



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(9): 2297-2299
© 2022 TPI
www.thepharmajournal.com
Received: 12-07-2022
Accepted: 22-08-2022

Bhupendra Singh
Department of Silviculture and
Agroforestry, College of
Horticulture and Forestry,
Agriculture University Kota,
Jhalawar, Rajasthan, India

Ram Karan Chauhan
Department of fruit science,
college of Horticulture and
Forestry, Jhalawar, Rajasthan,
India

Aditya Kumar Jayant
Department of Silviculture and
Agroforestry, College of
Horticulture and Forestry,
Agriculture University Kota,
Jhalawar, (Rajasthan), India

Bhanu Pratap Patidar
Department of Silviculture and
Agroforestry, College of
Horticulture and Forestry,
Agriculture University Kota,
Jhalawar, (Rajasthan), India

Corresponding Author:
Ram Karan Chauhan
Department of Silviculture and
Agroforestry, College of
Horticulture and Forestry,
Agriculture University Kota,
Jhalawar, Rajasthan, India

Agroforestry models of hadoti region of Rajasthan state

Bhupendra Singh, Ram Karan Chauhan, Aditya Kumar Jayant and Bhanu Pratap Patidar

Abstract

Agroforestry is a promising land use practice to maintain or increase agricultural productivity while preserving or improving soil fertility. This paper is based on survey shows that most of the farmers of Hadoti region are growing mainly Horti-silvicultural (HS), Agri-silvi-horticultural (ASH), Agri-silvicultural (AS), Agri-horticultural (AH), Home-garden (HG), Horti-pastural (HP), Silvi-pastural (SP) and Apiculture (AP) at their field. Farmers of this region are adopting Agri-silvicultural (AS) system as teak, neem, babul as a boundary plantation with mustard, coriander and wheat crops mainly. Secondly, farmers adopting Agri-horticultural (AH) system in which farmers raise mandarin, lemon, guava with different types of agricultural crops. These exiting agroforestry systems provide more return per unit area as compared to mono cropping. These types of agroforestry systems are most important for fulfil of basic needs of farmers and for improving the microclimate of this region.

Keywords: Agroforestry systems, farmers, hadoti region, micro climate, production

