

## Scribbles on agro-biodiversity, culture and sustainability

Avik Ray

[avik.ray.kol@gmail.com](mailto:avik.ray.kol@gmail.com)

Agriculture has been central to any great civilization, but the antiquity of plant-based subsistence is even more ancient. Right from the days of hunting and gathering, humans had become contingent of plant produce, be it fruits, nuts, tubers, roots, or grains<sup>1,2</sup>. Even before the initiation of organized agriculture, many cultural groups were employing plant resource in order to accomplish low-level food production. This long-term entanglement between humans and plants made possible various close encounters with heterogenous floral assemblages as strongly supported by archeological records; as a consequence, many of which they exploited and harvested for food or other purposes and become close associates of us, and many others were left out in the race and survived on their own. Hence, it is not difficult to perceive that plant-based subsistence was in full swing from the very early phase of human evolution<sup>3</sup>.

Indian culture has been closely entwined with rice from the dawn of civilization. Rice has been at the foci of our cultural, social, and spiritual milieu. Although the word rice strikes an image of white-colored cereals served hot in our meals, it has quite a diverse socio-cultural dimensions. It does not necessarily translate into a singular form as apparent from cursorial observation. A multitude of sense-tickling features, short or long grain, slender or flattened, aromatic or non-aromatic, white, yellow, purple or brown colored possessed by our great varieties of rice landraces. Most of these landraces are indigenous to their certain geographic region, mostly to their place of birth. The awe-inspiring diversity of landraces are legacy our farmer-ancestors who had created, cherry-picked, conserved, and cultivated in the landscapes, armed with the wisdom imbibed over centuries, or even over millennia<sup>4</sup>. This has not been very easy to achieve, but it costed them several centuries of intense labor, observation of minute details, and informal experimentation - it suggests a kind of long-term entanglement. The fruit of their labor, what we can visualize today, a wide diversity of various cultivated crops, be it cereals, vegetables, spices, fruits.

Coming back to the rice, the Indian food culture shaped by rice grains. We have a quite conservative choice of our preferred rice type, and the trend is similar across ethnicity. Bengalis relish a kind of grain as a staple, a different aromatic kind to prepare rice kheer (*payasum*), so do Malayalis, Tamils, Odiyas, Kashmiris, Assamese. An example would make the haze clear; one of the most enjoyed dish of Indians is *Biryani*; roaming around towns, cities, and metropolis of India would reveal a conspicuous to subtler difference in this desired dish. The north people do not prepare as south people, or as east people. The diversity of rice grains (and also the spices and other ingredients) used to prepare this revered dish, it differs in flavor, color, consistency and obviously in taste. In some places, it is extra-long grain *basmati* used whereas short-grain *jeera samba* in other. This means a widely accepted cuisine has imbibed local flavor over time. Local flavors perhaps broadly created by the

sense of taste of local people, ranging from the kind of rice grain, the spices, the flavoring agent. The choice of rice-eaters is also deeply amalgamated with the variety of rice grown in various regions. So, the kind of rice I like in my sought-after dish may not similar to yours specifically if you are not from my cultural domain.

But rice being a major staple of India, its assimilation into local culture has deeper implication and reaches out more people than any other crop. The facts of *Biriyani*-affinity can be more revealing if we step out from this specific ellipse and include a wide range of food items available to a larger body of consumers. Here, the example of rice culture confronts us with general aspects of human culture where food is a most influential driver. The consumer choice is often shaped by cultural attributes. Food culture tend to stem from the people's origin, which is in turn shaped by so many factors, such as, common resources (climate, landscape, soil, water), or by belief and information (religion, education and literacy, communication), by ethnicity (indigenous or immigrant), subsistence technology (hunting, gathering, agricultural, horticultural, fishing)<sup>5</sup>.

However, modern societies can merely give us a myopic view of the relationship among nature, culture, and agro-biodiversity. A deeper understanding compels us to throw a closer gaze at the indigenous agrarian societies, their values, age-old practices, and their understanding of natural resource. Many scholars, on this line, have observed a remarkable co-occurrence world's biodiversity and cultural diversity areas, i.e., the biodiverse regions of the world often boost high cultural



**an awe-inspiring diversity of food plants**

diversity<sup>6</sup>. The knowledge system of the indigenous societies often urged them to learn the usefulness of a wide range of plants around and a small section of which had been brought into formal cultivation. There are many examples of aborigines who remembered a long list of locally useful plants; early ethnographers have come across similar knowledge base of the local inhabitants and written their experience in their account<sup>7,8</sup>.

