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Missing the food from the woods: the case of *Soliga* tribes of Western Ghats, India

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Abstract

Forest dependent indigenous communities have traditionally fulfilled their dietary requirements from a range of locally available food resources. For *Soliga* tribes of Biligirirangana Hills (BR Hills) in India's Western Ghats, gathering of wild berries, tubers and mushrooms, shifting cultivation of millets, legumes and vegetables within the forests and small game hunting have habitually supported food and subsistence needs. Over the years, the traditional food practices have transformed drastically, driven by conservation policies that resulted in the resettlement of *Soligas* to forest peripheries, a ban on traditional fire practices and consequent colonization of forests by invasive species, altering the forest composition and leading to decline of wild food resources. We trace the trajectory of changes in *Soliga* food systems using a combination of methodologies ranging from a comprehensive literature review and expert interviews to household surveys in three *Soliga* settlements in BR Hills. Our study reveals the diminishing importance of forests as source of food and income and shift from food crops to cash crops in farms in forest peripheries to avert crop raids by wildlife. Dependence on forest produce collection and farming was found to vary based on the allocation of tribal land rights and the location of the settlements with respect to the forest type and availability of markets. While existing literature and expert respondents recognize the changing forest dynamics and the immense ecological knowledge of *Soligas* that complements forest conservation efforts, the nexus between forests, farming and health and nutrition of the tribe was hardly appreciated. Improved access to public food distribution system and evolving cultural preferences has increased the dependence on external markets for food. We further discuss the repercussions of these transitions on nutritional security and food sovereignty of the community.

Keywords: Food systems, Human health and well-being, Biodiversity conservation, Agriculture, Sustainable Forest management

Introduction

Forest dependent indigenous communities and their food systems are in flux in many parts of the world owing to several environmental and social challenges. The major local driver for transformations in most cases is the changes in the quantity and quality of forest resources and access to these resources, that are often linked to national, or state level forest and conservation polices and other macro level social-ecological drivers including climate change and globalised production systems (FAO *et al*. 2021, Saxena et al. 2016). The impacts of changing food systems are most conspicuous in tribal diets and lifestyle. In India for instance, the changing pattern of food consumption among tribal communities, with significant increases in consumption of fats (including animal fats), sugar and processed food has been documented in national surveys (National Sample Survey, 62nd round, 2006).

We use the case of case of transitions in traditional food system of a forest-dwelling tribe – *Soliga* – in the Biligiri Rangaswamy Temple Wildlife Sanctuary (BR Hills) in South India, to unpack the linkages between changing forest resources and indigenous food systems. The *Soliga* tribe has a rich tradition of sourcing food through shifting cultivation, gathering honey, tubers, fruits and berries from forest and occasional hunting. Following the declaration of a Wildlife sanctuary in BR Hills, shifting cultivation, hunting and traditional fire practices were banned in 1974 and the tribe was settled in *podus* (tribal hamlets) outside the sanctuary boundary where they started practicing settled agriculture. The Act not only limited the *Soligas'* access to the forest, but also prevented the culling of wild animals. This paper attempts to trace the transformations in traditional food and farming systems of *Soligas* and their connections with the transitions in forest ecosystems and forest related policies. The paper further attempts to assess the impacts of food system changes on food and nutritional security and sovereignty of the community.

Methodology

Biligirirangana hills in Western Ghats landscape of Karnataka state is home to 16,487 *Soligas*, living in 62 *podus* (settlements) (Madegowda 2009). (Location map in Figure 1). The mountain ranges were constituted as a Wildlife Sanctuary in 1974 and later declared as a Tiger Reserve in 2011 covering an area of 540 km^2 . The natural vegetation of BR Hills into five types: dry deciduous forests, scrub, grasslands, wet ever- green, and, high altitude montane forest, of which seasonally dry forests constitute approximately 90% (Ganesan and Setty 2004).

