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Research Article

Studies on agro-biodiversity of soliga tribes in BRT wild life sanctuary

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Abstract : The soligas of BRT wild life sanctuary, Karnataka mainly engaged in settled cultivation and collections of non-timber forest products (NTFPs) like honey, lichens, soap nut, amla are also one of their recent occupations. Soligas lead their life in harmony with the nature. Soligas are dependent on relatively primitive agriculture for their livelihood and solely on NTFPs collection. The information on agro-biodiversity was collected by direct interview with the tribal farmers. The tribal farms harbour huge biodiversity, especially the farms in which traditional practices are being followed. The agro-biodiversity of Soliga's is very rich with 87 varieties and about 50 species which includes 3 varieties of pumpkin, 8 finger millet, 4 tubers, 5 citrus, 5 maize, 8 bean and other varieties compared to the farmers of the other regions and also with rich diversity of multipurpose trees and shrubs on farmlands.

Key Words : Agro-biodiversity, Soliga, Variety, Tubers

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INTRODUCTION

Biological diversity, the planets life support system when disturbed/degraded, not only destroys individual species, but also threats the human sustenance in the biosphere, either directly or indirectly. So, pains to conserve biological diversity, both at local and global levels must be based on facts. Farmers especially in tropics have a long tradition of raising food crops, trees and animals together, as well as exploiting a wide range of products from natural wood lots (Nair, 1993). A diversity of crop and animal species, at the community, farm or field level adds to social and economic consistency through reducing dependency on a single enterprise (Khan and Arunachalam, 2003).

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BRT wild life sanctuary is situated in Chamarajanagar district of Karnataka. Soligas are the main indigenous tribal community of B.R.Hills, they lead semi-nomadic life. Engaged in settled cultivation and collections of non-timber forest products (NTFPs) like honey, lichens, soap nut, amla are also one of their recent occupations (Uma Shankar *et al.,* 1996). The indigenous cropping systems, animal rearing and other agriculture activities are in tune with the rituals of the tribes. Soligas are also known for their rich knowledge on soil fertility and ecofriendly agricultural practices. The Soligas seldom plough the land and they do not use chemical fertilizers or other chemical pest and diseases control measures and practice organic farming (Jadegowda and Ramesh, 2008). The need exist to ensure that agro-biodiversity is now conserved. Any biodiversity conservation process, however, cannot succeed without the involvement of the local people (Getz *et al.,* 1999). Hence looking to the importance of the agro-biodiversity a survey was carried out to study the agro-biodiversity of soliga tribal farmers at BRT wild life sanctuary.

EXPERIMENTAL METHODS

A survey was conducted during 2006-07 at BRT wild life sanctuary, Chamarajnagar district of Karnataka to assess the agro-biodiversity and farming practices of the soliga tribal farmers. For this study, 30 tribal farmers in BRT wild life sanctuary were selected randomly. The tribal settlements are called *podu* locally. In order to understand the farming practices and agro-biodiversity by the tribes of this region, a questionnaire was developed pertaining to relevant aspects like agricultural systems, cultivation practices, number of crops, number of species and varieties grown by individual farmers. Besides, the local calendar, rituals of the tribal and rainfall are related and presented in the tabular form.

EXPERIMENTAL RESULTS AND ANALYSIS

The mode of traditional agricultural systems of the soliga tribes are classified in 3 ways *viz.*, Pastoral, shifting and settled agriculture.

Pastoral agriculture:

This type of agricultural system is found in waste lands, grazing lands and surrounding forest area of the villages. The main crop species are perennial beans, squashes, castor, gourds and fruits. The biotic associations of forest species are grasses, shrubs and small tree components. In pastoral system the tribal are not cultivating the land but crops are established naturally through self-seeding. Crop produce is meant for subsidence only.

Table 1 : Crops grown by tribal formers at BRT wild life sanctuary

	Crops	Percentage of farmers cultivated	Species	Varieties	Total group	
					Species	Varieties
Cereals	Finger millet	93	1	8	4	16
	Maize	60	1	6		
	Amaranthus	42	1	6		
	Navane	20	1	2		
Legumes	Beans	45	4	5	7	13
	Red gram	41	1	2		
	Field-bean	30	1	3		
	Horse gram	0.9	1	1		
Vegetables	Pumpkin	48	2	6	9	14
	Gourd	46	3	4		
	Squash	21	2	2		
	Colocasia	10	2	2		
Oil seeds	Mustard	60	1	2	5	7
	Castor	18	2	3		
	Niger	1	1	1		
	Sesamum	0.4	1	1		
Tubers	Tubers	42	6	7	8	9
	Tapioca	0.8	1	1		
	Sweet potato	0.15	1	1		
Fruits	Banana	32	2	8	9	14
	Mango	31	1	2		
	Citrus	8	3	4		
	Papaya	7	1	2		
	Guava	5	1	2		
	Jack	3	1	2		
Others	Coffee	23	3	3	9	14
	Marigold	20	3	6		
	Mulberry	2	1	3		
	Chilly	0.9	2	2		

