afforestation of unclassed state forests lands areas in chittagong hill tracts of bangladesh

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Areas under Dacca-Mymensingh Sal, *Shorea robusta*, forests of central zone of Bangladesh is shrinking rapidly due to encroachments resulting from serious population pressure. The depleted lands of the Unclassed State Forests of Chittagong Hill Tracts, which can sustain only forest crops, have been suggested to be sought under afforstation programme to compensate it. The choice of species, the nursery techniques to be adopted and the labour supply situation that may arise in executing the programme and the consideration of the pest problem which might arise in future have been discussed mainly.

INTRODUCTION

In the wake of plausible expulsion threat from the plain forests of Dacca-Mymensingh areas and the northern zone of Bangladesh due to expanding population pressure, the necessity, scope and arguments for afforestation of Unclassed State Forests (USF) is now much more genuine, wider and stronger respectively than before. These USF areas constitute a large tract of contiguous land, free from the vices of legal complications and from all norms of scientific land use, land classification and land capability considera tions, should be devoted to forestry. This should not be viewed as merely an argument for increasing forest areas but be taken as a legitimate and just demand of the land itself. Moreover, when Bangladesh is under a population pressure of nearly one thousand persons per square mile, the highest in the world, it is unpardonable, with the present knowledge of scientific land use, to

allow this vast tract of potential land to remain virtually unattended and uncared for. Though some basic human problems are appended to the USFs ; yet those can be solved if approached with foresight, understanding, dedication and sympathy. These areas may be managed profitably, if horticulture in the lower fringes and forestry in the rest of the areas are practised.

PACE OF AFFORESTATION

The USF may be graded at par with the Reserved Forests so far the geology, rock, climatic conditions and vegetations are concerned excepting the soil and biotic interferences. Considering other factors remaining unchanged, the top soil and humus level are limiting factors which differentiate the USF, at its present form, from the Reserved Forests. Experiences have already been gathered from afforestation of such U S F areas in the Maini and the Raingkheong valleys under the Jhoom Control Division. It has been observed that the plantations now raised are more successful than those raised a decade earlier. It is not that our technique and supervision have improved radically but the success may be attributed, to a great extent, to the improvement in site quality due to protection for years. The past experience should, therefore, be considered as the guideline in formulating future afforestation programme of these denuded hills. It is suggested that the afforestation programme should, at the start, go slowly and then gear up gradually thus giving scope to the land to regain some of its lost fertility. At the end of 8 to 10 years, the land would be capable of supporting a good plantation. By then, the land would also be able to sustain good Jhoom crop (agricultural crops raised by shifting cultivation practised by tribal people) along with forest plantation. This will help solving the human problem by providing regular employment to certain number of tribal families.

The first phase of the work should be devoted to planning, organizing and raising small scale plantations. A working plan should, therefore, be drawn up. The area should be divided into blocks, compartments and sub-compartments, at this stage ; and should be laid out in maps with proper boundary descriptions.

CHOICE OF SPECIES

Choice of species is considered as the prime factor in the overall success of afforestation programme in such areas. The main objective is to cover up the denuded hills within the shortest possible time. The guiding principle in choosing a species in the first rotation should, therefore, be governed by the capability of the land at its present ecological condition and nutritional level so that it can sustain that particular species without undue stress. Once the condition of the soil is improved, the various economic and utility factors would determine the selection of species in the subsequent rotations. Again, every area has its own characteristic feature as regards the length of Jhooming, the texture and the depth of the top soil, the degree of slope and the existing vegetation it supports. So, the species selec-

tion cannot be uniformly prescribed in advance. From the experiences of the Jhoom Control and Soft-hard wood plantation programmes in Chittagong Hill Tracts, a combination of Kadam, *Anthocephalus cadamba* Miq. and Kainjal, *Bischofia javanica* Blume in the low lying flats and lower reaches of the hill, with Koroi, *Albizzia* sp. Minjiri, *Cassia siamea* Lamk. Gamar, *Gmelina arborea* Roxb sp. Dhaki Jam *Syzygium grande* wald. and Pitraj *Aphanamixis polystachya* Parker. in the slopes and ridges offers a good choice (Zahiruddin 1959-60) *Albizzia moluccana*, a fast growing species, tried in a limited scale in the northern region of Bangladesh, has given a very encouraging result and may be tried here. Some of the areas in Maini Vally have fairly good vegetative cover; and in such areas economically important species like Teak, *Teetona grandis* Linn. Garjan, *Dipterocarpus* sp. Chapalish, *Artocarpus chaplasha* Roxb Mahogrny, *Swientenia* Chikrassi, *Chikrassia tabularis* A. Juss and Tali, *Palaquium polyanthum* Wall. may be planted successfully. However, in sungrass infested areas hardy and quick growing species with dense foliage like Minjiri, Dhaki Jam, Koroi, Gamar and *Albizia moluccana* should be tried.

