Silenced Voices: Articulating the Role of 'Invisible' Women Farmers in the Conservation of Agrobiodiversity in Rural and Tribal India

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Abstract

Agrobiodiversity that ensures our food security is increasingly threatened by rapid globalization of modern agriculture. This has led to the realization of the need for conserving local genetic resources of domesticated organisms and their wild relatives. In the developing world, indigenous agriculture involves sustainably using, managing and conserving the biodiversity of local agroecosystems. Intangible cultural heritage is considered as an integral part of this biodiversity since it is nurtured and protected by human activities in relation to traditional agricultural practices. Across the globe women, who are more affected by poverty, hunger and malnutrition compared to men, are key stakeholders in a range of agricultural activities that provide them food, nutrition and even additional income. Although they constitute, often as unpaid workers in subsistence farming, the majority of the agrarian labour force, their voices remain mostly unheard in farming-related decision making and their vital contribution to agricultural production remain largely 'invisible' in the

academic literature and official statistics. Women are also the best custodians of oral traditions, cultural practices and traditional knowledge. Women in traditional farming, using their inherent prudence as diligent homemakers, are the unsung heroes of agro biodiversity conservation. Their gender dialect includes names with which they can narrate this complex variety and variability growing in their fields, gardens or homesteads, as well as ideas of taboos, totems and magic that are vital elements of this conservation effort. This paper provides an overview of the often overlooked contributions by rural and tribal women farmers of India in the *in situ* conservation of the genetic resources of crops and livestock, and discusses the significance of this in the context of household food and nutritional security.

Keywords: *Agrobiodiversity Conservation, Gender Dialect, Genetic Resources, India, Women*

Introduction

Agrobiodiversity[i]whose foundation is natural biodiversity[ii]results from the interactionbetween the environment, genetic resources[iii] and management practicesassociated with agroecosystems[iv]ofcrops, livestock, fisheries and forestry(Altieri, 1999: 20).This biodiversity bestows stability, adaptability and resilience to these human-modified habitats at whose core lies the agricultural activity of producing food, fodder, fibres, fuel, and many more useful products.Managed by farmers, herders, pastoralists, hunters, gatherers, fisher folk and forest dwellers, this diversity of genes, species and habitats is central to the sustainability of traditional food production systems, diets and livelihoods.

Traditional agrobiodiverse systemsof farming are genetically diverse and characterized by a wide range of cultivated species, most of which are local varieties of domesticated plantsand animals, often tolerating or encouraging other valuable wild species within the fields, along their margins, and in the adjoining natural habitats (Harlan, 1975: 188). The customary use of these diverse cultivated and wild local food resources ensures food security, nutrition security and healthy living for rural and tribal communities across the globe (Heywood, 2013: 42). This inherent agrobiodiversityexisting in indigenous

agricultural systems is closely linked with local intangible cultural heritage in the form of oral traditions, belief systems and knowledge systems of the locals whose stewardship has protected and enriched this tangible natural heritage (Howard, 2011: 164).However, the globalization of industrial agriculture has resulted in undesirable genetic uniformity and ecosystem simplification in the farmlands where the polycultures of traditional farmers' varieties are being replaced by monocultures of high-yielding modern cultivars (Fowler and Mooney, 1990: 278). The resulting genetic erosion[v]occurring across the globe and its long-term effects has led to the realization for conserving local genetic resources of domesticated organisms and their wild relatives in and around traditional agroecosystems (Brush, 1986: 151). Mostly limited to the developing world, often among indigenous communities of extreme or remote locations, traditional farmers play key roles in the on-farm nurture and protection of this endangered biocultural heritage that can contribute to the improvement of health and livelihoods of socio-economically marginalized indigenous communities (Altieri and Merrick, 1987: 90). Furthermore, the relationship between gender and biodiversity is also an emerging field of research (Khadka and Verma, 2012: 9). This paper presents a brief overview of the often overlooked contributions by rural and tribal women farmers of India in the *in situ* management and conservation of the genetic resources of crops and livestock, and discusses the significance of this gender dimension in agrobiodiversity conservation on household food and nutrition security and family health.