Shifting cultivation:

The major cropping systems are mixed and multistoried cropping systems involving pulses, fruits, cereals, vegetables and tubers. Tribal call this type of agricultural system as *podu* cultivation. In shifting cultivation they burn the weeds, thorny bushes and straws of forest land and start crop cultivation. The ashes of burnt plants added nutrients to the soil; and in turn help to build soil fertility. After taking mixed crops for several years, they abandon and move new areas. Of late, the shifting cultivation given way to settled farming.

Settled agriculture:

In settled agriculture the important crop species are cereals (predominantly ragi, maize, and foxtail millet), tubers, big beans, squashes, gourds, vegetables and oil seeds. Cropping system includes mixed and multistoried systems. Land is not ploughed. Seeds are dibbled into soil after turning it using a spade. Staggered planting of cereals (maize, ragi), pulses (red gram, field bean), and oil seeds (mustered, castor) is done starting from April and continued up to June. Generally maize pulses and then followed by finger millet with a gap of about one month. Perhaps, this staggered planting creates high plant density leading to suppression of weeds besides making use of rainfall for long period. Generally, tribal don't apply manure to crops. Weeds are not cleared except for removal big once manually. Pests and diseases of crops are not controlled. Local varieties of crops which are long duration and tolerant to pests and disease are grown. In multistoried cropping system, different layers (multistoried) of crops grown in kitchen garden and in the back yards. The major crops are perennial beans, cassava, squashes, banana, colocasia and sprawling vegetables. Better utilization of sunlight and spaces are major advantages of multistoried system. Climbers like beans utilize the support of natural trees. Soligas are also venturing upon plantation crops like coffee, pepper, cardamom and spices.

In olden days tribal's used to follow shifting cultivation but with increase in population, destruction of forests and advent of settled agriculture, forest laws and policies it has been stopped. The main AF systems being followed now are,

Agri-silvicultural systems:

Multipurpose trees and shrubs on farmland:

In this system various multipurpose tree species are scattered haphazardly or according to some systematic patterns on bunds, terraces or plot/field boundaries .the major components of this system are multipurpose trees and other fruit trees and common agricultural crop. In BRT the land on which this system is practiced is basically forest diverted for settled agriculture for tribal's.

Being originally a forest land without tribal's having rights on trees all the trees are indigenous forest trees along with some planted trees which include fruit and NTFP yielding trees. Some of the trees found on farmlands are, *Percia mecarantha, Syzigium cumini, Careya arborea, Plumaria alba, Terminalia tomentosa, Pterocarpus marsupium, Canthium dicoccum, Terminalia bellarica, Grewia telifolia, Tectona grandis, Pseudium gujava, Mangifera indica, Citrus* spp*, Sterospermum personatum, Acacia concina* etc.

The agroforestry systems practiced by Soligas harbour huge agro-biodiversity, the main crop components are; pumpkins, tubers, finger millet, maize, mustard foxtail millet, beans, amaranth, greens, bananas, castor etc.

Crop combination with plantation crops:

With the advent of commercial agroforestry systems the traditional subsistence, agroforestry systems which harbored huge biodiversity are losing base. The main component is the coffee based agro forestry system where trees act as shade trees though indigenous trees are used but fast growing exotics are fast gaining ground owing to the quick economic returns. The most preferred exotic is silver oak (*Grewilia robusta).*

Home gardens or kitchen gardens:

These systems harbour the highest diversity among all. These not only provide food to house holds and their animals but provide it on sustainable basis round the year.

Agro-biodiversity:

Various crops grown by tribal formers at BRT wild life sanctuary were grouped into cereals, legumes, vegetables, oil seeds, fruits, tubers and others are presented in Table 1.

Maximum number of farmers is cultivating finger millet and maize (cereal crops), while only few farmers are growing oil seeds. Rich species diversity was found on the Soliga farmlands. More number of species were recorded in vegetables and fruits followed by others. Likewise, varietal (intraspecific, genetic) diversity among the cultivated crops

Table 2 : Distribution of species and varieties among the farmers of BRT wild life sanctuary

Species	Number of farmers	Crop varieties	Number of farmers
6-10	3	14-18	2
11-15	12	19-23	7
16-20	14	24-27	5
21-25	1	28-31	10
		32-35	6

was in cereal group followed by vegetable and other crop groups. Most of the farmers prefer 11-12 crop species, while only few farmers are growing 21-25 and 6-10 crop species. Maximum number tribal peasants (10) are growing 28-30 varieties and very few are cultivating 14-18 crop varieties (Table 2).

