



Traditional Agroforestry Practices For Sustainable Livelihood In Rajouri District Of Jammu And Kashmir

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ABSTRACT

Rajouri district is located on the south western side of the Jammu and Kashmir (J&K) state. There exist many traditional agroforestry system and traditional practices that are sustaining the rural people. The present study was conducted in eight representative blocks of rajouri district with the objective of identification of important traditional agroforestry practices and traditional knowledge associated with them for ensuring sustainability and livelihood in the district. Based on survey reports done in the field, farmers preference and natural adoptions, Agri-horticulture is the main prevalent system followed by agri-horti-silviculture and agri-silviculture system. Majority of the fruit production is from Agri-horticulture maintained under low input system. Agri-silvi-pastoral and silvi-pastoral systems are mostly practiced on the marginal and wastelands and fodders trees are primarily grown for fuelwood and small timber, however, their value for feeding ruminants necessitates the planting of multipurpose fodder trees on the farm bunds, boundaries and sometimes grown scattered in the fields commonly known as *Gassnies*. Traditional agroforestry systems also provides some assistance originating from traditional knowledge to the farmer and local communities in one or another way thereby ensuring livelihood options for the farmers of the district.

Kew words:

Agroforestry systems, livelihood security, fodder, traditional knowledge.

INTRODUCTION

The bio-diversity of the state of Jammu and Kashmir is un-matched due to the presence of different agro-climatic zones viz. Low altitude sub-tropical, Mid to high altitude intermediate, Mid to high altitude temperate and Cold arid zone. Rajouri - The land of kings, is blessed with diverse climatic conditions ranging from subtropical (Sunderbani, Nowshera and parts of Kalakote) to intermediate (Rajouri, Manjakot, parts of Kalakote, Budhal and Thannamandi) to temperate situations (parts of

Budhal, Dharal and Thannamandi). Rajouri district is located on the south western side of the Jammu and Kashmir (J&K) state. The total geographical area of the district is about 2,53,000 ha of which the area under cultivation is about 93.90 thousand ha (32% of total geographical area). The total irrigated area of the district is 8562 ha which comprises 8 per cent of the net sown area. The cropping intensity of the distinct is 185 per cent. The total livestock population of the district is 11.811 lakh which constitutes 12 per cent of the

states livestock population. About 94.3% of the population of this hilly district is rural and subsistent (Anon. 2008-09; Khar et al. 2012). Majority of the fields of the district are situated across the slopes of the hills. The mean maximum summer and mean minimum winter temperatures are 36.50°C and 2.5°C, respectively. The annual rainfall of the district is about 1200mm. The climatic conditions of the Rajouri favour growth of vegetation luxuriantly and the plant cover flourishes well.

Multipurpose trees like *Albizia lebbeck*, *Celtis australis*, *Bauhinia variegata*, *Ulmus laevigata*, *Quercus himalayana*, *Morus alba*, *Robinia pseudocacia*, *Grewia optiva*, *Melia composita*, *Alianthus excelsa*, and *Dalbergia sissoo* etc. occurring naturally as well as grown under agroforestry systems in districts provides small timber, fodder, fuelwood and are used in making ploughs and implement handles. Trees existing in agroforestry systems in these districts are source of green fodder during the period of shortage of the fodder to the livestock e.g. *Grewia optiva*, *Celtis australis*, *Ulmus spp.* and *Ficus roxburghii*. Tree fruits/fruit products of *Myrica nagi*, *Ficus roxburghii*, *Syzygium cumini*, *Juglans regia*, *Pyrus pashia*, *Morus spp.*, *Prunus amygdalus* and *Aesculus indica* grown under agri-horti system are not only widely consumed by the inhabitants of these districts as regular food supplement to diet but also add variety to diets, improve palatability and provide essential vitamins, minerals, proteins and calories. Since district is characterized by fragility, poverty, inaccessibility, marginality and harsh climatic conditions which in turn lead to limited livelihood options for the people. In such a situation trees grown along with crops in the form of agroforestry provide a biomass reserve upon which people can fall back for subsistence and income in times of crop failure, unemployment and other kinds of hardships, contingencies or to meet exceptional needs. They help to meet contingencies by directly providing recurrent, seasonal or occasional flow of food, fodder, timber, and other products or earn cash to meet the contingencies thus helping in reducing household vulnerability to risk and thereby ensuring the livelihood of the peoples of the

districts. So keeping in view about the above importance the study has been conducted in Rajouri district with the objective of identification of important traditional agroforestry practices and traditional knowledge associated with them for ensuring sustainability and livelihood in the district.