The 'Invisible' Woman Farmer

Throughout history and across the globe, women's daily work requires a greater understanding of their local plant resources. Therefore, it is women who play predominant roles as plant gatherers, gardeners, herbalists, seed custodians, plant breeders and farmers. Women are the backbone of world agriculture (*Amali*, *1989: 52*).In India, women make up nearly half (47percent)of the self-employed agriculturists and about a third (33percent)of the agricultural workforce (Rao, 2006: 107). These rural and tribal women often pursuing multiple livelihood strategies, silently performed alongside their domestic

chores the most tedious agricultural tasks. However, this hard work is largely underpaid, even unpaid in subsistence farming (Kundu and Das, 2019: 126). Furthermore, they lack land entitlements, they have little control over other productive resources, and their voices remain unheard in private and public decision-making related to farming (Singh and Vinay, 2013: 157). Their vital contribution to agricultural productivity remains 'invisible' in academic and official spheres as well. In India, agriculture continues to engage more than 80percentof the rural female workforce (Rao, 2006: 107), and yet, less than only 13 percent of these women own any land (Agarwal, 2002: 10). Notably, this situation is assuming a complex dimension with the growing feminization of Indian farming on account of the increasing migration of rural men for better job opportunities (Pattnaik *et al*., 2018: 138). However, there are some encouraging exceptions from Peninsular and Northeast India. Women farmers of subsistence societies of the Kolli Hills, Tamil Nadu, by virtue of being in charge of the cultivation of the minor millets that have little or no commercial value, take all the decisions regarding the cultivation and use of this minor cereal crop (Rengalakshmi *et al*., 2002: 6). In the Jeypore Tract, Odisha, women farmers take the prime responsibility of mixed cropping in small landholdings (Mishra *et al*., 2013: 6). Women farmers of the matrilineal societies of the Khasi Hills, Meghalaya, are the custodians of clan-owned lands, they control the decision-making process and are also recognized as the food produced within their families and the larger tribal community[vi].

Keepers of Agrobiodiversity

In the developing world, women's work devoted to agriculture as farmers, labourers and entrepreneurs largely drives the local rural economy. Women who are more affected by poverty, hunger and malnutrition in comparison with men, are key stakeholders in a range of agricultural activities that provide food, nutrition and even additional income, which is important to their own health and that of their families. In rural and tribal communities where most of the world's hungry people live, women produce and provide most of the locally consumed food, and are involved in every step of the food production process from the farm to the table. Therefore, the sustainable utilization and

management of the biodiversity present in and around local agroecosystems as cheap, nutritious and reliable food resource, provides diverse and healthy diets for women and their children. Women farmers as the sentinels of local agrobiodiversity, traditionally practice biodiverse farming to serve the utilitarian purpose of managing and conserving their local food resources. Women as diligent homemakers and farmers use their inherent prudence and practical experience in the field and kitchen to use, manage and conserve the local genetic resources for sustaining their health and livelihoods. Away from the limelight, these silent roles played by underprivileged women farmers of marginalized communities in conserving their rich agrobiodiversity are beginning to be documented in India, and her neighbourhood such as in Bangladesh (Talukdar, 2012: 22) and in Nepal (Karki and Gurung, 2012: 38) and across the world (Urdanivia, 2014: 35). In the Eastern Ghats, the Malayali tribe of Kolli Hills, Tamil Nadu, practice subsistence farming, and this region is best known for the genetic diversity of several minor millets species whose highly heterogeneous populations harbour enormous intra-specific phenotypic variability (Rengalakshmi *et al*., 2002: 3). The subsistence lifestyle, local food habits and rain-fed farming techniques of these indigenous community have led them to cultivate and conserve seeds of several underutilized minor cereals such as the foxtail millet or *thenai* (*Setaria italica)*, little millet or *samai* (*Panicum sumatrense*) and kodo millet or *varagu* (*Paspalum scrobiculatum*), to name a few, for the practical purpose of year-round consumption and sowing in the next farming season (Anburaja and Nandagopalan, 2013: 35).