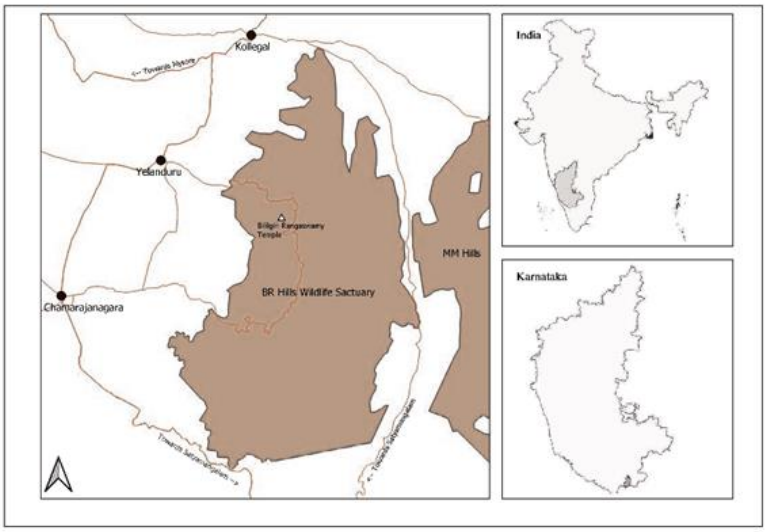


Fig. 1: Location map of BR Hills in South India (Source: Seshadri *et al.* 2021]

Our study used a combination of methods including a literature review and interviews with key informants to understand the changes in forests, farming and food systems and a household level survey to assess the impacts of recent forest policies on *Soligas*.

Literature Review

As extensive literature is available on *Soligas* and BR hills, we started the study with a systematic literature review to consolidate the available knowledge pertinent to forests, agroecology and food systems. Key words applied for search in Google Scholar database included "*Soliga*", "Sholega",

"Sholaga", *Soliga*, "*Soliga*ru", "BRT", "BRTWS", "Biligiri Rangaswamy Temple (BRT) Wildlife Sanctuary", "traditional food system" and "Indigenous people in Karnataka". Appropriate materials were selected for review after screening for the following criteria: 1. The item must relate to *Soligas* in BR hills specifically, not elsewhere; 2. It must deal with aspects such as forests and biodiversity, agriculture, health and nutritional wellbeing and socio-cultural practices, that are related to food systems. Among a total of 281 hits, 64 items across books (11), papers (45), popular press including magazine (3), reports (6) and thesis (4) were finally reviewed.

Key informant interviews

We also conducted in-depth interviews of 14 key informants who were selected based on the information from literature and from informal discussions with a few members of *Soliga* community. Selected community members including elders and women, social workers who have been engaging with the community, academic experts who have studied the community and the forests, public health experts, Forest Department officials and political actors who have mobilized the community for claiming land rights were interviewed. The interviews focused on the socio-cultural, ecological and economic aspects of forest, farms, food and health and their interconnections. Responses were classified thematically into five major categories - forests, farming, food and cultural practices, health and nutrition and the last one about the changing nexus between all those triggered by various interventions and its impacts.

Household surveys

Household surveys were conducted to understand the perceptions on the changes in forests, food, farming and socioeconomic conditions particularly after the allotment of tribal forest rights through the Forest Rights Act (FRA) of 2006. Three *podus*- Bangale Podu (BP), Muthagada gadde Podu (MP) and Havina Mule (HM) were selected for surveys based on accessibility and the number of households who were given land rights. BP and MP were located in moist deciduous forests near the famous pilgrim centre, BR Hills temple, while HM was located in dry deciduous forests in an interior location away from roads. 9-10 households were interviewed randomly using a semi-structured questionnaire, making a total sample size of 28. Data collected was analysed both quantitatively and thematically.

Results

Transformations in traditional food and farming systems of *Soligas*

Documentation of *Soliga* farming practices note that they cultivated millets and pulses, and were dependent mainly on forests for vegetables, fruits, roots and tubers, honey and meat (Morab 1977). However, since the Wildlife Protection Act, 1972 the *Soligas* were resettled in the forest periphery, causing a fundamental shift in their forest-farm food production system. The spread of the invasive *Lantana camara* following the ban on traditional fire practises resulted in decline forest resources for humans and animals. This resulted in *Soliga* farmers facing huge crop losses due to depredation by wildlife, due to which they switched to cash crops such as coffee and cotton as an adaptive strategy, supported by local NGOs (Mundoli *et al.* 2016). Now, a largely farm-based food system exists in some pockets of the BR Hills; but most *Soligas* have moved to a combination of government food assistance and market-based food sources.

Farming however has gained prominence as a source of income presently as revealed in the household surveys (Fig. 2) compared to NTFP collection which was the major income source in the pre-FRA period. Land rights made farming more attractive as a source of livelihood. Wage labour is ranked second and third both in past and present by majority, but in present there are few people who rank it first. Only in BP, NTFP collection is still the dominant income source.

