



Study of Traditional Agroforestry Practices by the Native farmers of Bastar district (C.G.)

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ABSTRACT

Agro-forestry is land use management system involves raising trees in combination with other agricultural enterprises, including livestock. Different species of trees can be planted with many types of crops in a variety of patterns in per unit of area. The dissertation research study conducted on “Traditional agroforestry practices by native farmers of Bastar district” was carried out in 10 agroforestry fields of 04 blocks of Bastar district. Study was conducted by 1x1m² quadrat methodology at 0 metre, 05 metre and 10 metre distance from the tree base. Growth performance of the tree and agriculture crops was estimated from relevant growth parameter. Out of 10 agroforestry fields which were studied Agroforestry 06 fields were of Agrisilviculture and 04 were of Agrihorticulture respectively. Yield of agriculture crops were estimated through crop biomass, plant population and grain weight Soil samples analysed were collected at 0m,5m,10m from the base of trees and also samples were taken from open fields and waste land to estimate pH, OC, EC, N, P and K. After analysing OC was found highest at 0m and decreased towards 10 m distance from the base of the tree towards the main agricultural crop whereas the HI value and LER value was oppositely found to be highest across 10 metres a minimum at 0 metres from the tree base; minimum OC was found at wasteland with respect to agriculture land.

INTRODUCTION

Agro-forestry is the new name for an ancient land-use practice with the integration of farming with forestry practices with in the farming system. There are innumerable examples of traditional land-use practices involving combined production of trees and agricultural species on the same piece of land in many parts of the world which are now known as agroforestry practices. India has a long tradition of agroforestry and many different types of indigenous agroforestry systems can be found in different parts of the country (Nair1991).

In Bastar native peoples also follow the tradition of planting trees around the agricultural land and villages as a boundary plantation since from the ancient past. They are aware of the soil holding capacity of the trees around the farm and sometimes as intercropping; as they know about the benefit of the tree for windbreak, and also helpful in making shelter for the humans and livestock's etc by the tree wood so can be said shelterbelt system were also known. They follow the traditional practices and also the proper utilization of many trees and its products of economical, medicinal & multipurpose values. They are known to have the tradition of worshipping trees so for that

they introduce trees within their fields following unknowing the agroforestry system. Thus, agroforestry practices also help in conserving biodiversity in traditional agricultural systems and natural forest areas. So, to justify the scientific approach towards the ancient tree crop combination practices of the native tribal peoples of Bastar this study was conducted to provide exposure towards the advantages of agroforestry over traditional agricultural practices.

MATERIALS AND METHOD

The present work was carried in 10 Agroforestry fields of nine villages viz; Tikralohanga, Sosanpal, karanji, Potanar, Deurgav, Birlinga, Kurandi, Telimarenga and Kumrawand of Bastar district, Chhattisgarh during year 2019 in summer season, the study deals with the Agroforestry system in Baster.

Based on the standard criteria of the composition of different Agroforestry components will be enumerated on the basis of ICRAF/NCRAF standardization of Agroforestry tree ideotypes. The height (in m) of trees was measured by Abney's level, tree diameter (in cm) was recorded at breast height (DBH) i.e. 1.37 m on the tree stem height above the ground surface of individual trees; crop observations were taken by quadrature method; physiochemical analysis of soil was conducted on SGCARS laboratory, N by Macro Kjeldhal method (Subbiah and Asija, 1956), P by Spectrophotometer method (Olsen *et al.*, 1954), K by Flame photometer method (Piper, 1966), pH by Elico pH meter method (Jackson, 1958), EC by Simen meter method Solubridge Method (Richards, 1954), OC by Walkley and Black's Rapid Titration method 1934 (Jackson, 1958).

