no tenancy or other rights as enjoyed by the ryots under the malguzari or ryotwari systems. They have only certain concessions and privileges as long as they fulfil their corresponding obligations; technically they can be summarily evicted by the Divisional Forest Officer subject to an appeal to the Conservator.¹ It may be suggested that some kind of cooperative or collectivist farming in these villages may be tried and also the contracts for petty jobs and collection of some of the forest products may be given to the labour co-operatives or *muttaks* formed of the labourers of these villages themselves as against outside contractors. Needless to emphasise that the lot of these Adivasis or settlers has to be raised rapidly by providing proper facilities for education, sanitation and extending the benefits of adult franchise.

Forests and War

Forests play an important role in war economy, for they provide huge supplies for construction and repair of military hutments or damaged buildings, green timber for storing trenches, walnut-woods for guns, etc. The part played by the Indian forests, particularly by the forests of C.P. in the war effort may be noted here. During 1940-41 some of the following supplies were made departmentally through the Forest Utilization Officer from the forests of the C.P.

(i) 2,18,241 C. ft. timber valued at Rs. 3,25,415 and 7,19,499 poles costing Rs. 5,67,239 besides *salai* planks were supplied entirely by the departmental agency, while arrangements were made to supply another 1,00,000 C. ft. of timber and 3,54,000 poles;

(ii) 37,323 bamboos from the Betul division were supplied departmentally, to various contractors and orders for supply of 80,000 bamboos in the next year were received;

(iii) 50,000 solid bamboo tent from the Hoshangabad division and 70,000 wooden tent pins mostly babul, sal, dhaora and saj from the Mandla and Amraoti divisions; and

1. "The main privileges and concessions given to the villages are enough cultivable land to support the cultivator and his family. A nominal land rent of about Re. 0-4-0 per acre per annum is charged; (II) Free grazing for eight bulls or cows per holding to cultivators and four such animals to each labourer; (III) Free removal of thorns and wood needed for *bona fide* agricultural purposes, a reasonable quantity of wood and grass for house building and repairs and all the requirements of dead wood for fuel, bamboos, leaves, edible fruits, flowers, and roots for domestic purposes; (iv) Advance of *taccavi* on easy terms in cash or as seed and for purchase of bullocks or carts upto Rs. 500 per individual. Interest at the rate of one anna per rupee per annum is charged on advances thus given. The obligations are that the Forest Department and its contractors have the first claim to the labour of forest villagers on payment of the market rate and that the villagers may not accept other employment without the sanction of the Forest Department." Vide Questionnaire of the Forest Policy Committee, C. P. and Berar, 1948, opp. cit pp. 48-50.

(iv) 3,359 cwts. of dried dhaora leaves from Bhandara, Saugar, Hoshangabad and Jubbulpore to the Harness and Saddlery Factory for tanning purposes.

The above figures are indicative of the war efforts of the forest department as well as the commendable work done through the departmental agency as against private contractors. The expansion of the activity of the department in the province may be seen from the fact that during the two years 1939 and 1940 (ending 31st March) the sales of timber effected from depots and the value of timber and other produce supplied against special orders undertaken by the forest utilisation officer amounted to Rs. 12,60,839 and Rs. 14,17,012 respectively.

Even in a purely military sense, the value of forests is immense. Forests serve as a strong line of defence and as a cover against aerial reconnaissance and attack. Use of artillery at close range and a free operation of mechanical units becomes extremely difficult in forests. As an illustration, in the American Revolution, Arnold's attack against Quebec was rendered less effective after a long struggle of columns through the Main woods. Similarly, in the Riff War, the Spaniards could not conquer Northern Morocco, till they could burn down its oak forests in which the Arabs ambushed the Spaniards. During the World War II, it was the forests of Finland that could withhold the initial attack of mechanised units of the Red Army against Finland. Before the advent of the ships made out of iron and when the wooden ships were in vogue, the forest wealth of a nation was a single powerful factor for defence on land and attack on sea. Thus, it is evident that forests lying along the frontiers have to be carefully preserved and clear felling of trees has to be prohibited as a measure of national defence. The damage caused to forests in the last war was extensive not so much due to bombardment, as due to heavy fellings to meet the requirements of war. In Europe, the forests of Greece and Poland appeared to have suffered badly in the last war, while no great havoc was done to forests in other countries involved in active fighting.