If we zoom in into India, the central region, south-eastern states, north-eastern states are widely accepted as a center for bio-cultural diversity. A majority of India's ethnic communities lives in this region. If we selectively choose various tribal groups, such as *Bondo*, *Paroja*, *Chenchuas*, *Gadavas*, *Dongria Kondhs*, *Didayi* in and around the central and the south-eastern region we might be able to chart out their attributes pertaining to natural resource management. Over the centuries or even millennia, they have selectively harvested and used, manipulated, nurtured wild flora and faunal diversity. They used to rely on wild tubers (e.g., yams, arums), wild fruits (e.g., *Diospyros*, *Syzygium*, *Cordia*), honey, ant-eggs, fish, crabs, mussels collected from the forest or natural aquatic body<sup>9</sup>; applied locally available plant produce in ailments (*Aegle marmelos*, *Phyllanthus emblica*, *Vitex negundo*, *Terminalia bellirica*, *Tinospora cordifolia* etc) used plants in enhancing aesthetics of their homes. In addition, many are agrarian

communities, they maintained a rich repertoire of major cereal grains (rice, millets), legumes (wild pulses), tubers and roots, oil seeds etc; that they used to grow in the surrounding landscapes for their subsistence. They have engineered the landscapes in multifarious ways making them amenable for cultivation suiting their requirement; e.g., created variously manipulated landscapes like shifting or slash and burn for upland rain-fed crops, a terraced field for water-requiring plants, valley cultivation for others<sup>10</sup>. Perhaps, living amidst the nature coupled with the diversity of eco-systems, climatic and other environmental conditions enabled the evolutionary force to act on to generate a wide array of



### **eco-system engineering by various ethnic groups**

cultivated food plants. In course, they were preferentially selected and curated carefully to be assimilated into local food culture. Evidently, a peek into the indigenous food system would reveal a diverse spectrum of edible items consumed by them, and it takes us to yet another example to fathom the living interaction among culture, food, and agro-biodiversity.

Building on these facts, it seems quite clear that the human culture had long embraced biodiversity and the inherent link is rooted deeper in time, but one may wonder at how does the notion of sustainability appear here? Sustainability often carries a sense of time, the cultural institutions which survived the wear and tear of time and perfected through a sequel of experiments that experienced success as well as failure. The decision of acceptance is dependent on the success and has worked in a long chain of events. So, when we cherish a specific heirloom rice which is resistant to a certain disease, it may not be difficult to surmise that the heirloom variety is not only a product of close observation and hard labor, but also would also remind us of a farmer who has mastered the art of pure line selection after ensuring the disease resistance. Similarly, the terraced field to efficiently manage water in the field also demanded a knowledge of the creation of bunds and secured its maintenance if the situation worsens. In a nutshell, the cultural exercise leading to a sustainable system, be it a disease-free heirloom rice or irrigation network or maintaining a fine balance between exploitation and wise use of natural resource, more often asked for repeated cycles of trial and error to gain an insight on whether the chosen one works better than the existing option; that costed the doers a sizable amount of time and energy to achieve the desired goal. It means the practice of sustainability requires to be a dynamic process that could have functioned in a close feedback of positive and negative decision loop. It is dependent on many other extrinsic and intrinsic factors and thus could be context-dependent, so that one size may not fit all<sup>11</sup>, e.g., the certain disease resistant rice cultivar faring well ten years back, may not yield expected result in the face of rapid climate change when causal insect population breeding rapidly under increased temperature regime. Consider another case, a forest-dwelling hunter-gatherer tribe was happily securing all their required resources thirty-forty years ago, but the situation may turn otherwise after forest shrinks owing to fragmentation

or an increase in population size leading to resource crunch. Hence, summarizing, it is all about a dynamic system that is dependent on many factors and requires modulation to function effectively<sup>12</sup>. Summarizing, it appears that the facets of agro-biodiversity and sustainability are embedded in human cultural space, in a broader human-environment interface. In order to appreciate its nature and shades, one needs to perceive the associated culture that has been instrumental in the creation, selection, and conservation of those bewildering forms and long-term exercise that facilitated its maintenance.

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