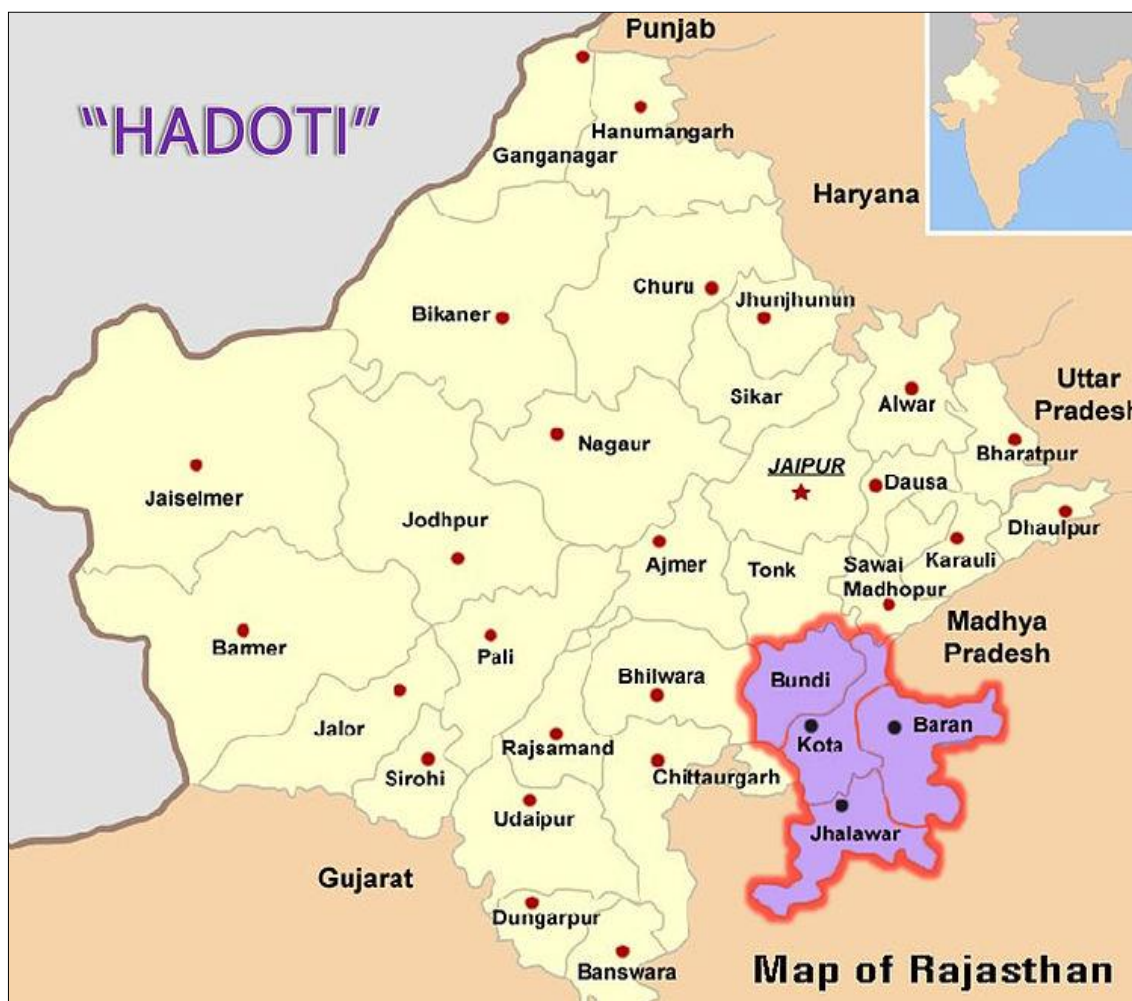
Introduction

Agroforestry practices come in many forms but fall into two group's viz., first, is those that are sequential such as fallows and second, those are simultaneous such as alley-cropping. Among all, some 18 different agroforestry practices have some infinite number of variations to each other (Nair, 1987) [5]. Agroforestry is generally practiced with the intention of developing a more efficient and sustainable form of land use that can improve farm productivity and the welfare of the rural community. The total area under Agroforestry in the world is 1023 mha. Maximum areas of Agroforestry in the world are found in South America (3.2 million square kilometre) followed by sub Saharan Africa that is 1.9 million square kilometre (Kumar *et al.*, 2014) [4]. However the area under Agroforestry is increasing continuously. In India, in 2007 it was reported 7.4 million hectare but in 2013 it reached up to 25.32 million hectare (Dhyani *et al.*, 2013). At present in India, agroforestry is practiced between 17.45 m ha to 25.32 m ha. The estimated area under the agroforestry in Uttar Pradesh (1.86 m ha), Maharashtra (1.61 m ha) and Rajasthan (1.55 m ha) as first, second and third, respectively. However, there are still many challenges that impede the growth of agroforestry in India. These include a lack of uniform policies and regulations relating to felling and transporting farm-grown plant products like timber (Asharam *et al.*, 2018) [1]. In the era of changing climate every country is looking for ensuring the food security of its citizen. In this context, agroforestry emerges to be the integrated and sustainable model of food production catering to environmental services while assuring sustainable production as well. Judicious integration of tree species with agricultural crops and/or animals is the way to achieve the targeted 4 per cent sustained growth in agriculture by optimizing the farm productivity and enhancing livelihood opportunities of small farmers, landless and in particular women. Agroforestry systems significantly contribute towards livelihood improvement through 5Fs, i.e. food, fodder, fuel, fibre and fertilizer. Trees on farm can also help in generating diversified off-farm employment opportunities by supporting large number of wood based industries. Despite these magnificent contributions, the adoption level of agroforestry practices among the farmers is still limited. This calls for organized efforts in setting priorities and strategies for upliftment of rural livelihood through agroforestry research and extension services in India. The tree component of agroforestry systems can greatly contribute to the restoration of shattered domestic rural economies, becoming a prized capital asset for resource-poor farmers, compensating for seasonal shortages, providing recurrent flows of food, fuel, fodder and other useful materials for rural industries, and conserving soil, water and human energy (Kumar *et al.*, 2014) [4].

Study area

Hadoti is a region of Rajasthan state in Western India. The

study area involves Hadoti region which comprises of Kota, Bundi, Baran and Jhalawar districts.



Methodology

The present study was conducted in the all four district of Hadoti region of Rajasthan. Information related to existing agroforestry models were collected through the farmers during the field visit at their agricultural farms. Total 32 villages were selected, 8 villages from each district, to conduct this filed study to fulfil the objectives of the present study.

Result and Discussion

The present study revealed that farmers of different villages of Hadoti region of Rajasthan having different economical status have adopted peripheral and mixed planting almost to the same extent, with the number of marginal farmers being the same as the number of large farmers. Mostly farmers have prominently adopted eight types of agroforestry systems viz., Horti-silvicultural (HS), Agri-silvi-horticultural (ASH), Agri-silvicultural (AS), Agri-horticultural (ASH), Home gardens (HG), Horti-pastural (HP), Silvi-pastural (SP) and Apiculture (AP) according to their needs to achieve livelihood security. Similar results were found by Singh *et al.*, 2017^[6] and reported that the farmers of Navsari prominently adopted five types of agroforestry systems viz., Agri-silvi-horticulture, Agri-silviculture, Agri-horticulture, Home gardens and Horti-pasture according to their needs to achieve livelihood security. Both types of agroforestry are popular all over the villages of the selected district. The farmers of Kota district are mainly growing guava orchard having eucalyptus, ardu,