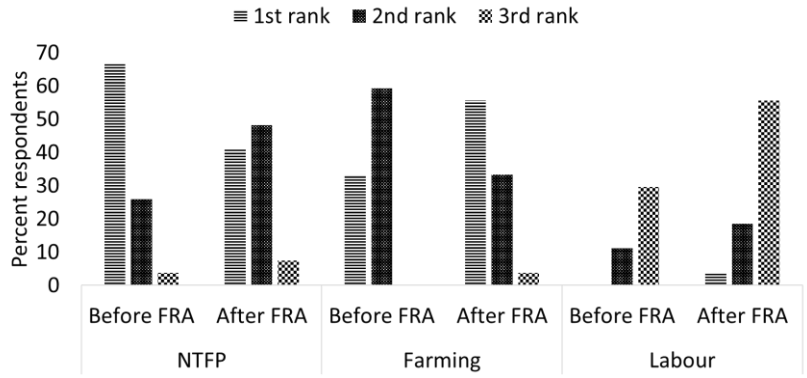


Fig. 2: Major sources of household income in past and present

Shift from food crop farming to to cash crops was also documented in the *podus*, except HM (Fig. 3). Food crops such as *ragi* (finger millet), *avare* (Dolichos beans) and maize that were common in the pre-land rights period are replaced by coffee and its companion crop pepper presently. The trend is strongest in MP where almost 100% of respondents grew coffee, supported by the favourable agroclimatic conditions and early adoption of coffee owing to locational factors. The reasons for the crop change as cited by respondents are allotment of land rights which made farming as a livelihood option more secure, higher cash income from coffee and severe crop depredation by wildlife that makes food crop growing difficult. In HM such shift didn't occur despite the land titles, as the dry deciduous forest type with lower rainfall is not conducive for coffee and there is a ready market for maize and other food produce from the Tibetan settlements located near the *podu*. Livestock farming was also common in this *podu* with 62% of respondents rearing cows.

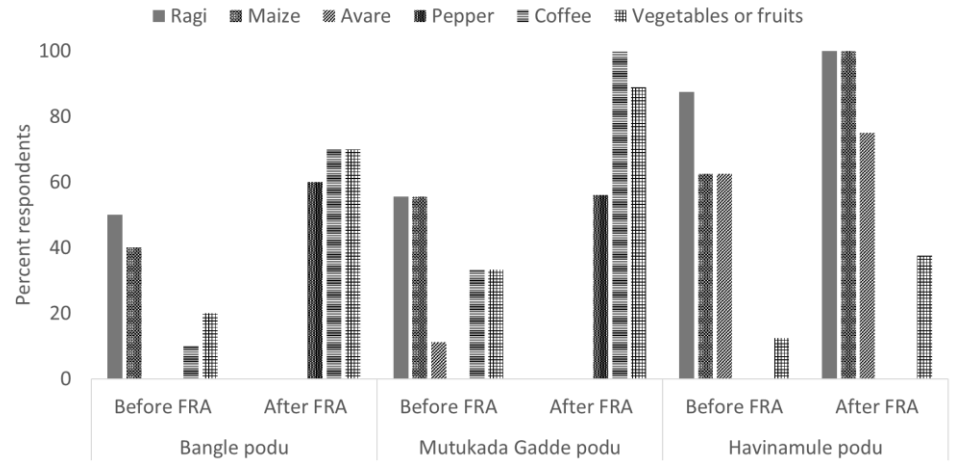


Fig. 3: Major crops grown before the allotment of land titles and in the present

Among the key informants interviewed there was a strong consensus about the change in *Soliga* farming from multi-layered cropping systems and individual kitchen gardens using minimum external inputs to commercial crops like coffee and high-value vegetables. Some also mentioned that there is

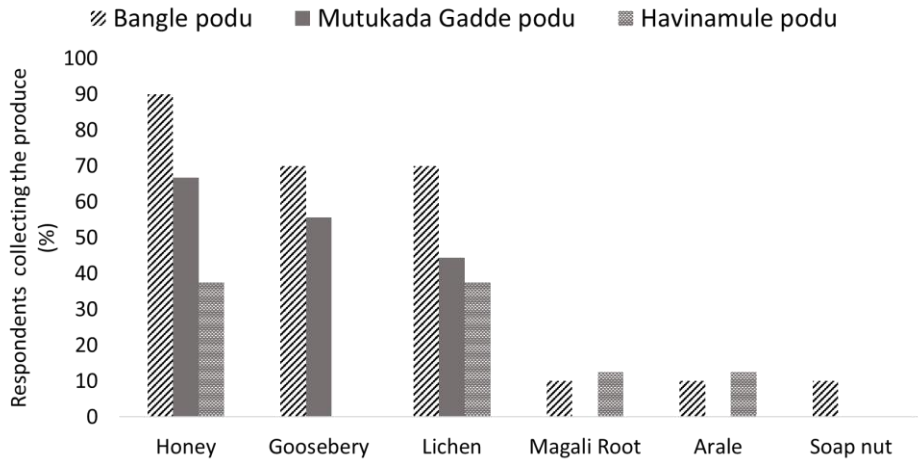
very little leaf litter available to use as compost in farming due to Lantana invasion. This has also taken a huge toll on soil fertility and productivity.