TECHNIQUES FOR RAISING PLANTATIONS

Almost all the economically important indigenous forest tree species of Chittagong Hill Tracts have been tried in plantations by different methods at different times. From the results of these trials it is recommended that Koroi, Minjiri, Dhaki Jam, Garjan, Tali and Chapalish should be sown densely in line. Line sowing, though a little expensive, has a number of advantages. Firstly, the rate of growth is much faster in the first few years, enabling the seedlings to shoot up above the weed height. Secondly, it offers the Foresters a choice for retaining the healthy seedlings and removing the poor ones during the successive tending operations. Thirdly, the seedlings in the lines have the effect of cover crop and suppress the sungrass and weeds which reduce the weeding cost. In the sungrass infested areas and in the southern and the western exposed slopes leguminous cover crops like, *Boga medelna* and arhhar etc. should be sown in between the lines.

For raising Kadam, Toon,, Kainjal, Champaful, *Michelia cheampaca* Linn. Chikrassi and Mahogony the transplantation of seedlings is done from nurseries raised in the same year. The use of polyethene tubes for raising transplants has given excellent results (Aldhous 1959). The height growth difference, in this case, is in the order of feet; so is the proportion of diameter growth. Initial height and diameter growth is an essential prerequisite for the survival of the plants in tropical rain forests where the weed growth is luxuriant. Under the present practices of transplanting with naked root or ball of earth, the mortality percentage is very high. The causes of mortality of plants in the process of transplantation were found to be due to improper planting, severe shock during uprooting the plants from nursery beds, damage in handling and transportation from nursery to planting sites and the drought following planting. The timing of rains

with respect to planting is the most determining factor. If transplanting is followed by a shower of rain and dull weather, the percentage of success is better. This timing, however, cannot always be maintained because of the magnitude of the work, its remoteness from the controlling offices and nursery sites and the problem of labour procurement during that particular time. As a result, in most cases the transplants either die completely or the leading shoots "die-back" rendering the plant initially branchy. In the first year, the surviving transplants cannot put in enough growth by withstanding the shock and are thus suppressed by weeds. Transplantation of seedlings raised in polythene bags can overcome this disadvantage and, therefore, should be followed for raising successful plantations of miscellaneous species. The use of polythene bags will, of course, involve extra expenditure but this is compensated by the height and diameter growth of the seedlings and percentage of success. For vacancy filling in older plantations, transplantation of one-year-old seedlings raised in polythene bags should be the only choice if effective results are desired.

NURSERY PRACTICES

Good nursery is a *sine qua non* for good plantation and ensures 75 percent success. A few plantations raised during the Second and the Third Five Year Development plan periods are not upto the mark. This is primarily because the plantation programme did not keep pace with the nursery stock. Much more acreage of plantations were raised than was permitted by the nursery stock. The shortfall in nursery was covered by direct sowing of miscellaneous species. But these species required great care both as regards to timely collection of seeds, methods of sowing and planting, as well as, subsequent tending operations. As a result the efforts failed. Since the objective is to practise intensive forestry, the extensiveness should, therefore, be kept only within the financial limitations. It is, therefore, extremely essential that adequate nursery provisions be made in the afforestation programme, not only for raising new plantations but also for vacancy filling in older plantations.

The nursery practices in Bangladesh also needs a radical change. The practices as regards to procurement of seeds and techniques of raising plants should be switched over from conventional methods to modern methods on the basis of the advanced knowledge. It is known that use of sound viable seeds of good inherent quality provides a solid base for raising of fast grown healthy plantations capable of producing wood of good quality. But introduction of such superior varieties presupposes organisation of adequate supplies of seeds of such qualities. Seed stands formed of the selected plantations are the source of best seeds. But such seed stands have not been marked out as yet. Seed orchard is an universally accepted means of propagating clones of selected and improved varieties for supplying seeds of desired quality (Matthews 1963). It is true that in the present system of seed procurement, nothing is known about the age, size and form of the mother trees. It will not be an exaggeration to state that majority

of Teak seeds, the principal species of our plantation, are collected today from trees of 5 to 15 years of age and not from mature trees with good form. It is reported that at Kaptai a group of people collect Teak seeds indescriminately during seeding periods and various Forest Divisions purchase the same from those vendors without knowing the source or origin. Since there is no definitely marked seed stands, supervision of seed collection is not practicable. Establishment of seed stands and seed orchards is the solution to ensure collection of seeds of desired quality and calls for immediate attention.

USE OF FERTILIZER

Application of fertilizers, no doubt, gives good results. In Khaskhali Protected Forests under Jhoom Control Division cultivation of ginger and turmeric was allowed in the plantations. The cultivators used urea in the furrows of the ginger and turmeric rows. After one year a difference of 2 to 3 feet in height growth of the planted seedlings was observed in such areas compared to the adjacent areas where no cultivation of ginger and turmeric was done. So was the proportion of diameter growth. The leaves of plants in fertilizer applied areas were much bigger in size and more green in colour. A very marked contrast was apparent. Application of fertilizer is, thus, worth considering particularly in poor sites. But detail experiments are necessary to establish ultimate cost benefit ratio, combination of fertilizers to be applied, their doses and method of application.

