

Agricultural Biodiversity: It's Need for Sustainable Progress

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Abstract

Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems, also named agro-ecosystems. Agricultural biodiversity should be considered as a key resource and the most important human heritage. Biodiversity of farm animals and plants gives the foundation to food production that ensures the existence and future of contemporary civilizations. Rapid economic development, unfortunately, does not facilitate the preservation of biodiversity and organisms characterized by many desirable properties and features are perishing. Economic progress forces humans to abandon traditional, safe and more varied species, and to switch to monocultures and that non-native to specific habitats, but which are more productive. In this way mankind had lost forever a large part of this living deposit of the past times, and this process continues. It is therefore necessary to promote and encourage the individuals to better understand the need in the subject and seek support in the interest of present and future mankind

Key words: agricultural biodiversity, genetic erosion, ecological agriculture, agro ecosystem, natural resources

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"Cherish the natural world because you're part of it and you depend on it"
-Sir David Attenborough

INTRODUCTION

Biodiversity means the richness and variety of life - of genes, species and ecosystems. Biodiversity maintains the health of the biosphere. It provides us with food and medicine and contributes to our economy. The greater the variety of species, the healthier is the biosphere. Sustainability of an ecosystem is the ability of that ecosystem to maintain its ecological processes, structure and function over time in the gaze of external stress. It is strongly linked to ecosystem health. The biodiversity of an ecosystem contributes to the sustainability of that ecosystem. The higher the biodiversity of an ecosystem, the more sustainable it is. Conversely, lower the biodiversity equals less sustainability. A great variety of genes and species means that the ecosystem is better able to carry out natural processes (such as biogeochemical cycles, population dynamics, evolution, succession, etc.) in the face of external stress.

The more sustainable an ecosystem is the better it is for the environment and for people. This is because we need ecosystems to survive - we need nutrients, food, medicine and money to survive and

ecosystems provide us with all of these things. So, it is in everyone's best interest to increase the sustainability of ecosystems.

Agricultural biodiversity is of fundamental significance to human societies, providing sociocultural, economic and environmental benefits. It is essential for food security and poverty alleviation. Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems, also named agro-ecosystems. Agricultural biodiversity should be considered as a key resource and the most important human heritage. Biodiversity of farm animals and plants gives the foundation to food production that ensures the existence and future of contemporary civilizations. Rapid economic development, unfortunately, does not facilitate the preservation of biodiversity and organisms characterized by many desirable properties and features are perishing. Economic progress forces humans to abandon traditional, safe and more varied species, and to switch to monocultures and that non-native to specific habitats, but which are more productive. In this way mankind had lost forever a large part of this living deposit of the past times, and this process continues. It is therefore necessary to promote and encourage the individuals to better understand the need in the subject and seek support in the interest of present and future mankind.

Agricultural biodiversity is of key importance to world food supply, both now and in the future. It is vital in ensuring food security for the approximately 1.3 billion small farmers in developing countries and emerging economies. Around 75 percent of the 1.2 billion poorest people in the world live in rural areas and are dependent on traditional agriculture practices. This makes agricultural biodiversity a strategic resource in the fight against poverty in those regions.

Agricultural biodiversity comprises all components of biodiversity important to food and agriculture. This includes all biodiversity in farming landscapes, not just farm animals and crop plants. Agricultural biodiversity thus takes in the genetic resources of crop varieties and farmed animal breeds (including fish) together with undomesticated (wild) resources in field, woodland, pasture and aquatic ecosystems, together with elements of biological diversity that secure ecosystem services such as the nutrient cycle, crop pest and disease regulation, pollination, conservation of local wildlife, protection of water resources, prevention of erosion, climate regulation and carbon fixation.

The organisms referred to are used in farming, forestry and fishing in cultivation systems that in various ways and to varying degrees are integrated with natural ecosystems. Cultivated organisms interact with organisms in these natural ecosystems and depend on them to produce their output. Dependency of this kind includes soil fertility provided by soil organisms, pests being reduced by natural enemies and plants being pollinated by insects.

Agricultural biodiversity goes hand in hand with variety in farming and production practices, because unlike biodiversity in general, many components of agricultural biodiversity critically depend on human activity. Whatever is not actively used – cultivated, held, processed, sold, eaten, etc. – is ultimately threatened with extinction. Rich agricultural biodiversity is the basis of tomorrow's food supply, as it equates to a larger gene pool available for use. Concentrating on few high-output breeds, species or varieties harbors a risk of declining yields, for example due to loss of disease resistance or environmental tolerance, or due to the danger of inbreeding depression (decreasing vitality, fertility or fitness). Loss of genetic diversity means an irretrievable loss of future breeding options. This hinders adaptation to unforeseeable disease risks or to environmental variations like climate change. It also constitutes a loss of cultural heritage.