Key informants mentioned that millet consumption among *Soligas* has reduced by 50% over the past two decades. Food items collected from forests such as leafy greens, tubers, berries and other fruits have drastically reduced in *Soliga* diets. Consumption of wild meat has also dwindled due to restrictions on hunting. Although, food assistance programmes such as Public Distribution System (PDS) have addressed the issues related to hunger, the dietary diversity has been impacted.

The household surveys revealed that milk and egg consumption became more common from past to present especially in BP and MP, facilitated by the higher cash income from coffee. HM podu was 100% sufficient in food while in other two *podus* around 70% respondents reported availability of sufficient food. Food from forests and the PDS were used by 100% of respondents. Dependence on other sources such as private shops (70% of respondents)is common now and sharing within the community (20% of respondents) was also found.

Connections of food systems with the changes in forest ecology and policy

Evidence shows that the traditional food system of the *Soligas* relied on the forest and its produce. The forest was the source of a range of of Non-Timber Forest Produce (NTFP) including honey, lichens, soap nut (*Acacia sinuata*), *Magali roots*(*Decalapis hamiltonii*), *amla* (*Phyllanthus emblica* and *Phyllanthus indofischeri*), soap berry (*Sapindus trifoliatus*), *arale* (*Terminalia chebula*), tamarind (*Tamarindus indica*), wild turmeric (*Curcuma angustifolia*), *tarekai* (*Terminalia bellirica*), *jamun* (*Sygizium cumini*), and wild mango (*Mangifera indica*), many of which were part of their diet (Hegde et al. 1996). In the household surveys, it was found that honey, lichen and gooseberry are the NTFPs most commonly collected at present (Fig. 3) . BP tops the collection of honey, lichen and gooseberry and soap nut is collected only by *Soligas* from this podu. As revealed in Fig. 2, this podu still has NTFP collection as the major source of income. Diversity of NTFPs collected is relatively less in MP where strong shifts towards cash crop farming has occurred.



Literature shows that over time, changes in forest management (prompted largely by the government's conservation policies) have transformed the *Soliga*'s relationship with the forest and its produce. After the area was declared a Wildlife Sanctuary in 1974, the traditional 'litter fires' used by the *Soligas* to facilitate fodder growth and collection of NTFP have been stopped. This has allowed the unchecked growth of invasive species *Lantana* whose density has quadrupled between 1997 to 2008, changing the forest structure as well as the diversity of species (Sundaram and Hiremath 2012; Sundaram et al. 2015).

Most key informants asserted that the forest quality at BRT has been deteriorating over the past couple of decades owing to rampant spread of *Lantana*, that suppresses the growth of endemic flora. They mentioned that the forest cover estimates showed increasing trend mainly due to invasion, but floral biodiversity or richness is on the decline. Although the tiger population showed upward trend and that may indicate healthy forests, the ecologists opined that tiger numbers are not the sole indicator of good forests. Unanimously agreeing on the importance of *Soliga*'s forest knowledge and traditional fire practices that contributed to forest health, they all suggested that forest department needs to integrate such knowledge in the forest management plans. They also highlighted that due to constant change in forest governance (from protected area to Wildlife Sanctuary to Tiger Reserve and the allotment of land rights and community forest rights), there is a lack clarity on rules related to access of forests among the community members. It has been challenging for the *Soligas* to access forest freely and collect forest produce for their own use as well as for sales.

Impacts of food system changes on food and nutritional security and sovereignty of the community

The impact of these food and farming changes on nutritional security are less well-documented. According to the National Family Health Survey (Round 4; 2015-16), 12.2% of tribal children in Karnataka were wasted as compared to 10.3% of non-tribal children; 19.4% were stunted as compared to 16.3% of non-tribal children; and 14.1% were underweight as compared to 11.6% of non-tribal children. 63.7% of tribal children were anemic as compared to 60.5% of non-tribal children. Evidence shows that the PDS works well in this area, providing rations of ragi, lentils, eggs, oil/ghee and sugar. However, dependence on the PDS has made their food habits are monotonous, without the diversity previously provided by the forest produce (Yankanchi and Channesh 2017). Perhaps as a result of the government assistance, there was no deficiency observed in consumption of major nutrient categories (Krishna Raj et al. 2017). However, measures such as levels of anemia and body measurement of children indicate a significant shortfall in the nutritional adequacy of the diet (Prabhakar and Gangadhar 2016).