MATERIALS AND METHODS

The study site falls in north-west of Himalayas and lies between 72°16' and 72°30' east longitude and 34°34' and 39°30' north latitude. Rajouri district comprises of three predominant agro climatic zone (ACZs) viz; sub tropical zone, lower intermediate or temperate tropical transition and higher intermediate or tropical region. The sub tropical zone is below 800m from mean sea level, the lower intermediate zone lies between 800-1500 m above the mean sea level and the higher intermediate zone lies above 1500 m from the mean sea level. Present investigations was carried out in the Sunderbani, Lamberi, Siot, Nowshera, Rajouri and Manjakote villages of Rajouri district (Table 1). Traditional agroforestry as well as indigenous practices followed by the farmers were identified through the preliminary surveys of the area and in consultation with the local residents. From each selected village ten informants were selected randomly thereby constituting a sample of sixty informants.

The selected informants were interviewed through group discussions collectively, so as to ensure on spot folk validation and triangulation of the people. The conversation followed was documented so as to record the existing traditional agroforestry systems and indigenous practices and results were documented along with opinion and expression of the respondents.

RESULTS AND DISCUSSIONS

Traditional Agroforestry systems

Agroforestry practices differ considerably from area to area as farmers adapt to needs and circumstances. This section provides a number of examples of the traditional Agroforestry systems and indigenous practices successfully employed by farmers in the district. The major traditional

systems prevailing in the district are enlisted in Table 2. Based on survey reports done in the field, farmers preference and natural adoptions Agri-horticulture is the main prevalent system followed by agri-horti-silviculture and agri-silviculture system providing agriculture crops such as maize, paddy, summer vegetables (Okra, cucurbits, brinjal etc.) and pulses during the kharif season and wheat, winter vegetable (cole crops, raddish and turnip etc) and oilseeds (Mustard and gobi-sarson) during the Rabi season. Majority of the fruit production is from *Prunus persica* (peach), *Ficus roxburghii* (Fig), *Syzygium cumini* (Jamun), *Juglans regia*, (Walnut) growing naturally and some in the form of managed and unmanaged orchards such as Peach (*Pyrus persica*), plum (*Prunus domestica*) and apricot (*Prunus armeniaca*) in the district that are maintained under the Agri-horticulture low input system.

Agri-silvi-pastoral and silvi-pastoral systems are mostly practiced on the marginal and wastelands. Under Agri-silvi-pastoral systems apart from maize wheat rotation fodder crops like rapeseed mustard, cowpea, barseem, oats are cultivated on marginal lands during the rabi season whereas and sorghum (Cherry) is the preferential fodder crop during the kharif season. Majority of the fodder species are used as multipurpose and contributed to the high socioeconomic values. Farmers maintain naturally regenerating tree species, particularly on edges of terraced agriculture fields without any significant input of manpower. This system is called as indigenous agroforestry system and include trees like *Celtis australis* (Khirak), *Grewia optiva* (Dhaman), *Morus alba* (Mulberry), *Toona ciliata* (Toon), *Albizzia lebbek* (Kikar), *Acacia catechu* (Khair), *Dalbergia sissoo* (Shisham), for subtropical area, *Ulmus wallichiana* (Manu) extending to subtemperate area and local grasses like *Dicanthium* spp and *Crysopogon fulvus* with some of the introduced perennial grasses like Napier hybrid and *Setaria* spp. Dhaman and khirak are the two prominent fodder trees species of the district (Choudhary et al. 2011) Fodders trees are primarily grown for fuelwood and small timber, however, their value for feeding ruminants necessitates the planting of multipurpose fodder

trees on the farm bunds, boundaries and sometimes grown scattered in the fields commonly known as *Gassnies*.