The role of agricultural biodiversity:

It can:-

- Increase productivity, food security, and economic returns
- Reduce the pressure of agriculture on delicate areas, forests and endangered species
- Make farming systems more stable, vigorous, and sustainable
- Contribute to sound pest and disease management
- Conserve soil and increase natural soil fertility and health
- Contribute to sustainable growth
- Diversify products and income opportunities
- Reduce or spread risks to individuals and nations
- Help maximize effective use of resources and the environment
- Reduce dependency on external inputs
- Improve human nutrition and provide sources of medicines and vitamins,
- Conserve ecosystem structure and stability of species diversity.

Loss of agricultural biodiversity:

There are many reasons for this decline in agro biodiversity. Throughout the century the decline has accelerated, along with increased demands from a growing population and greater competition for natural resources.

The principal underlying causes include:

- **The rapid expansion of industrial and Green Revolution agriculture.**-This includes intensive livestock production, industrial fisheries and aquaculture. Some production systems use genetically modified varieties and breeds. Moreover, relatively few crop varieties are cultivated in monocultures and a limited number of domestic animal breeds, or fish, are reared or few aquatic species cultivated.
- **Globalization of the food system and marketing.** The extension of industrial patenting, and other intellectual property systems, to living organisms has led to the widespread cultivation and rearing of fewer varieties and breeds. This results in a more uniform, less diverse, but more competitive global market. As a consequence there have been:
 - Changes in farmers' and consumers' perceptions, preferences and living conditions;
 - Marginalization of small-scale, diverse food production systems that conserve farmers' varieties of crops and breeds of domestic animals;
 - Reduced integration of livestock in arable production, which reduces the diversity of uses for which livestock are needed; and,
 - Reduced use of 'nurture' fisheries techniques that conserve and develop aquatic biodiversity.
 - The replacement of local varieties by improved or exotic varieties and species.-The main cause of the genetic erosion of crops - as reported by almost all countries

Need of Protecting Agricultural Biodiversity:

There is a dire need of protecting Agricultural biodiversity as it is a crucial component. It is a fundamental component of life on Earth. The value of agricultural biodiversity, both intrinsically and to

humans, is immeasurable, and thus must be protected. It also makes important contributions to sustainable livelihoods in a number of ways:

- Agricultural biodiversity contributes directly to sustainable livelihoods in both traditional and industrial-type agricultural systems through production effects (crops, soil nutrient recycling, pest predators, etc);
- It also contributes indirectly to sustainable livelihoods in traditional and industrial-type agricultural systems through the provision of important ecosystem functions and services; and,
- It contributes to the livelihoods of a wide range of other stakeholders (public sector plant breeders and other agricultural research scientists, international biochemical companies, urban consumers, the international gene bank system).

Measures required conserving agricultural diversity for sustainable future:

It can be achieved by-

- Promoting public awareness of the value of agricultural biodiversity, its conservation and optimum use
- Developing and monitoring early warning systems for loss of agricultural biodiversity,
- Building strong national programmes
- Promoting networks for plant genetic resources for food and agriculture
- Constructing comprehensive information systems
- Expanding and improving education and training
- New approach to agricultural research
- Adoption of several alternative practices to make agriculture less environmentally damaging,
- Reducing the use of natural resources preserving soil fertility and biodiversity.

Conclusion:

Taken together, the opportunities for action at local, national and global level to support the wider use of agricultural biodiversity to reduce poverty, promote development and improve food security, imply that a new approach to agricultural research and development is needed, to meet the needs of the majority of the rural poor who live in areas that have fewer natural resources, are prone to natural disasters, and who are far less able to purchase inputs such as fertilizers and pesticides. Moving our agriculture towards more sustainable path is not an easy task, because we need to deal simultaneously with a number of different environmental, social, economical, technical issues and tackle these at many different levels from individual farms to a global agro-based system. So there is a need of adoption of several alternative practices to make agriculture less environmentally damaging, reducing the use of natural resources preserving soil fertility and biodiversity. We need to create a room for different and more ecological agriculture and research also need to be done in order to better assess the potential and the constraints of different options available to us. Sustainability can be attained not only by focusing on production and economic but by minimally meeting environmental regulations in the most cost effective way. Sustainability means preserving economic productivity and taking kindly the ecological foundation and social implications and impact of farming. It includes designing systems that are resilient and can endure for the indefinite future. Only then it will help to sustain the human species as well as healthy natural environment in future. Thus, eventually it may be required to our society that it changes some of its paradigms and values in order to preserve our support system, the soil and its health for the future generations.

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Web sites

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- FAO Web site for Gender, Agro biodiversity and Local Knowledge: www.fao.org/sd/links