Lessons from the Field

In the biodiversity-rich tropical regions of the globe, it is the woman who manage most of the local plant resources in homesteads, farms, gardens, pastures, plantations, forests, and marketplaces. They are also the traditional knowledge holders of the variety and variability of local food and medicinal plants, and are also responsible for their management and *in situ* conservation. Gender is socially constructed. The gender-based rigid division of labour in tribal and rural social systems traditionally allot women most of the household jobs along with the monotonous, time-consuming drudgery tasks of agriculture. Although men

plough the fields, women do most of the work including farm activities such as sowing, transplanting, weeding, fertilizing, weeding, harvesting, and even post-harvest operations such as threshing and winnowing, as well as livestock management. Spending long hours in the field, regular partaking and close observation give them a comprehensive knowledge of the farming systems and its resources. Thus, involved in most of the steps in raising, harvesting and processing them, they have a first hand knowledge of the growing conditions, nutritional requirements, and morphological and agronomic traits of the diverse local farmers' varieties of cultivated plants. This vital pool of experience helps them to acquire critical knowledge of plant taxonomy and crop breeding based on the practical motive of managing their local food resources. This process of knowledge acquisition is dynamic and continuous in response to the changes and adaptations in the crop in response to long-term changes in both the natural and cultural environment. Women's specialized knowledge of the value and diverse use of domesticated crop species and varieties extends to wild plants that are occasionally used as food in times of need such as famines and floods, and also as medicines to treat illnesses and maintain healthy lifestyle. Through the empirical experience of innovations and experimentations, sustainable use and management practices have developed to protect natural resources such as soil, water, vegetation and biological diversity. This has important implications for the conservation of plant genetic resources. In the Eastern Himalayas, the Apatanis of the Ziro Valley, Arunachal Pradesh, practice their unique integrated rice-fish cultivation. Their traditional farmers' groups rice are led and predominated by women. The remarkable local agroecosystem managed by women farmers harbour numerous landraces of the japonica rice or*pyapin* (*Oryza sativa* var. *japonica*) (Dollo *et al*., 2009: 48) and finger millet or *sarse* (*Eleusine coracana*) (Dollo *et al*., 2009: 49) with unique agronomic features. Due to the gender dynamics in traditional farming, women and men are associated with different oral traditions, cultural practices and traditional knowledge related to agrobiodiversity. Through their different activities, men and women have often developed different knowledge about the local environment, its biodiversity and their uses. These gender-differentiated local knowledge systems play a decisive role in the *in situ* conservation, management and improvement of crop genetic

resources for food. The decision about what to conserve depends on the perception of what is most useful to the household and the wider community. The Malayalis women of the Eastern Ghats are largely responsible for most of the farming and post-harvest activities. Even for land preparation on the steep slopes which is traditionally done by men, the women in these hills take part in it if there are not enough hands (Rengalakshmi *et al*., 2002: 6). From this hands-on experience they know more about the minor millet crops than the men. Furthermore, based on these expertises, women farmers, in comparison to their male counterparts, also have different priorities regarding the crops species they can choose to cultivate and divergent opinions regarding the value of the crop varieties they can choose to select for storing seeds. According to existing social norms, women are responsible for the food, nutrition and health of the family. Women farmers, unlike their male counterparts, prefer to cultivate neglected minor food crops that are nutritionally superior but are commercially unattractive. They also prefer to cultivate those varieties of food crops that have superior culinary traits. In the Kolli Hills, women cultivate take care of household food and nutrition security, and prefer growing the minor millets as they have more subsistence value. In selecting the little millet, the men prefer the early maturing varieties such as the *malliasamai* for its superior agronomic trait, but, in sharp contrast, the women farmers prefer *vellaperumsamai* and *karumperumsamai* for their superior taste and consistency (Rengalakshmi *et al*., 2002: 7).Similarly, in the Jeypore Tract, Odisha, tribal women choose rice seeds based on their cooking quality, cooking time, digestion time, suitability for producing minor rice products, and straw quality (Mishra *et al*., 2013: 7). Women, as the holders of this local traditional knowledge of food and farming, hand it down the generations during their daily conversations in the gender dialect preserve from mothers to daughters, older siblings to younger ones and elders to the youth. Their intricate vocabulary is sophisticated enough to effectively narrate the complex variety and variability growing in their fields, gardens or homesteads whose utility is meticulously explored in the kitchen, with the use of distinctive names of the native plant varieties and plant lore and rituals that are often linked to their agronomic features, culinary uses or nutritive properties. The taboos, totems and magic associated with their sowing,