RESULT AND DISCUSSION

A survey was conducted in the 10 farmer's field, at four block of Bastar district to collect data on proper interpretation for agroforestry practices in Bastar district in summer season. Information was collected by prepared questioners regarding the formers and tree crop forming practices in the block namely Jagdalpur, Bastar, Tokapal and Lohandiguda of Bastar district of Chhattisgarh during the period from February to July 2019. The data was collected in the field during the study and following results and discussion were done on this basis. Data regarding study area is tabulated in Table no. 01. Data regarding measurement of tree crops are tabulated in table no. (02), vegetable crop measurements in table no. (03); grain crop measurements are tabulated in table no. (04); Soil analysis and Light interception measurements were tabulated in table no. (04) and (05) respectively.

The research study conducted on "Traditional agroforestry practices in Bastar district" was carried out in 10 agroforestry field of Bastar district of four block .The study deals with the growth performance of tree and agriculture crop component as well as their respective yield for growth performance of tree, height, girth and crown diameter were noted whereas growth performance of agriculture crop were noted by making 1mx1m quadrature at 0m,5m and 10m from the base of tree minimum average collar diameter of crop was found at 0m and maximum at 10m whereas average height of crop was maximum at 0m and minimum at 10m.

Yield of agriculture crops were also calculated with the help of plant biomass girth weight/fruit weight plant population; Grain yield was calculated. The yield per hectare obtained in Kurandi I (Jagdalpur block) was maximum at 10 m i.e., 113.22 quintal and minimum at 0 m i.e., 58.32 quintal/ha. The yield obtained in Kurandi II (Jagdalpur) was highest at 10 m i.e., 132.84 quintal and minimum at 0 m i.e., 70.20 quintal/ha. The Harvest index per hectare obtained in Kumarahwand (Jagdalpur block) was maximum at 10 m i.e., 37.60 quintal and minimum at 0 m i.e., 35.16 quintal/ha. The yield obtained in Birlinga (Bastar block) was highest at 5 m i.e., 18.72 quintal and minimum at 0 m i.e., 12.10 quintal/ha.

The yield obtained in Tikralohanga (Bastar block) was maximum at 10 m i.e., 29.04 quintal and minimum at 0 m i.e., 19.65 quintal/ha. The Harvest index obtained in Deurgaon (Laundiguda block) was maximum at 10 m i.e., 87.95 quintal and minimum at 0 m i.e., 79.84 quintal/ha. The Harvest index obtained in Karanji (Laundiguda block) was maximum at 10 m i.e., 42.86 quintal and minimum at 0 m i.e., 27.44 quintal/ha. The Harvest index obtained in Potanar (Laundiguda block) was maximum at 10 m i.e., 43.17 quintal and minimum at 0 m i.e., 28.20 quintal/ha. The Harvest index obtained in Telimarenga (Tokapal block) was maximum at 10 m i.e., 43.63 quintal and minimum at 0 m i.e., 36 quintal/ha. The Harvest index obtained in Sosanpal (Tokapal block) was maximum at 10 m i.e., 34.63 quintal and minimum at 0 m i.e., 29.92 quintal/ha.

Table no. (01) Details of the Measurement of Tree crops in the studied fields.

Field No	Site	Tree species	Tree to tree distance (m)	Tree Height (mtrs)	Tree Girth (cm.)	Crown diameter (mtrs)
1	Kurandi	Subabul	2.5	12.87	83.71	4.36
2	Kurandi II	Tamarind	3	8.61	74.22	4.12
3	Kumrawand	Eucalyptus	3	20.85	86.50	3.00
4	Birlinga	Mango	5	16.46	162.10	8.92
5	Tikralohanga	Acacia	2	13.56	165.91	5.16
6	Deurgaon	Jamun	2	14.97	59.25	3.15
7	Karanji	Mango	3	11.48	113.83	4.03
8	Potandar	Arjun	3	13.72	65.85	4.32
9	Telimarenga	Teak	3	22.46	80.78	4.72
10	Sosanpal	Eucalyptus	1	12.00	31.00	2.50

Table no. (03) Details of the Measurements of Agriculture Vegetable crops under the Tree crops in the studied fields.