Our Forest Policy

The first Statement on Forest Policy was made by the Government of India in their resolution No. 22-F of 19-10-1894 embodying the following principles: (i) In order to preserve the general climatic and physical conditions of the country it is necessary to have sufficient areas under forests; (ii) therefore, it is imperative to preserve or create at least the minimum areas considered necessary for the general well-being of the country; (iii) land for purposes of farming is of greater importance than for forestry but permanent cultivation should not reduce areas under

forests below the necessary minimum; (iv) realisation of largest amount of revenue may be aimed at in management of forests consistent with the principles of sustained yield and after satisfying the needs of the local people at free or at concession rates. In the light of the above, State forests are divided into four main classes, viz. protective forests, timber forests, minor forests and pasture lands. Guiding principles for the management of each have been laid down. On the basis of this policy, simple working plans were prepared for the working of important forests in different provinces by the end of the 19th century and subsequently more detailed working plans for a few. Almost to the present day, the forest policy followed in India has been guided by the principles underlying this statement. The next important announcement made on forest policy is discernible in the observations made by Sir Herbert Howard, Inspector General of Forests in India in 1944 in his note on "Post-war Forest Policy for India". According to him the most important forest problems of India are: (a) proper land management to control floods and erosion and afforestation of certain tracts deficient in forests, even if it affects private ownership, and (b) provision of small timber and fuel for the general agriculturist to satisfy his direct wants as also to wean him of the habit of burning cowdung needed as manure.

It may be noted that the Government of India's forest policy as laid down in 1894 has certain flaws and the developments that have taken place during the last half a century would call for a more comprehensive and rational forest policy. Firstly, the statement has in view only the State forests, the large extents of private forests having been excluded from its scope till the passing of the Indian Forests Act. The demand for timber, fuel and other forest products has enormously increased due to increase in population, development of industries, transport and communications and hence the need for forest products is no longer restricted to meet the requirements of agriculture and that of the local population alone. Due to rapid strides of silvicultural research, the importance of many forest products has been created or enhanced and they are put to more than one use. The present outlook of the world emphasises the need for developing to the maximum capacity the forest resources available within the country itself in order to lessen its dependence for imports from abroad, at any rate in so far as the defence and essential requirements are concerned. Lastly, the reorientation of the policy is also indispensable for conservation of forest resources from being destroyed through reckless exploitation, or undue neglect under private or public enterprise and for establishing a balanced utilisation and development of forests on the basis of sustained yield.

A detailed examination of the results and the achievements of the Indian forests based on the old forest policy is not possible here except

by way of passing reference. Forests were a Central subject till the introduction of Provincial Autonomy under the Government of India Act 1935, perhaps with the exception of Bombay and Burma which were entrusted with the work of administration of their forests since 1920. Even though valuable forest resources have been built up during the last fifty years, the objectives of the forest policy of 1894 are far from being fully realised. In the first place, it is doubtful whether the minimum area considered necessary to be under forests has been created. Owing to the reduction in the total area as a result of the partition of the country, the proportionate figure of 11.4% must have appreciably gone up now to nearly 25%. But this sudden increase in the area under forests is effected by partition and not by the forest policy. Secondly, no concerted effort was made to establish fuel and fodder reserves as recommended by Dr. Voelcker. The general policy followed has been to create "reserved" forest out of valuable timber forests, forests unencumbered with rights and distant forest areas meant specially for 'protection' and to constitute the rest of the forest area into "unreserved" forests, "unclassed" forests and "protective" forests. On account of the fear of incurring the displeasure of private owners or local population by interference with the customary rights, the salient regulations of the Indian Forest Act as well as the principles of the forest policy have not been strictly enforced with regard to grazing or overcutting of trees. Consequently, overgrazing and over-felling of trees have depleted the growing stocks in almost all classes of forests and impeded their regeneration, thus intensifying the demand on the "reserved" forests. Moreover, the system of forest administration by village communities or Panchayats have also contributed to the general deterioration and even destruction of some of the Government forests in some Provinces. Government regulation of private forests has not been found effective to check mal-utilisation of private forests.

Outlines of Future Policy

If forestry is to be successful, it has to be necessarily planned and systematically developed. Again planning, to be effective, must have some definite objectives in its view. The objectives of forest planning pertinent to our analysis are: (i) to be self-sufficient in production of timber and other materials necessary for Government requirements and particularly for defence and military use, (ii) assured supply of forest products for public consumption and for the needs of the agriculturist, (iii) supply of raw materials obtainable from forests for industries, pharmacies, railways and shipbuilding and other means of transport, communications and building trades; (iv) Protection of forests from soil erosion, avalanches and high winds; (v) Preservation

of wild life for recreation and scenic beauty as well as physical and climatic purposes and (vi) realisation of the maximum income by way of regular revenues from exports of forest produce and a saving from curtailment of imports and wastages in production and utilisation. In some forests, one or two of the above objects might be more prominent, while in others it may be possible to combine a good many, if not all, of these objectives.

