Multipurpose Tree Species Of Western Himalaya With An Agroforestry Prospective For Rural Needs

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Abstract: The Western Himalaya is rich in multipurpose tree species (MPTs) which are traditionally preferred in agro-forestry. Indigenous plants remained excluded in all reforestation and afforestation programmes run by the Govt. agencies due to lack of the knowledge of local MPTs and planting material. In present paper a list of 70 MPTs is presented with their brief notes on their uses and distribution, suitable for agroforestry plantation. There is need to study the propagation behaviour of these short listed plants so that suitable planting material may be made available for the successful agroforestry programme to ensure people participation. [Journal of American Science 2010;6(1):73-80]. (ISSN: 1545-1003).

Key words: Agroforestry, Himalaya, Propagation behavior, Peoples participation, Rural needs.

1. Introduction

Agro-forestry can play major role in the protecting environment and forest (Khurana and Khosala 1993; Gaur 1993; Quli, 2001). The agro-forestry practice in the Garhwal of Uttarakhand in Western Himalaya is permanent feature of agricultural landscape (Semwal and Maikhuri 1996; Maikhuri et al. 1996; Bhatt and Badoni, 1995; Bhatt and Todaria, 1999; Semawal et al. 2001). However, this system is practiced in unplanned manner. People have little choice in selection of plants and what ever grows naturally is accepted. The planting of sapling by conscious efforts is unknown because people have no knowledge of how to raise a particular plant nursery (Vashishtha, et al. 2005). The farmers have integrated crops, trees and animals in their farming and land management systems reasonably for solving the problem of acute shortages of fuel wood, fodder and other forest produce (Bhatt, 2002).

Spread over 18% of the total area of the country, the Himalaya has had a great influence on the life and culture of Indian people (Boserup, 1965; Gaur et al. 1985; Nand and Kumar, 1989; Swaroop, 1993). The mountainous belt of Himalaya present unique environment concern owing to their young age, origin of the major rivers and complex and fragile ecosystem (Gaur et al. 1985; Ramakrishnan, 1994; Kumar et. al. 1996; Purohit, 1997; Gaur, 1993; Dhar et al. 2000). Therefore, the main objective of the action oriented research in Himalayan region is to promote the socio-economic development of the hill people in harmony with preservation of ecological balance. It should envisage conservation and utilization of ecosystem of Himalayan region under the thrust area such as, creation of nurseries and seedling banks, study of ecosystem and optimal utilization of local resources (Semwal and Maikhuri, 1996).

Promotion of agroforestry can be another step to check deforestation in the hills. It can meet the demand of fodder, and fuel locally and thus lessen the dependence on the forest. Ecological hazards originating from denudation of mountains have generally encouraged attempts to reclaim the barren landscape by
reforestation. However, selection of species remained an ignored aspect in these programmes because information is lacking on indigenous species and large numbers of exotics are being introduced, which may constitute a threat to the ecological security of the region and unfit for the local needs. So far in the annual plantation activity, Bambooos, Eucalyptus, Acacia, Albizia, Prosopis, Dalbergia Delonix, Grevillea, Melia etc. constitute 90% of plantation programmes, which could very well be replaced by local tree species of the region. We cannot reverse this trend unless we know the indigenous MPTs suitable for agroforestry and their propagation behaviour. This should help in raising the saplings of desired tree species in nurseries for plantation purposes and also accommodate the local preference by the farmers.

In this paper, the study presented a list of MPTs which are indigenous to Garhwal region of Western Himalaya and suitable for agroforestry particularly and other forestry programmes in general and Model developed by community for fulfillment of daily needs (Fig. 1).

2. Material and Methods:

The study covers the entire Garhwal of Western Himalaya, which lies in between 29°31.9’ N to 31°26.5’N lat and 77°33.5’E to 80°60’ E long. Physiographically, the whole terrain is mountainous and can be divided in to three zones-lower Himalayan zone (300-500masl); middle Himalaya (600-1000masl); and upper Himalaya (1100-2500masl). Extensive surveys were made during different seasons in various zones of the study area. A tentative list of MPTs was compiled which included more than 70 trees species with notes on folk knowledge regarding multipurpose trees (MPTs), their adaptation and use. The methods of collection, preservation and Herbarium preparation were followed as usual practices adopting by Jain and Rao (1977). The identification of specimens was done with the help of regional floras (Babu, 1977; Hara et al. 1978; Naithani, 1984 and 1985; Gaur, 1999). The description includes botanical names of plants followed by some important citations such as Hooker (1872-97), Duthie (1903-29), Babu (1977), Hara et al. (1978), Naithani (1984-1985) and Gaur (1999).