Field No.	Field no. / Site	Distance from tree	Plant Population	Plant Height (m)	Plant Collar Diameter (cm)	Plant Biomass (g)	Leaf dimension (cm)		Fruit Yield			No. of fruits / plant	Total no. plants / ha	Yield / ha (Quintal)
							L	W	L (cm)	W (cm)	Wt (g)			
1.	Kurandi	0 m	9	5.02	0.63	567	5.4	3.5	9.8	3.2	54	12	90000	58.32
		5 m	9	4.62	0.65	579	4.6	3.4	7.7	4.4	72	16	90000	103.68
		10 m	9	4.40	0.67	586	4.4	3.4	6.9	4.8	74	17	90000	113.22
2.	Kurandi II	0 m	9	4.2	0.65	562	5.2	3.5	10.1	3.2	60	13	90000	70.20
		5 m	9	5.2	0.67	572	4.9	3.4	7.3	4.3	80	17	90000	122.40
		10 m	9	5.5	0.66	576	4.9	3.4	6.8	4.5	82	18	90000	132.84
4.	Birlinga	0 m	11	1.9	0.60	552	4.5	3.7	15	2.5	11	10	11000	12.10
		5 m	12	1.8	0.63	567	4.7	3.4	12.	2.2	13	12	12000	18.72
		10 m	12	1.6	0.64	571	4.9	3.1	9	1.9	14	10	12000	16.80
5.	Tikralohanga	0 m	12	70	0.92	230	3.3	1.52	6.12	0.81	9.1	18	120000	19.65
		5 m	12	67	0.95	252	3.1	1.43	5.11	1.10	10.1	21	120000	25.45
		10 m	12	61	0.96	260	3.1	1.40	5.21	1.11	11.0	22	120000	29.04

Table No. (04) Details of the yield and growth parameters of Agricultural rice grain crops under the Tree crops in the studied fields.

Sr. No.	Field no. / Site	Distance from tree (mtrs)	Plant Population	Plant Height	Plant Collar Diameter	Plant Biomass (g)	100 grain wt. (g)	Grain Yield	Straw Yield	Biological Yield	HI	LER
1.	03 / Kumrawand	0 m	104	35	0.98	201	18.5	731	1348	20.79	35.16	1.72
		5 m	107	32	1.08	242	22.2	950	1616	25.66	37.02	1.93
		10 m	108	31	1.04	251	23.5	1015	1684	26.99	37.61	2
2.	06 / Deurgaon	0 m	93	79	0.95	349	17.2	2719	6864	34.05	79.84	1.70
		5 m	100	81	0.90	428	20.8	3744	5410	42.85	87.37	1.97
		10 m	101	82	0.94	434	21.2	3854	5278	43.81	87.95	2
3.	07 /	0 m	25	221	1.13	391	21	2625	6940	95.65	27.44	1.52

	Kranji	5 m	28	212	1.36	410	30	4704	6776	114.80	40.97	1.93
		10 m	28	210	1.41	418	32	5017	6686	117.03	42.86	2
4.	08 / Potanar	0 m	24	202	1.10	402	21	2721	6926	96.47	28.20	1.54
		5 m	28	185	1.39	412	30	4704	6832	115.36	40.77	1.93
		10 m	28	180	1.43	415	32	5017	6602	116.19	43.17	2
5.	09 / Telimaren ga	0 m	22	211	1.14	450	30	3564	6336	9900	36.00	1.84
		5 m	21	205	1.30	460	35	4116	5544	9660	42.60	1.97
		10 m	21	204	1.35	462	36	4233	5468	9701	43.63	2
6.	10 / Sosanpal	0 m	29	210	1.33	417	24	3619	8473	120.92	29.92	1.82
		5 m	30	195	1.38	420	26	4212	8388	126.00	33.42	1.96
		10 m	30	190	1.39	421	27	4374	8256	126.30	34.63	2

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