

Resolving Nepal's Agrobiodiversity Crisis

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Nepal, one of the most naturally diverse countries in the world has noticeable congregation of biodiversity in remarkable physical setting. The extreme variation in altitude, complex topography, varied climatic conditions and antiquities of biological systems have generated immense genetic diversity in flora and fauna at both species and intra-species levels. The Himalayan ecosystem in Nepal with its steep rises in elevation, rugged terrains and patchworks of ethnic and cultural diversity, is being proximal to the origin and secondary sources of origin of different cultivated plants. Nepal harbors numerous wild relatives of cultivated agricultural crops ranged from 60m (Kechanakalan, Jhapa) to 4700m (Khumbu, Solukhumbu). 83 different wild relatives of 46 genera under 18 families of 36 agricultural crops have been reported by Shrestha and Shrestha in 1996.

Nepalese farmers rely on diversity of under researched but locally adapted crops of indigenous origin whose conservation is considered as sacred act. Local landraces are most adapted and suitable variety for particular domain as it is continuously evolving due to interaction with local environment. The agriculture system is characterized by farming households with land parcels spinning a wide range of altitudinal variation and irrigation practices along with different slope aspects increases the ecological diversity encompassed by farmer's fields and such micro environments create different evolutionary process for continuous adaptation of crop populations, resulting wide range of local landraces. Farmers maintain and select various varieties not only based on local environments, but also make decisions based on their management practices and crop traits.

The vital resource agricultural biodiversity is the most used subset of biological diversity in securing food security. Despite the key role of local crops in food security due to their hardiness, resilience to stress and nutritional value, public value investment in research and development of these crops is scarce. Though Nepal

is rich in genetic diversity of traditional mountain crops; identification of suitable varieties and accessing in sufficient amount has been a real problem. More than 75 percent of the global crop diversity has been disappeared irrevocably over the twentieth century as reported by FAO in 2011. In Nepal 50 percent of landraces or traits has been lost.

The major constraints of agriculture sector leading to low productivity is the rugged topography resulting in low availability of arable land, harsh climatic conditions, traditional agriculture systems, non-mechanizations and lack of infrastructures. Many landraces are being rare and endangered. The locally adapted crops have not been used in breeding programme is leading to genetic erosion due to replacement of the landraces and local varieties by improved varieties. Traditional mountain crops are highly under-researched and international breeding efforts in mountain crops are limited in spite of its importance. Commercialization of agriculture and widespread use of modern high yielding varieties, improper use of insecticides and pesticides and conversion of farmland into semi-permanent and permanent settlement has a major threat to agrobiodiversity.

The maintenance of genetic diversity of crops is necessary to derive different transgenic segregates suitable for different ecology to meet the demand of farmers. It is prime essential to mainstream the conservation and use of agrobiodiversity in the agricultural production landscapes of Nepal to improve ecosystem resilience, ecosystem services and access benefit sharing capacity in mountain ecosystem. The documentation of detailed information on agricultural biodiversity with the involvement of local farmers in creating a community biodiversity register will be vital. The collaborative approaches of government, semi-government and private agencies ensuring conservation and sustainable use of agriculture genetic resources for the betterment of Nepalese should be treated as complementary. There is need of extensive characterization,

evaluation and tagging economically important traits to facilitate and utilize genetic diversity aiming the development and promotion of diverse set of varieties.

Tangible results could be achieved via involvement of universities, research organizations and extension sectors for collective actions. Most importantly, awareness on importance of local crops in terms of climate resilience and food nutritional security has to be highlighted along with the extensive characterization, evaluation and tagging of economically important traits to facilitate and utilize genetic diversity.

Nepal should be in stronger position to address the agriculture biodiversity crisis. Agrobiodiversity is directly associated with food and nutrition security. The potentialities of local landraces should be explored and exploited at large scale. The varieties that are well adapted to marginal environment are key resource for farmers. Modern reason of genetic erosion is replacement by modern varieties equipped with very limited use of local landraces in breeding non-profit agriculture business. Therefore, on farm and ex-situ conservation are necessary for maintaining the available genetic diversity in order to develop options for a fair and equitable sharing of benefits arising from access and use of agricultural genetic resources and material.

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