Most of the key informants agreed that there is very little documented evidence about health and nutritional problems arising from changing forest-farm linkages among *Soligas*. Nevertheless, they highlighted emergence of non-communicable diseases like hypertension and diabetes over the past couple of decades. They also observed that *Soligas* living in the core forest areas have lower incidence of such diseases compared to those in periphery, possibly due to availability of food produce from the forests. Although, sickle cell anemia is endemic among *Soliga* community, its impacts are more pronounced now, due to lack of iron rich forest fruits such as *jamun* in the diet. Child malnutrition cases also were on rise in past few years. Shift to food assistance programmes has been the major influencing factor for declining health and nutritional status among *Soligas*.

Cultural practices such as sharing of crops produce and collective celebration of festivals have been reshaped by shift in crops. Earlier they used to share produce from own farms, whereas now they share prepared food or food items bought from market. Elaborate preparation of traditional cuisine has vanished, and instead quick recipes and fast food have taken its place, indicating changes in food culture.

Discussion

The traditional food systems of the *Soligas* have been profoundly affected by the change in their relationship with the forest and farm. The reduced availability of fruit, green leafy vegetables, and tubers, mushrooms and bamboo shoots, that were previously abundantly available from the forest

and formed the core of the traditional diet, is a significant nutritional loss. While the PDS, with its regular supply of food staples, has compensated to some extent, and ensured some measure of food security to the *Soliga* community, it has not compensated in terms of nutritional security. In addition, there is a rising reliance on the market to provide these essentials, thus raising concerns over both the food sovereignty of the *Soligas* and its implications for their nutritional outcomes.

Crops grown, NTFPs collection and forest dependence for livelihood were found to vary based on the location of the podu with respect to the forest type and availability of markets. The impacts of land rights on farming are therefore modulated by other ecological and social factors. An inverse relationship between cash crop farming and forest produce collection as income source was observed. Impacst of land rights was visible in terms of the incarease in number of people doing agriculture, but this is not being translated to self sufficency in food consumption as the easy access to food from PDS serves as an incentive to shift to financially remunerative crops such as coffee at the cost of food self-sufficiency. Cash income from coffee and higher purchasing power however compensate for the lack of own food produce to consume. The podu without any shift to coffee is 100% food sufficient in this study.

Key informants recognized the existing gap in research and actions focusing on interconnections between forest, farms and food in the context of *Soliga* tribe. While the rich ecological knowledge possessed by *Soligas* is very strongly recognized, its application in the right manner in relevant domains of forest conservation and farming is found wanting.

Conclusions and implications

The study throws up interesting findings with wider implications on indigenous food systems in general. In many contexts, recognition of indigenous land rights have been identified as the ultimate solution for achieving economic and social welfare of traditional communities and ensuring biodiversity conservation. This study shows that while land rights are essential, this should not be considered as the silver bullet for indigenous wellbeing as several other social-ecological factors would determine the impacts of land rights on ecological and livelihood sustainability. Local and national leveld drivers including policy changes such as FRA, Tiger Reserve declaration, social welfare schemes (employment, food assistance, education and healthcare reforms) and emergence of commercial crops were found have a significant influence on *Soliga* food, farming, health and lifestyle in this study.

The neo-liberal environmental approaches towards management of forests as tools for carbon storage and biodiversity preservation that is enshrined in government polices conflicts with the *Soliga*'s historical imagination around the ecological integrity of the forest: as a space which holds cultural and social significance, as well as a source for their dietary and livelihood needs (Rai et al. 2019). Though cash income from commercial crop farming currently substitutes forest derived foods, the qualitative difference in terms of nutritional adequacy and subjective perceptions of the community towards such shifts need wider explorations. Within the *Soliga* community of BR hills, issues of nutritional security and food sovereignty or revival of traditional food systems have not received much attention in contrast to their active assertion of land rights through political mobilisation. The delinking of tribal livelihoods from forests as a consequence of conservation policies has resulted in declining importance of forest-based food systems. This also calls for wider awareness building on the intricate linkages between forest-farm-food and human health and wellbeing among Solegas and other indigenous groups undergoing such transformations.

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