Livestock are maintained mostly on tree loppings. Tree leaves are commonly referred to as "top feeds" and are often considered as emergency livestock fodder, they contribute to the staple feeds of small and large ruminants in the district (Raghavan 1989). These feeds are particularly valuable for goats and sheep. Fodder trees currently provide concentrates to the livestock population of both the sedentary, marginal and the nomadic farmers. The landless population who own small herds of sheep and goats depend on shrubs and tree feed resources growing near the village, roadsides, and on community lands. The trees provide valuable feeds at low cost and are easily accessible; however, utilization pattern varies from season to season and from altitudinal ranges (Rawat and Vishvakarma 2010). In Rajouri district tree fodders are mostly used as supplement for green fodder during early winters where there is scarcity of green grasses.

Indigenous practices from Agroforestry for sustainable livelihood

In spite of being imparting an important role in sustainable livelihood to the farming communities of the district traditional agroforestry systems also provides some assistance originating from traditional knowledge to the farmer and local communities in one or another way. Different such indigenous practices followed in the district are enlisted in Table 3. Multipurpose trees species like Toot (*Morus alba*), Khirak (*Celtis australis*) and Dhaman (*Grewia optiva*) twigs are used by the farmers in making small baskets that fetch then Rs. 100- 150 per basket ensuring livelihood options. More over the small shoots of toot are used for making the storage structures locally named as *Pandi* are commonly used in the house holds for their domestic need and safe storage of food grains. Dhaman (*Grewia optiva*) wood is commonly used in preparation of parts of *desi* plough known as *dandi*, handles of sickles, khurpi and kodal. Majority of times small shoot and twigs from these multipurpose trees are used in the paddy fields for the preparation of structures like *KUNNU* and

Table 1. Detail of the villages selected for the study

S. No	Villages	Block	Altitude (m.a.m.s.l)
1	Sunderbani	Sunderbani	550
2	Lamberi	Sunderbani	600
3	Siot	Kalakote	560
4	Nowshera	Sunderbani	580
5	Rajouri	Rajouri	960
6	Manjakot	Manjakote.	1250
7	Dahrals	Dahrals	1500
8	Kotranka	Budhal	Above 1500

Table 2. Traditional Agroforestry Systems prevalent in Rajouri district

S. No	Name of the system	Crop/enterprises	Preference Ranking	Matrix
1	Agri -silviculture	Maize /Paddy+ Wheat/mustard + Mulberry + Dhaman + Khirak + Manu	++	
2	Agri -horticulture	Maize /Paddy+ Wheat/mustard + pulses + citrus + guava/ Peach + Plum + Apricot	+++++	
3	Silvipastoral	Khair+ Shisham + Mulberry + Dhaman + Khirak + Kikar + Toon + local grasses + Animals	++	
4	Agrisilvipastoral	Maize + Mustard + Mulberry + Dhaman + Khirak + barseem / fodder sorghum + Oats + local natural grasses + animals	+++	
5	Agrihortisilviculture	Maize /Paddy+ Wheat/mustard + citrus + guava/ Peach + Plum + Apricot + Bael + natural grasses	+++	

KUNUTRU that proved to be helpful in storage of paddy crop after harvest in the fields itself and to protect it from the shattering losses from incessant rains.

Wild grown shrubs and medicinal plants such as *Zanthoxullum* spp (Timbroo), *Adhathoda vasica* (Basuti), and (*Viola serpanse*) Banafsha are commonly used in different house hold remedies and products (Choudhary et al. 2008; Singh et al. 2011). Locally prepared *chutney* from the seed and stem of timbroo are not only relished by the locals along with the roti made from the maize floor but also possesses astringent and medicinal value that

cures stomach and tooth aches. Leaves of Basuti are used in ripening of mango fruits and due to its pungent nature, it repels birds. Leaves of basuti are used by the local farmers for curing Jaundice. The Charak Samhita, an age-old written document on herbal therapy, reports on the production of 340 herbal drugs and their indigenous uses (Prajapati et al. 2003).

