1. ABOUT AGROBIODIVERSITY RESEARCH

Offerings to the spirits at the beginning of rice harvest in San Din Daeng Karen community, Thailand. Photo: D. Mijatović
Assessing Agrobiodiversity: A Compendium of Methods

1. ABOUT AGROBIODIVERSITY RESEARCH

1.1 WHAT IS AGROBIODIVERSITY?

Since the beginning of agriculture more than 10,000 years ago, hundreds of thousands of crop varieties and thousands of livestock breeds have been created through human and ecosystem interaction. These varieties and breeds are adapted to specific ecologies, climates and human needs, and they continue to evolve in unique environments and management systems.

AGROBIODIVERSITY includes all the variety and variability of animals, plants and microorganisms that are used directly or indirectly for food and agriculture, including crops, livestock, trees and fish. Created and managed by farmers, pastoralists, fishers and forest dwellers, it comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and medicine. Agrobiodiversity also includes the diversity of non-harvested species that support production (soil microorganisms, predators, pollinators) and those in the wider environment that support agroecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agroecosystems (FAO and PAR 2011).

Crops and animals depend on countless organisms above and below ground that interact with each other in a complex web of ecological activities. Ecological processes that result from the interactions among species and between species and the environment provide a continuous flow of essential ecosystem services, including soil fertility maintenance, soil erosion control, pest and disease regulation and pollination.

- Thousands of species of plants and mushrooms have been cultivated or harvested.
- Countless varieties of cultivated species have been developed through adaptation to diverse natural and cultural environments.
- Thirty-eight species of animals and around 8,000 distinct breeds of livestock have been domesticated and bred by pastoralists and other livestock keepers.
- More than 20,000 species of wild bees and many species of butterflies, flies, moths, wasps, beetles, birds, bats and other animals contribute to the pollination of plants, many of which are food to people and animals.
- Millions of organisms, including vertebrate animals, earthworms, nematodes, insects, fungi and bacteria, are found in healthy soil.
1.2 THE CONTRIBUTION OF AGROBIO DIVERSITY RESEARCH

In recent decades, great advances have been made in describing agrobiodiversity and understanding the cultural and biological forces that sustain and create that diversity. Substantial evidence has been generated on the important contribution of agrobiodiversity to resilience, livelihoods, health, nutrition and ecosystem services. Inspiring collaborative initiatives have emerged that have shown how research can assist or even instigate actions to maintain and increase agrobiodiversity through co-creation and sharing of knowledge.

DESCRIBING DIVERSITY

Assessment of the diversity of local varieties, breeds and wild plants and of their management and uses is a key first step in their improved conservation and use. Converting local knowledge into written documents, drawings, maps or audio and video recordings can help prevent loss of diversity. Documenting the use of wild plants, the diversity and abundance of insect pollinators and the number, distribution and characteristics of local crops, varieties and animal breeds can help local communities to assert, conserve and protect their traditional knowledge. Documentation of local knowledge about diversity can also facilitate the processes of knowledge sharing and transmission from elders to younger generations.

CO-CREATING KNOWLEDGE

Agrobiodiversity management involves a dynamic interplay between conservation and innovation. Integration of traditional and scientific knowledge helps create strategies that harness agrobiodiversity to improve sustainability, resilience, nutrition, health and livelihoods. Collaborative research can support local processes of innovation without undermining the biological and cultural underpinnings of diversity-rich agricultural and pastoral systems. Participatory disease management strategies (Mulumba et al. 2012), participatory plant breeding (Ceccarelli and Grando 2009) and sustainable grazing plans (LPP and LIFE Network 2010) are examples of strategies combining local and scientific knowledge.

SHARING DIVERSITY

Conservation and innovation in agrobiodiversity depend on continued exchange of knowledge and experiences, seeds and cultivation techniques between generations, and between individuals and communities. In addition to traditional forms of knowledge sharing and transmission, different forms of exchange networks, institutions and activities are important for the conservation of and access to materials and knowledge that otherwise may be lost. Social networks and associations can help enable local communities to engage in collective management practices and strengthen the property rights of individuals or groups, as shown by community seed banks (Vernooy et al. 2017) and diversity fairs (Sthapit et al. 2006).

Different forms of exchange networks, institutions and activities, such as community seed banks and diversity fairs, have emerged as important for the conservation and access to diversity and knowledge that otherwise may be lost.

Community seedbank, India. Photo: Bioversity International/P. Bordoni
The diversity present in any landscape is the result of interactions between biological, ecological, environmental, social and cultural processes. Because of this, assessing agrobiodiversity and its management requires approaches that transcend single disciplinary perspectives. This is best done using a 'transdisciplinary' approach, which implies using a common language that all participants can understand, building joint visions and discussing choices and challenges. Transdisciplinary approaches include innovative participatory ways of working with local communities and engaging research practitioners from different disciplines, policymakers and other stakeholders.

Studies of agrobiodiversity are best achieved through the process of participatory research (Figure 1.1). Participatory approaches focus on local perspectives, seeking to emphasize mutual learning. Participatory agrobiodiversity research requires a collaborative relationship between community members, local organizations and researchers.

Every aspect of the research process should be discussed and agreed with the community in order to develop a common understanding of the methods, the analysis and the purposes of the data collection. This will help avoid unreasonable expectations or extracting information that could go against potential benefits for the community.

The members of local communities where research is taking place play an important role in data collection, analysis, validation and sharing. It is essential that they are given an opportunity to use the research process and results to address their own questions, needs and challenges.

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**Figure 1.1 Participatory research process**

1. Select sites based on the interest of the local communities, evidence of unique agrobiodiversity or expression of concern over loss of agrobiodiversity.
2. Discuss a Free Prior Informed Consent (FPIC) agreement with the community and have it signed by their representatives. The FPIC protocol should summarize the agreed conditions of the research process, state how it benefits the communities involved and under what conditions data are shared and used.
3. Collect data.
4. Analyse the data obtained.
5. Share and validate the data and the results of any analysis with the local communities by visualisation, public presentations and discussions.
6. Develop action plans to enhance the management and maintenance of agrobiodiversity through community-based approaches using the results obtained.
FURTHER INFORMATION / REFERENCES


CENESTA (2013) Evolutionary Plant Breeding. A method to adopt crops to climate changes, increase on-farm biodiversity and support sustainable livelihoods. (Tehran, Centre for Sustainable Development).


PAR Climate Change Project (2010) FPIC – Agrobiodiversity and Climate Change project. http://agrobiodiversityplatform.org/climatechange/the-project/abd_and_cc_project_fpic/