3. Results and Discussion:

On the basis of survey conducted, it is quite evident that agroforestry is though practiced but by and large is an unplanned activity in Garhwal of Western Himalaya. People prefer to collect fodder for their livestock around their agricultural land, but seldom plant a tree. They harbour and patronise trees which naturally grow and have no choice on their selection. Generally, the rule of natural selection and adaptability governs the distribution. On the basis of survey most commonly used 70 MPTs were identified in the entire Garhwal of Western Himalaya of which 13 species are growing in lower region, 24 species are growing in middle Himalaya and rest 31 species in upper Himalayan zone. The brief description of the plants is presented as following:

List of Plants:

Fodder, Fuel, Timber, Medicine, Nitrogen Fixing.


17. **Cassia fistula** L., Vern. Kirala, F. Caesalpiniaeaceae, Fl. Feb.-Apr., Fr. May-June, upto 1400m; Fodder, Fuel Timber, Medicine, Nitrogen fixing.


42. Millettia extensa Benth. Vern. Gauj; F. Fabaceae, Fl. Apl. – May, Fr. Jul. – Aug., upto 1500m, Fodder, Medicine, Soil binding, Fibre.
monopetala

agroforestry plants are

district of Garhwal the most commonly preferred

too. While in Pauri, Rudraprayag and Chamoli

stricking cultural diversity in the agroforestry

There has been noticeable reflection of

leucotrichophora, Q. gluaca,,Q semicarpifolia

nepalensis,Betula alnoides, Quercus

ridges

Bauhinia

the plants of choice are

eriocarpa

sps, Celtis australis, Grewia oppositifolia, G.

palmata, F. nemoralis, F. subincisa, Quercus

altitude is also different. For example the

The preference of MPTs at different

fodder. While in Pauri, Rudraprayag and Chamoli

 require suitable planting material. Here

people. Any such movement would involve a

conservation of ecology and prosperity of

agroforestry may hold a new promise to the

their trial through ages. Further, the community

make it people programme. People wisely think

and might be largely responsible for failure to

agroforestry was kept away willingly and

from irrigated land. Here the main

consideration was maximum crop yield. Any

plant around the field was considered unwanted.

Hardly any plant was seen in and around the

fields in irrigated area (as has been revealed

during the survey in different localities, Barsu,

Agustyamuni, Tilwara, Gholtir in Rudraprayag;

Gauchar, Maldhar-Saikot in Chamoli; Purola,

Barkot, Uttarkashi in Uttarkashi Disdrict). The

agroforestry was promoted on the marginal and

unirrigated land and treated as welcome

supplement to the poor crop yield. The people

depended more on livestocks in these area

(Guptkashi, Ukhimath, Kandara, Bhanaj in

Rudraprayag and Gpeshwer, Joshimath,

Gairsain, Naryanbagar, Tharali in district

Chamoli).

At present, the plants which

Government agencies use in forestry and social

forestry are commonly Acacia auriculiformis,

Albizia lebbeck, Dalbergia sissoo, Eucalyptis

sps., Grevillea robusta, Jacarands sps.,

Leucaena leucocephala, Mangifera indica, Melia

azadirach, Morus alba, Salix sps., vitex negundo.

However, these plant species are not native to

Garhwal, still they may have been preferred

mainly because the propagation of these plants is

well known and planting material is easily

available. But this shall be a short cut approach

and might be largely responsible for failure to

make it people programme. People wisely think

of a plant well known to them ethnically and

socially. Therefore there is need to know the

local MPTs so that they may be involved in

agroforestry. They also make it better from the

point of view of crop-plant interaction, since

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people. Any such movement would involve a

requirement of suitable planting material. Here

we have selected and identified most commonly

used multipurpose trees giving complete details

of their uses and habitat. From the list presented,

plants can be choosen for particular location

altitude wise. There are some plnts such as

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there are large numbers of

of Garhwal region of Western Himalaya and are

by the people for their needs traditionally

for fodder, fuel and also as cheap timber. It has

been noted that those plants which are not used

as construction material in plains are quite

adequate to meet the demands in hills because

in colder climate the wood is insect resistant.

