# A CASE FOR MORE FODDER-BEARING TREES*

THE subject of increasing the "fodder-bearing" arboreal vegetation of India, particularly in the arid and semi-arid regions, is one of great importance. It is a known fact that the semi-arid regions of the world are the natural environment of famous breeds of cattle, and that drought and scarcity of grazing are often features of these tracts.

These dry regions usually have, indigenous to them, varieties of drought-resistant trees and shrubs, often described as "fodder-bearing", inasmuch as they produce edible leaves and pods. These are of inestimable value to graziers for feeding livestock when drought has destroyed surface grazing. Such species on attaining maturity can usually survive and thrive on a much smaller annual rainfall than is required to produce surface grazing on the same area. Unfortunately, very little has been done in India to increase their numbers, and this field offers unlimited scope for work and organized development.

*Reasons for Failure.*—For the past twenty years I have worked in that semi-arid tract of North-West India, which is the natural environment of the well-known breed of Hariana cattle and where famine and scarcity years are more the rule than the exception. During this time I have seen thousands of cattle kept alive by the harvest from the indigenous fodder-bearing trees of the tract, and have always regretted the absence of any organized plan to increase the tree population.

The activities of the peasant in ruthlessly lopping trees for fodder and for fuel are usually blamed for the dearth of the same. I cannot fully subscribe to this, as most of these severely and unscientifically lopped and pruned trees do survive this harsh treatment.

The two main reasons for the failure of fodder-bearing trees to spread over the areas to which they are indigenous are—

(*a*) The entire absence of any organized effort (in the arid and semi-arid tracts at least) to educate, and inculcate in the peasant a love of trees, and to inspire him to develop them.

(*b*) The habit of these particular varieties of trees themselves, generally speaking, is not satisfactory for self-propagation.

The first is a matter for organization and propaganda, and the second can be adjusted by man at the expense of very little effort.

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* By W. S. Read, P.V.S., Superintendent, Government Cattle Farm, Hissar, Punjab, in the *Indian Farming*, Vol. I., No. 3, March, 1940.

Drought-resistant trees found in the arid tracts, mostly fruit by forming pods which contain the seed. These seeds usually have extremely hard skins which are impervious to weather, and they may remain in or on the soil for years without germinating. Those that do germinate have usually first passed through the digestive organs of livestock, where the coat of the seed is softened. Such seeds are expelled in the dung of the animals and then germinate. A few which fall into places offering suitable protection and sufficient moisture grow into trees, but the majority either die or are consumed by birds and other vermin. Thus, self-propagation is a slow process.

This preliminary to successful germination, however, is easily reproduced artificially, and the growing of fodder-bearing trees in greater numbers is, therefore, simply a matter for education, propaganda, and organization.

*Room for Fodder-Bearing Trees.*—The use of the word "plantation" is being avoided in this article, as to the layman it is likely to evoke visions of large areas of woods, spinneys or copses, usually dependent upon a rainfall of at least 25 in. anually, or facilities for copious and regular irrigation. The work of establishing and developing such wooded areas is also generally regarded as a matter to be left to the skilled staff of the Forestry Department.

Undoubtedly there is considerable room for plantations of fodder-bearing trees in areas where the livestock population is high, and the rainfall or watering facilities are sufficient for establishing such plantations. Many of them are on or near areas already controlled by the Forest Department and can be dealt with adequately by its officials.

*Simple Technique.*—The most urgent need, however, is for the reafforestation, with fodder-bearing trees, of the cattle breeding tracts of the arid and semi-arid regions of India, always so liable to protracted scarcity and famine. Obviously it is not possible to create special circles of the Forest Department to deal with these areas, and neither is it necessary. The technique for increasing the population of fodder-bearing trees is simple and well within the scope of the peasant if he is properly instructed, guided, and inspired by local officials, land-owners, and others.

High rainfall or abundant irrigation is not an essential for increasing the numbers of indigenous fodder trees of these arid tracts. They have already established themselves under low rainfall conditions and survive in years and consecutive years of abnormally scanty rains, in spite also of ruthless lopping and pruning.

At the Government Cattle Farm, Hissar, reafforestation, on both *barani* (rain-fed) and *nahri* (canal-irrigated) areas has been practised for many years. A good example of the small quantities of moisture required to grow indigenous fodder trees was observed during the present cycle of successive famine years. A few years ago an old village road on the farm was made up, and seeds of the *khikar* (*Acacia arabica*), treated in the manner about to be described, were sown in the borrow pits. No artificial irrigation has been given, and acute famine conditions have prevailed for over three years, but still these young trees have survived.

*Propagation.*—The method of propagation is simple. Fallen seed pods from existing trees should be collected, and be stored is a dry place until the rains. They should then be treated by either of the two methods given below :—

(*a*) Pen some sheep or goats and feed the pods to them, keeping them penned so that the droppings containing the seeds may be collected for sowing, or

(*b*) Prepare liquid manure in old oil drums or other vessels, and steep the seed for several days until the skins have softened.

After a shower of rain the prepared seed should be sown in borrow pits, along *bunds*, and in any suitable places where moisture accumulates. The seedlings should be covered with thorn to protect them, until they have grown sufficiently high for much of the foliage to be above the browsing reach of sheep and goats.

*Encouragement Needed.*—This simple process is within the scope and ability of the average peasant. All that he requires is training, example and encouragement. District officials of all departments are in the best position to supply this. The village notables are keen students of the idiosyncrasies of those in authority. Should their recreation be shooting, *shikar* is provided. Rest-house gardens and compounds always improve when an amateur gardener is in power. If district officials of all grades appear to become bitten with a craze for reafforestation, and it becomes known that recommendations and awards may in future depend a good deal upon the local increase in the number of fodder-bearing trees, the tree population will most certainly increase.