harvesting or the habitats of wild edibles are vital elements of their on-farm conservation effort of this diversity and help in sustainably using and managing these key food resources. These vital survival skills entrenched in the female dialects finds practical meaning and emotional expression in singing and performing of folk songs, field rituals and food offerings. In the Ramanagara district, Karnataka, based on such time-honored beliefs and practices, the women possess fine skills in handling seeds, cultivating crops and cooking food, particularly in relation to the finger millet or *ragi* (*Eleusine coracana*) as the local staple (Hazareesingh, 2020: 955).

Saving Seeds for Future

Landraces[vii] are rich gene repositories in *traditional* agricultural landscapes. These dynamic populations of locally developed, morphologically distinct and genetically diverse crop varieties are well-adapted to local environments, and linked with local crop management and seed saving practices. Seed saving[viii]is the most important method of maintaining and conserving local crop genetic resources to ensure diversity of food on our tables, and sustain scientific crop breeding programmes for global food and nutrition security. In India, two-thirds of farmers, and mostly women, produce seeds from their own harvest (Sahai, 2000: 35). These seed-saving women farmers are the custodians of crop genetic diversity that directly affects their household dietary patterns throughout the year. Their traditional seed management practicesis key to sustainably using, conserving and enhancing the local plant genetic resources.

Seed Selection

This, mainly aimed at obtaining healthier seeds, can be used to maintain and improve quality of crop variety. In a crop field, there are differences between plants, and some have characteristics that are more suitable than the others. Women farmers play the vital role of seed selectors. They have developed various selection strategies to select seed from crops based on phenotypic characters at pre- or post-harvest stages. They apply criteria such as seed density in panicle in pre-harvest selection, and well-filled seeds in post-harvest selection. In the Jeypore Tract, women ritually tie turmeric-smeared threads to

select the healthy rice plants (Mishra *et al*., 2013: 9).In the Kolli Hills, elite, vigorous, disease-free millet plants are identified in the field, harvested and threshed (Rengalakshmi *et al*., 2002: 6). After harvesting,l oose and drooping panicles on the threshing floor before the first threshing are collected to ensures good, well-filled, heavier seeds. During threshed and winnowing, off-colour, undersized and chaffy grains are rejected. In case of vegetables, fruits of plants during the third or fourth harvest cycle, are selected.

Seed Storage

This involves preserving good quality seeds of selected landraces to keep them viable for a few years until they are needed for the next planting. Seeds from healthy plants are stored in requisite quantity as seed material for the following season, and again dried before sowing. The ability of seed to tolerate moisture loss allows the seed to maintain the viability in dry state. They are also vulnerable to insects. Women farmers also perform the vital role of seed preservers. They have developed simple methods of protecting seeds from desiccation and pests during their storage. In the Kolli Hills, the selected panicles of millets are tied together and sundried on the rooftops (Rengalakshmi *et al*., 2002: 6). Seeds are stored in an air-tight traditional storage structure called *thombai*, built with mud, straw and wood. In case of vegetables, the fruits are left on the plant to ripen, and then the seeds are mixed with ash and sundried. In the Jeypore Tract, rice seeds are dried on a cow dung smeared floor (Mishra *et al*., 2013: 10), mixed with dried powder of *neem* (*Azadirachta indica*) and *karanja* (*Pongamia pinnata*) leaves to (Rengalakshmi *et al*., 2002: 18) and stored in air-tight traditional storage structures called *dhoosi*and *khaniki*, in the form of straw rope and bamboo baskets, both plastered with cow dung (Mishra *et al*., 2013: 10).

Seed Enhancement

This involves mixed cropping along with microclimatic variations in the agricultural plots, is a common strategies by women farmers against the risk of crop failure due to biotc and abiotic factors. This is also an innovative means to enrichlocal crop genetic resources. As a traditional crop breeding strategy, seeds of different crops are selected and growing them together in a common plot.