To achieve these aims, some of the following measures may be adopted; (i) From the view-point of defence, all forests lying along the frontiers and also within the country having some strategic importance should be preserved and large-scale felling of trees should be prohibited in such areas. For the same reason, all the waste lands and sub-marginal and hilly tracts along the adjoining borders which are found not suitable for profitable cultivation or habitation may be afforested with suitable trees (ii) as a measure of erosion control, all tree-cutting may be prohibited on steep slopes or regulated cutting under rigid control may be permitted on less steep areas and coastal tracts. Similarly, free growth around lakes, on the banks of rivers, streams and in the vicinity of sea coast may be preserved or created to prevent bank washing, unless the other uses of such areas outweigh the consideration of protection in certain cases. (iii) In the matter of afforestation and deciding the different claims of land for forestry, pastures and cultivation particularly in relation to the Grow More Food Campaign, the guiding principle must be one of a proper assessment of values under different uses in the context of the short term and long term effects. For example, if particular patches of forest areas which are considered to be of greater value are brought under cultivation, they may be completely cleared of trees and successfully cultivated under field crops in preference to forest crops. But every effort has to be made to afforest all hills and unhealthy areas in the interior, all sub-marginal lands and as much land as possible shown as "not available for cultivation" and other waste lands which are not suited for farming or the costs of bringing them under cultivation would be very high when compared with the expected returns. Forests are determined by physical and economic factors and it is not possible to suggest their mechanical distribution since areas under them may be surplus in certain tracts and deficit in others. Therefore, in those regions and provinces, which are favourable for forestry due to physical factors of climate and topography, forests may amount to even 30 to 40% of the total area, while in the deficit provinces and regions which are predominantly agricultural, at least a minimum area must be maintained under forests, say 15% to cater for the local demand for firewood, fodder and grazing which cost heavily when transported over

long distances. (iv) Accurate data about the local requirements regarding areas under various kinds of forests, amounts of timber, rate of growth in relation to annual fellings for domestic consumption and total demand have to be collected for their planned exploitation. The removal and replacement of inferior trees and shrubs with suitable plants of high grades and the improvement of mixed woods by scientific cutting and measures for protection from fire, diseases and theft have to be seriously taken up with proper working evolved for forest management. Along with the schemes for abolition of the Zamindaris, the private forests should be compulsorily acquired by the state on payment of suitable compensation and should be brought upto the level of state managed forests through proper schemes for their rapid development. Instead of entrusting the work of management of the minor forests to village panchayats, they may be handed over to co-operative societies which have to carry on the work under the supervision of the trained personnel of Forest Department under the working plans prepared by the Government. (v) There is a large scope for research into the different kinds of woods and produce obtained in Indian forests and into the methods of their seasoning and preservation. Imports of timber and wooden articles may be reduced to minimum by developing our own resources or by finding substitutes for some of the imported stuffs from the available timber forests and, if necessary, by introduction of some of the valuable species suited to Indian conditions in our forests. There is great scope for development for forest industries like manufacture of paper and plywood, fibres, rayons, lac, oils, fat, gums, medicinal drugs and other woods useful for sports, toys and building purposes. When our hydro-electric potentialities are fully exploited, it may be possible to use electricity cheaply in transport and manufacture of some of the forest products. It is also essential to avoid wastes in various phases of manufacture by developing a system of integrated forest industries and subsidiary industries on the lines of those in the Scandinavian countries, which, no doubt, may take some time to establish.

Conclusion

Obviously, forest policies have to be set up in relation to the conditions and requirements of a nation and their success or otherwise can be judged only after a very long time from economic and social effects. In the above discussion, an attempt is made to bring out some of the economic and social aspects of the major problems of forests, discreetly avoiding the technical side which is the field of a silvy-culturist rather than that of an economist. The success of forestry depends not only on silvy-cultural research, but largely how it is put into practice with the increase in 'forest consciousness' among the people themselves and

the extent of their co-operation. One of the major handicaps of Indian forestry is lack of trained personnel which may be made good by establishment of adequate number of schools and colleges and research centres for training and research in forestry to man efficiently the plans for rehabilitation of our forests.

SOIL EROSION IN RAJAPUTANA *

(PART II) **

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Sheet erosion is also effected by wind. The predisposing conditions for wind erosions are: (1) a dry period; (2) an absence of protective covering for the soil and a low fertility level, causing the soil to pulverize; and (3) a broad, flat or slightly undulating region across which wind and soil can move unhindered. Evidently, the most important of these is the prevalence of drought conditions for a sufficiently long time as a result of which the soil becomes dry and can be easily blown away.

Strong currents of wind on arid country pick up loose particles of sand, clay, leaves, etc., and drive them along. In eastern Rajaputana wind-blown sand deposits itself in many places. As early as 1879 the Editor of the Rajaputana Gazetteer wrote (Vol. I, p. 132): 'Bharatpur forms part of the alluvial basin of the Ganges and Jumna, consequently the great majority of the exposed rocks is alluvial, consisting of modern alluvial deposit, with blown sand which the wind carries from the desert of Rajputana, and occasionally forms into mounds to the leeward of some natural inequality in the surface'. According to Wad,† there is always an encroachment of wind-borne sand on the arable lands of Rajputana as well as a sorting out of finer particles by wind from field surfaces, leaving the soil less retentive of moisture and its surface poorer in plant food. For example, in the northern portion of the Kishangarh State, which is extremely sandy, the sand is blown from the north-western district of the Jodhpur State. In many instances this *blown sand* has been deposited in transverse valleys amongst the hill ranges and seems to *encroach slowly over the entire tract*. Many a farm-stead has been absorbed in an advancing tide of wind-blown sand. As early

* The Territory is now known as the United State of Rajasthan.

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† Wad, *op. cit.*, p. 587.