Locally available fodder grasses plays very important role in feeding of livestock's during the lean season. The structures locally known as *KARAH*I (Photo 1) are made from the dried natural grasses well as maize stalks that are cut during the

Table 3. Indigenous technology practiced by the farmers in Rajouri district

S. No.	Crop / Enterprise	ITK Practiced	Purpose of ITK
1	Safe storage of Rice	Making Kunnu and Kunutru	For minimize losses from hailstorm and drying the crop for threshing
2	Safe storage of grains	Dried leaves of <i>Adathoda vesica</i> for protection against storage pest.	Minimizing storage loss
3	Cucurbits and brinjal	Dried leaves of <i>Melia azadirach</i> for protection against storage pest.	Minimizing storage loss
4	Maize and grasses	Making Karhi from fodder grasses	Storage of hay for lean periods of winter
5	Safe storage of food grains	Locally made storage structures by Morus (Toot) locally known as 'PANDI'	Minimizing storage loss of grains
6	Astringent value	Use of <i>Xanthoxylum</i> spp stems as toothbrush	Makes stomach and teeth healthy

**Photo 1.** Karahi Making From Fodder Grasses For Storage Of Hay For Lean Period

month of September –October during the period locally known ASSU and the tradition known as *Netri* where local peoples from a community or a village get together and cut the grass for local *gassnies* which are then dried and stored in the shapes called as *KARAHIs* for providing fodder to their animals during the lean seasons. Various such traditional practices have already been reported supports the findings of the study (Bhagat et al. 2006; Kanwar and Sharma 2006 and Slathia and Paul 2012).

CONCLUSION

Traditional agroforestry systems and practices associated with them plays an important role in securing the sustainable livelihood security of the rural people of Rajouri districts. Based on the preference ranking Agri-horticulture system is the most preferred system. Prevalent systems not provide production from the system but also have some tremendous amount of traditional knowledge and practices which is available only in oral form and has not yet been documented. Many times such

knowledge has been communicated in good faith by local people has been used without acknowledgement or reciprocity to claim intellectual property on the same. In times to come traditional system and practices will be a boon for sustaining the rural economy.

REFERENCES

- Anonymous 2008 Digest of statistics 2008-09. Directorate of Economics and Statistics, Govt. of Jammu and Kashmir. 579 p
- Bhagat GR, Paul N and Slathia PS 2006 Fahadaha: An indigenous dry fodder storage structure of Jammu region. *Indian J Tradit. Knowledge*, 15 (1): 95-96
- Choudhary P, Manmohan Sharma and Sharma V 2011 Source variation in important seed and nursery characteristics of *Grewia optiva* D and *Celtis australis* L. *Journal of Research SKUAST-J* **10**:87-92
- Choudhary P, Sharma R and Gupta SP 2008 Cultivation of medicinal and aromatic plants. Proceeding: In-service training programme. Krishi Vigyan Kendra Rajouri 48 p
- Kanwar P and Sharma N 2006 Tradational storage structures prevalent in Himachali houses. . *Indian J Tradit. Knowledge* **15** (1): 98-103
- Khar S, Choudhary P, Sharma R, Kumar M, Sinha A K and Mahajan A 2011-2012 Annual Progress Report. KVK Rajouri. 87 p
- Prajapati ND, Purohit SS, Sharma AK, Kumar T 2004 A Handbook of Medicinal Plants. Jodhpur: Agrobios
- Raghavan GV 1989 Availability and use of shrubs and tree fodders in India *In: Shrubs and tree fodders or farm animals. Proceedings of a workshop in denpasar, indonesia, 24 - 29 july 1989.* 196-210
- Rawat YS and Vishvakarma SCR 2010 Diversity, distribution and utilization of fodder species in subtemperate, temperate and cold desert region of the Himachal Pradesh, north-western, Himalaya. *Journal of American Science* **6**(6): 73-81
- Singh SB, Choudhary P, Singh AP, Sinha AK, Deshpandey KY and Mahajan A 2010-2011 Annual Progress Report. KVK Rajouri. 93 p
- Slathia PS and Paul N 2012 Tradational practices for sustainable livelihood in Kandi belts of Jammu. *Indian Journal of Traditional Knowledge* **11**(3):548-552.