Traditional agricultural calendar of the soligas:

In traditional agricultural practices, forecasting rain, controlling pest and diseases are done through tribal

Table 3 : Annual agricultural work and rituals of the soligas of B.R.Hills

Calendar month	Months according to Soligas	Soliga names for the rain	Agricultural activities	Rituals
Jan-Feb	Shivoga	-	-	Collecting of ragi and pulses for the rotti habba
Feb-Mar	Ugadi	Rashi	Clearing the weed and stubble	Rotti habba
Mar-April	Dodda Jathray	Mesura	Burning the unwanted thorny bushes and stumps	-
April-May	Teppa	Adhri	Sowing of maize, pulses, caster and gourds	-
May-June	Adere	Dodda adhirpushia	Sowing of ragi, mustard and amaranths	Dulu puje, boomethayee puje
June-July	Kakkata	Kakkata	Removing of weeds	Pyru pooje
July-Aug	Shravana	Asilesha uppe	Harvesting of maize	Offering maize cobs to goddesses
Aug-Sept	Shravana	Uppe	Removal of weeds and threshing of maize	-
Sept-Oct	Marlami	Ubbe	Removal of weeds	-
Oct-Nov	Devalige	Chithe	Harvesting of millets	Hosa ragi habba
Nov-Dec	Kiri-devalege	Sath anegampalu	Harvesting of pluses	-
Dec-Jan	Shankranti	Astha	Harvesting of castor, indigenous tubers	Offering of newly harvested tubes to earth goddesses

Table 4 : Diversity of crops grown by the Soligas

Varieties of Bananas:	**Varieties of field bean (avaray):**	**Varieties of finger millet (ragi):**	**Varieties of citrus:**	**Varieties of maize (jola):**
Durga balay	Sannuga avaray	Kari kaddi ragi	Heralaykai	Koore jola
Shakalati	Mudde nella avaray	Haalu bunduga ragi	Madala	Kempu jola
Rasa bala	Ginnu nella avaray	Billi bunduga ragi	Chakota (pummelo)	Bili jola
Putta balay	Dodda avaray	Kari bunduga ragi	Nimbay hannu (lemon)	Dodda jola
Odura	Naad avaray	Haalu muddaga ragi	Kittalay hannu (orange)	San jola
Madranga	Malaya avaray	Muddaga ragi		
Kabbalay	Nell avaray (climber	Kari muddaga ragi	**Varieties of tubers:**	**Varieties of pigeon pea (togri belay)**
Chandra balay (red)	field beans, many	Male ragi	Bella genasu (sweet potato)	Malay togari
Boodi balay	varities)		Mara bella genasu (tapioca)	Nada togari
Yellaki balay	Seppay avaray	**Fruits trees**	Tottambu	
Gujja balay (dwarf)	(sanna seppay,	Mango	Kesu (colocasia)	
Anay balay (big fruit)	dodda seppay)	Guava		**Varieties of pumpkin (kumbla):**
Kadu balay		Papaya	**Varieties of genasu (yam, dioscorea)** bellaray,	Bala kumbla (long)
		Jackfruit	nayvay,	Sihi kumbala (round, big,
Varieties of castor (haralu)		Banana	nooray	sweet)
Dodda haralu		**Varieties of amaranth (edda)**		Chittay kumbla (small)
Sanna haralu		Dombedda		
Chit haralu		Maale edda		
		Harive and numerous other varities		

agriculture calendar (Table 3). It conclusively says that agronomic practices and rituals are associated closely with one another e.g. *rotti habba* celebrated with clearing of bushes stubbles and *pyru pooje* with removal of weeds excess seedlings. Harvesting of millets is celebrated as *hosa ragi habba* at the end of cropping season. The tribal farming consists of rich agro-biodiversity and cultivation practices are in tune with natural processes. Although the soil fertility is high, the crop productivity is low which calls for improved cultivation practices.

Crop diversity:

The tribal farms harbor huge biodiversity, especially the farms in which traditional practices are being followed (Table 4). The agro-biodiversity of Soliga's is very rich compared to the farmers of the other regions. But due to the advent of commercial AF systems especially coffee based agro-forestry system traditional AF systems are losing their base. Now a days in this regions also, the farmers looking for commercial cropping. These farmers are retained different species of trees as it is in the field, since they are tribal people, they are well aware of the importance of the trees.

Overall, the efforts to conserve the most important world agro-biodiversity in BRT wild life sanctuary are inspiring and praiseworthy.

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