This cheap wood and fuel comes from non-timber

MPTs which are equally good as provider of

fodder.

It is remarkable that the lower

Himalayan region has predominance of the

multipurpose trees Bauhinia semla., B. purpurea,

Bombax ceiba, Phyllanthus emblica, Ficus

hispida, F. glomerata, Albizia lebbeck, Adina

cordifolia, Acacia catechu, L. chinensis,

Madhuca longifolia,, Mallotus philippensis,

Syzygium cumini, Dalbergia sissoo, Melia

azedarach, Moringa oleifera etc. while the

middle Himalaya have the MPTs such as F.

auriculata, F. subincisa, Boehmeria rugulosa,

Grewia eriocarpa, Litsea monopetala,

Terminalia sps Ougeinia ooeinensis, Bauhinia

variegata, Pyrus pashia. In the upper Himalayan

ridges Ficus nemoralis, Salix babyloinca, Alnus

nepalensis,Betula alnoides, Quercus

leucotrichophora, Q. gluaca.,Q semicarpifolia

etc are quite common.

There has been noticeable reflection of

stricking cultural diversity in the agroforestry

too. While in Pauri, Rudraprayag and Chamoli

district of Garhwal the most commonly preferred

agroforestry plants are Ficus auriculata, F.

palmata, F. nemoralis, F. subincisa, Quercus

sps., Celtis australis, Grewia oppositifolia, G.

eriocarpa, Boehmeria rugulosa, Litsea

monopetala etc., in Tehri and Uttarkashi district

the plants of choice are Bauhinia sps. such as

Bauhinia vahlii, B. variegata, B. purpurea and

Albizia lebbeck, Mallotus philipppensis, Premna

barbata etc.

The preference of MPTs at different

altitude is also different. For example the Ficus

sp. are considered highly valuable fodder in the

higher altitude (1000-18000m asl) area whereas

Celtis australis and Grewia oppositifolia are

consider the best fodder in the lower altitude

(300-14000m asl) of Garhwal of Western

Himalaya. The other striking observation was

that agroforestry was kept away willingly and

wittingly from irrigated land. Here the main

consideration was maximum crop yield. Any

plant around the field was considered unwanted.

Hardly any plant was seen in and around the

fields in irrigated area (as has been revealed

during the survey in different localities, Barsu,

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oppositifolia, Boehmeria rugulosa, Debregeasia

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salisifolia, Pyrus pashia, Toona ciliate, T. serrata which grow over from very low altitude in valley to very high altitude while other group have very restricted habitat. Plants such as Ficus hispida, F. semicordata, Terminalia alata, T. bellirica, T. chebula, Wrightia arborea, Litsea chinensis, Artocarpus lacoocha can only be selected for plantation in lower heights (300-800m asl)

Women folk have to walk miles to get fodder and fuel leaving little time for child care and other household duties; least is to be said about their own emancipation. If agroforestry is adopted, it has a potential to shed off waste of time and efforts. However, it has to be a planned activity and people should have a choice of MPTs and opportunity of sapling availability. In this way the present study may prove to be a turning point. This shall prove especially helpful for Government agencies involved in agroforestry and forestry.

Thus the agroforestry can play a major role in restoring the ecological imbalance by meeting the demand of fuel, fodder and timber of the rural community locally around their fields in Himalayan hills. To make it popular programme, there is a need to include indigenous MPTs of the area. Indigenous MPTs has other advantages also, besides providing fodder, fuel and many of them provide high quality fibre (Ficus semicordata, Grewia oppositifolia, G. asiatica etc) and edible fruits (Celtis australis, Grewia oppositifolia, G. asiatica, Ficus auriculata, Ficus palmata, Ficus semicordata, Ficus nemoralis, Pyrus pashia, etc). A judicious selection of plant species will feed the local needs, an important input for successful programme. Though several workers have recently documented the flora of the region (Naithani, 1984-85; Gaur and Barthwal 1995; Gaur, 1999), but no attempt have so far been made to list the MPTs, which can be recommended for agroforestry. Therefore the present work would be an important step in popularizing the agroforestry in Garhwal.
Acknowledgements:
Authors gratefully acknowledged the Head, Department of Botany, HNB Garhwal University, Director, High Altitude Plant Physiology Research Centre, Principal Govt. P.G. College Gopeshwar, and Project Director Aajeevika project for encouragement and Support throughout the study periods.

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