Good use might also be made of the Boy Scout organization, by infecting the boys with a desire to grow trees and keep them alive. Waste water from domestic operations from each house in a village could also be utilized to keep at least one young tree alive.

It is true that the peasant rather dislikes trees, as he says they harbour the birds which destroy his crops. He must be taught to realize that the fodder from the trees is a great compensation when he has no crops, and that many of the birds are really his friends, as they destroy the insect pests which infest his soil and crops. Any trees which he does grow at present are usually of a quasi-religious character, such as the *pipal* which is grown for shade round tanks, wells and places of worship, and is not very much use for anything else. He should be taught that fodder-bearing trees instead would also give shade and at the same time be a source of profit to him in times of grazing scarcity as well as in other directions.

The most important item of any programme for increasing the tree population in dry areas must be the total elimination of any defeatist complex that the peasant is the natural destroyer of trees and that nothing can be done about it. The problem can be solved if the educated will take up reafforestation and infect the peasant by their enthusiasm and example.

*Use for Tanning Industry.*—Probably the chief of the fodder-bearing trees of the arid tracts of north-west India is the *khikar* (*Acacia arabica*). Its leaves

and pods are eaten by all classes of livestock, and the seed (which is produced prolifically) is amenable to the treatment already described in this note. It grows to a considerable height and thus is safe, when mature, from over-grazing. The wood is a good fuel and makes excellent charcoal, and the bark is of importance to the tanning industry. The timber is hard and strong and is largely used in village carpentry.

Another fodder-bearing tree which has been gaining in popularity is the Mesquite (*Prosopis glandulosa*). During the past few years many thousands of seeds have been distributed from the Government Cattle Farm, Hissar, and the tree is now becoming quite common in the Punjab. Only the pods are edible, but on the plains it gives two heavy crops of these annually. The fact that the leaves are not relished by livestock is an advantage as it saves the tree from extermination, and the seasonal fall of the leaves adds badly needed vegetable matter to the soil. The Mesquite has a remarkable root system, which binds the soil and prevents erosion. It also gives plenty of shade, makes an efficient wind-break, and the wood from mature trees can be used as fuel. The seed can be prepared for sowing by the methods already described.

Both of these trees will thrive under arid conditions in the *barani* areas, and suitable places for sowing them are on grazing lands, on *bunds*, on the boundaries of fields, in the burrow pits of village roads, round tanks and wells, as groves round villages, and in the compounds of tahsils, thanas, and schools. These latter places might be used as seed collection and distribution centres.

I may add that the enthusiast for increasing fodder-bearing arboreal vegetation in the arid and semi-arid areas of India must be willing to work for posterity with little hope of acknowledgement or reward. He will find that subordinates are more willing to work on schemes showing direct results, such as seed distribution of new varieties of proved high-yielding field crops, the digging of manure pits, or almost anything that will show visible results in the shortest time. The task of convincing the peasant is also far simpler for projects by which direct and early results can be proved.

These are no doubt the chief reasons why vital operations, which only give indirect benefits (such as the problem under discussion), have been so sadly neglected in the past.

*Portulacaria Afra Jacq.*—In the low rainfall areas of South Africa, there is a small, drought-resistant, fodder-bearing tree, known in English as Elephant's Food (*Portulacaria afra* Jacq.) and called in Africaans " *Spekboom* ". It grows in the form of a short gnarled trunk which divides into short branches carrying a mass of fleshy shoots covered with small fleshy leaves. These are eaten avidly by sheep, goats, and cattle, and farms which have their grazing areas well covered with this plant fetch much higher prices when offered for sale than those devoid of " Spekboom ".

During my recent tour in South Africa I became particularly interest in this tree, not only because it is a fodder tree, but because I recognized it as belonging to the same group as *Portulaca*, a green, ornamental pot and border plant, well-known to gardeners in northern India. This indicated that *Portulacaria afra* Jacq. would probably also thrive in this country.

The Government Botanist at the Grootfontein College of Agriculture, Middelburg, Cape Province, informed me that there are only two species of *Portulacaria*, both of them South African. He thought it possible that a variety of it might have been introduced into India as an ornamental plant, as it is not infrequently used as a hedge or border plant in South Africa.

*Palatable Types.*—He further informed me that some types are much more palatable than others, that the usual method of propagation is by means of cuttings and that it resists drying out to such an extent that cuttings would no doubt survive if posted to India in a suitable container. The plant also sets seed, but it is rather difficult to collect, as it drops promptly when ripe. He had no information as to the viability of the seed.

I saw *Portulacaria* growing *barani* in areas of low rainfall in South Africa, under extremes of climate reasonably similar to those found on the plains of Northern India. It is true that these areas were 2,000 feet and over above sea level, but I must point out that such heights in Africa do not compare with similar heights in the hilly areas of India. South Africa is a country of extensive, high plateaux on which climatic factors are more similar to the conditions found in the plains, rather than the hills of India. Nevertheless, I think *Portulacaria afra* Jacq. should also thrive in the hills and foothills of India, where its deep rooting habit would be an additional advantage.

From the foregoing it would appear that some investigations in regard to *Portulacaria afra* Jacq. might be of value in this country. Lines of research might include ascertaining whether the *Portulaca* already known in India is one of the palatable varieties of *Portulacaria*, and if so whether a useful fodder-bearing tree can be produced from it in suitable environments. Trials could also be made with palatable species of *Portulacaria afra* Jacq. imported through the good offices of the Government Botanist at the Grootfontein College of Agriculture.