Inadvertently, this allows introgression hybridization[ix] of the crop, which may produce valuable novel genotypes and widen the crop's genetic base. In the Kolli Hills, women farmers enrich the genetic richness of millet crops by the innovative practice of mixed cropping (Rengalakshmi *et al*., 2002: 7). They deliberate mix various millet landraces, with different quantitative characters in a common plot along with microclimatic variations due to altitude. The diversity of millets in the fields across these hills constitutes a dynamic and resilient mosaic system. Likewise, in the Jeypore Tract, mixed cropping is done with landraces of multiple crops such as rice, millets, pulses and oil seeds, all in different proportions(Mishra *et al*., 2013: 6).

Seed Exchange

This is prevalent among small and marginal farmers who are self sufficient in seeds of preferred cultivars and resort to exchanging them with their neighbours, especially after drought or other emergencies. This kinship-based cultural practice, institutionalized through community-managed seed banks by pooling, maintaining and distributing seeds, ensures the availability of planting material at the appropriate time for the local food production system.This is also a key tool to ensure diffusion across the community of knowhow associated with their use and conservation of local genetic resources. In the Kolli hills and Jeypore Tract, women play a key role in seed supply or exchange (Rengalakshmi *et al*., 2002: 12). They sometimes reserve grain from local or more distant farmers who are known for obtaining good harvests. The women also perform the critical function of periodic checking to monitor the quality of seed. In the Khasi Hills, women are conservers of seeds and know when each grain has to be sown[x]. They exchange seeds and are singularly responsible for the conservation of local genetic resources which are hardy and can resist the vagaries of climate change.

Conclusion

Research into the many possible relationships, intersections and tensions between language and gender is diverse. It transcends disciplinary boundaries. Thus this paper sets out to investigate the silent contributions of the 'invisible'

women farmers of rural and tribal India in the crucial area of the conservation of agrobiodiversity, which not only ensures our long-term food and nutrition security, but also gives these women their identity in dialect contact that can leadthem towards the horizon of empowerment. The brief overview of selected case studies centred on patterns found within the tribal and rural culture of India, amply portray the dexterity and versatility of indigenous women farmers in performing the vital role of seed selector and preserver by using their own experience in the farm and kitchen, as well as traditional wisdom acquired from elders, mothers, and older siblings. This endeavour to highlight the efforts of the neglected women farmers provides insights not just into the idiom of agrobiodiversity, but also into universal issues of human language and identity. Together with this attempt to give voice to the women's farming experience, this examination of their dialect can also be effective in listening to and articulations of the hurdles faced by them with respect to their family, farm and markets, in reaching their goals for improving food and nutrition security for women and children in the South Asia, and stabilizing their livelihood. Women farmers are autonomous and resilient and should be trusted to understand their social and physical environment better than anyone else. In the recent times, the number of women speaking for better legislative support for farmers and farm labourers has soared. While women still constitute a small percentage of protesters, these movements have helped articulate their silenced voices as women transitioned from a wavering audience to firm participants. Like their culturally-acquired skills used to in fields and homes to conserve and enrich the genetic base of their local food production systems, they have also started to educate themselves on their legal rights and speak their minds on the public platforms. These voices need to be heard not only in homes, fields and markets, but also by people making and implementing public policy that affects their lives and livelihoods if we are to realize the dream of a progressive India.

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Endnotes

i The variety and variability of harvested and non-harvested microbes, plants and animals at the genetic, species and habitat levels that existin and around agricultural systems.

ii The variety and variability of life on earth, at the three levels as above, as well as at a local, regional or global scale.

iii The genetic variability within a domesticated biological species in the form of crop varieties and livestock breeds, as well as their wild relatives from which they have been artificially modified through domestication, selection and hybridization.

iv The ecosystem modified by the human activity of agriculture.

v The loss of genetic variability from populations of domesticated plants and animals.

vi Chitnis, R. In photos: The seed-saving farmers in India who pass down land to their daughters. YES! Magazine (January 13, 2016). https://www.pri.org/stories/2016-01-13/photos-seed-saving-farmers-india-who-pass-down-land-their-daughters.

vi The local plant cultivars or animal breeds improved by traditional agricultural methods.

vii The practice of saving seeds or vegetative propagules of crop plants for future use.

ix The transfer of genetic information from one species or variety to another as a result of hybridization between them and repeated backcrossing.

x Chitnis, R. *Ibid*.

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