PEST CONTROL

In the natural forests perceptible insect damage is not noticed because the host species of a particular insect or groups of insects do not occur as pure stand. But plantations offer steady supply of succulent food material over an extensive area for a concentrated attack. Although a large scale plantation programme has been launched but the pest control aspect did not receive any attention. Teak, the principal species of the plantations of Bangladesh, is affected by more than one pest. In a severe attack by *Hyblaea puera*, the Teak defoliator, about 30 percent of the annual increment is lost by a single defoliation. Similar losses may also be caused by *Hapalia machaeralis*, the Teak scaletonizer. The Mean Annual Increment (MAI) of a 10-year old Teak plantation of Quality Class-1 is 34 cu ft per acre. Thirty percent loss means a loss of 10 cu ft per acre. In terms of money value, the loss sustained is to the tune of taka two hundred per acre. Spreaded over thousands of acres of plantations affected every year, the loss will calculate to an alarming figure. Successive defoliation leads to complete death of the plants.

During 1970 a severe defoliation of Teak was noticed in Pablakhali, Mohallya and Sarbatali block of the Kassalong Reserved Forests. In most cases a complete defoliation was noticed and some plants died. Similar defoliations were reported from Chittagong, Cox's Bazar and Chittagong Hill Tracts South Divisions. Defoliations of Gamar were also noticed in the plantations of lower

Kassalong Reserves. In 1965 large scale defoliations of Chatian, *Alstonia scholaris* R. Br. both in the nursery and in the plantations were noticed at Cox's Bazar Division. In plantations a substantial percentage of Teak plants are attacked by borer, *Dihammus cervinus,* forming canker rendering the plants initially malformed. Most of these plants break off at the canker. Almost every Gamer plant too is being attacked by the same borer, as well as, other insects.

As plantation area is increasing progressively every year, the ground for wide spread insect attack is being laid and in due course this may break out as epidemic. Therefore, pest control measures must receive prime consideration in plantation programme. In Pakistan Shisham, *Dalbergia sissoo* Roxb., defoliation was effectively controlled by aerial spraying (Choudhury 1963). Such sprayings in Teak plantations of Bangladesh has become an urgent necessity.

LABOUR PROBLEM AND ITS SOLUTION

In an extensive afforestation programme sufficient labour force is necessary to carry out various steps of plantation works, raising of nursery stocks, road making and other subsequent maintenance operations etc. In Chittagong Hill Tracts, where population distribution is scattered and thin, availability of labour for plantation works is a problem. Moreover, the winter cultivation and Jhooming season coincide with the plantation time making it all the more difficult to procure outside labours. So, unless provision for permanent labour force is made, it would be difficult to get labour at the appropriate time. The Forest Villagers (Jhoomia) scheme, as practised in the Reserved Forests, is primitive and crude, advantage is taken of their poverty ; and the crude Jungle life is also continued. It is suggested that a permanent forest village be set up in the same line as the labour colonies of tea gardens and provide those labours with accomodation, school and medical facilities and, if possible, ration at subsidised rates at the time of scarcity. This, on one hand, will ensure permanently experienced labour supply and on the other hand will raise the general efficiency of man power and literacy level of the country.

COMMUNICATIONS IN THE FORESTS

Production is inspired by the consumptive demand. But even with adequate production the demand cannot be fulfilled without the means of transporting the demanded commodities to the consumers. In case of bad means of communication, often such commodities may be too prohibitive in cost to have a market. Again efficiency in production is dependant on the facilities made available to the man and machinary engaged in production. If the time and energy of a worker is spent in reaching the working site and coming back, the efficiency in the execution of work is bound to hamper. Therefore, for efficient execution and supervision of works and easy and quicker marketing of the products, good communication and transportation is indispensible and should form a

part of the future afforestation programmes. A system of main road, feeder roads and inspection paths should be drawn up in advance with the help of contour maps and be executed in a phased programme as the afforestation work progresses. A wheeled tractor with trailor should be provided in each centre of plantation for movement of staff and transporting planting materials.

Road making and maintenance is an expensive item and in a crippled economy prevailing in Bangladesh it may not always be possible to get adequate fund for this purpose. Until then the indigenous resources to provide means of mobility should be depended upon. It is, therefore, strongly felt that elephant should be reintroduced for inspection purposes particularly in the forests of Chittagong Hill Tracts where the new plantation sites have shifted at a distance of 10 to 15 miles from the Range or Beat Office and the only means of communication is on foot. It is thus humanly impossible for the staff to put in their best supervision in the plantation works by walking such a distance in those difficult terrains.

CONCLUTIONS

Land is a fixed resource and can seldom be increased. To the contrary it may even get reduced by river and sea actions. Great responsibility, thus, lies on the agencies controlling and utilizing the land. It is, therefore, stressed that optimum utilization of the land resource be made by exercising judicious and unbiased plans which may not turn detrimental to this basic resource.

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