moringa and neem as a boundary plantation with different types of horticultural (guava, lemon, jamun) and agricultural crops (wheat, soybean, linseed, mustard and coriander). In Bundi, eight out of ten farmers raise eucalyptus, ardu and guava along with agricultural crops mainly paddy, coriander, linseed and wheat. The farmers of Baran district raise babul, mahua and palash as a boundary plantation or in combination with horticultural (jamun and lemon) and agricultural crops (gram, sugarcane, garlic and soybean). Similar results were recorded by Verma (1990)^[7] in a study in which nine out of ten farmers raise eucalyptus either in pure or in combination with other tree species. In Jhalawar district mostly farmer's raise teak, ardu, siris and mahua as a boundary plantation, mandarin and lemon as a main crops and garlic, mustard, gram and coriander as an intercrops. The table show that neem (*Azadirachta indica*), teak (*Tectona grandis*), ardu (*Ailanthus excelsa*) and babul (*Acacia nilotica*) are the dominant tree species which were regularly found on agricultural field of this region during study. The major fruit crops of Hadoti region are lemon (*Citrus Limon*), jamun (*Syzygium cumini*), guava (*Psidium guajava*) and mango (*Mangifera indica*). The important agricultural crops in this region are mustard (*Brassica juncea*), coriander (*Corinadrum sativum*), gram (*Cicer arietinum*) wheat (*Triticum aestivum*) and soybean (*Glycine max*). Chilli (*Capsicum frutescens*), tomato (*Solanum lycopersicum*), pea (*Pisum sativum*), okra (*Abelmoschus esculentus*), brinjal (*Solanum melongena*) and onion (*Allium cepa*) has been raised as a home garden. The

apiculture system was also found in this region during the study association with palash (*Butea monosperma*), gulmohar

(*Delonix regia*), mustard (*Brassica juncea*) and coriander (*Coriandrum sativum*) near water bodies in all districts.

Table 1: The tree component of agroforestry systems can greatly contribute to the restoration of shattered domestic rural economies

Sr. No.	Agroforestry system	Tree component	Horti./Agri. crops
1	Horti-silvicultural (HS)	Neem, teak, babul	Guava, lemon, jamun
2	Agri-silvi-horticultural (ASH)	Eucalyptus, teak, mahua, neem	Mandarin, amla, jamun, coriander, mustard, wheat, soybean
3	Agri-silvicultural (AS)	Ardu, teak, neem, babul	Guava, jamun, lemon, paddy, coriander, mustard, soybean
4	Agri-horticultural (AH)	----	Mango, guava jamun, lemon, linseed, wheat, gram, soybean
5	Home-garden (HG)	Teak, neem, <i>moringa</i>	Guava, jamun, chilli, tomato, okra, brinjal, onion, pea
6	Horti-pastural (HP)	----	Jamun, mango, barseem, jwar, rijka, sugarcane, lucerne
7	Silvi-pastural (SP)	Babul, khejda, siris, ardu	Jwar, barseem, <i>azolla</i> sesbania
8	Apiculture (AP)	Palash, kusum, gulmohar	Mustard, coriander

Dobriyal *et al.*, 2019^[3] expressed that the ultimate answer lies outside the forests and especially by the introduction onto peasant farms of agroforestry practices in which trees can be grown for food, fodder and fuel wood, *e.g.* along field boundaries and on unutilized and underutilized corners of farms, home gardens *etc.* The tree component of agroforestry systems can greatly contribute to the restoration of shattered domestic rural economies, becoming a prized capital asset for resource-poor farmers, compensating for seasonal shortages, providing recurrent flows of food, fuel, fodder and other useful materials for rural industries, and conserving soil, water and human energy.

7. Verma DPS. Agroforestry practices of Gujarat state. International Tree Crops Journal. 1990;6(1):17-30.

Conclusion

Present study shows that the farmers prominently adopted eight types of agroforestry systems mainly *viz.*, Horti-silvicultural (HS), Agri-silvi-horticultural (ASH), Agri-silvicultural (AS), Agri-horticultural (AH), Home-garden (HG), Horti-pastural (HP), Silvi-pastural (SP) and Apiculture (AP) according to household, local needs and livelihood security of this region. The common systems recorded in this region are mandarin + coriander (AH), teak + gram (AS), vegetables+ neem+ jamun (HG). These Agroforestry practices also provide indirect benefits to the farmers as work soil improver and addition more organic matters to release more nutrients for main crops. Teak or ardu based (boundary plantation) agroforestry practices are more common in the Hadoti region.

References

1. Asharam, Chaturvedi OP, Inderdev. Role of agroforestry in current scenario. Agroforestry for climate resilience and rural livelihood. Scientific publishers, Jodhpur, 2018, 1-10.
2. Dhyani SK, Handa A. Uma. Area under agroforestry in India: An assessment for present status and future perspective. Indian Journal of Agroforestry. 2013;15(1):1-11.
3. Dobriyal MJ, Hussain M, Prajapati VM, Devanand J. Agroforestry models of south Gujarat. Flora and Fauna. 2019;25(2):137-139.
4. Kumar P, Singh RP, Singh AK, Kumar V. Quantification and distribution of agro forestry systems and practices at global level. Hort. Flora Res. Spectrum. 2014;3(1):1-6.
5. Nair PKR. Agroforestry systems inventory. Agroforestry Systems. 1987;5(3):70-72.
6. Singh NR, Arunachalam A, Bhusara JB, Dobriyal MJ, Gunaga RP. Diversification of agroforestry systems in Navasari district of Gujarat. Indian Journal of Hill Farming. 2017;30(1):70-72.