



Relationship between the rich biodiversity in organic farming and best conservation practices

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INTRODUCTION



- About a third of the world's land surface is used for agriculture (IFOAM, 2004).
- Organic agriculture can restore ecosystems and deliver ecosystem services (Pretty *et al.*, 2005)
- Rich biodiversity in agricultural environment improves productivity of agricultural systems (Secretariat of the Convention on Biological Diversity, 2008).
- Implication of erosion of both biodiversity and poor environmental conservation
- The conventional agricultural production system allows inputs without much regard for the environment.

BIODIVERSITY

- Agricultural biodiversity is considered an integral part of the general biological diversity.
- Three levels: genetic diversity, species diversity and ecosystem diversity- FAO (1999)

Biodiversity cont.

Biodiversity covers:

- **genetic resources - the essential living materials of plants and animals;**
- **edible plants and crops, livestock (small and large, lineal breeds or thoroughbreds) and freshwater fish;**
- **soil organisms vital to soil fertility, structure, quality, and soil health;**
- **naturally occurring insects, bacteria, and fungi;**
- **agro ecosystem components and types and**
- **'wild' resources (species and elements) of natural habitats and landscapes.**

ORGANIC AGRICULTURE AND BIODIVERSITY



- **Most efforts to preserve biodiversity focus on natural ecosystems, using tools such as protected areas – despite the fact that these areas represent less than 10 per cent of the earth’s land surface.**
- **Large proportions of the total species of a region are likely to be found in agriculture systems.**
- **Organic farming systems aim to increase this diversity of crops, in time or in space.**
- **Importance of biodiversity is enshrined within the operating standards developed worldwide for organic farming.**

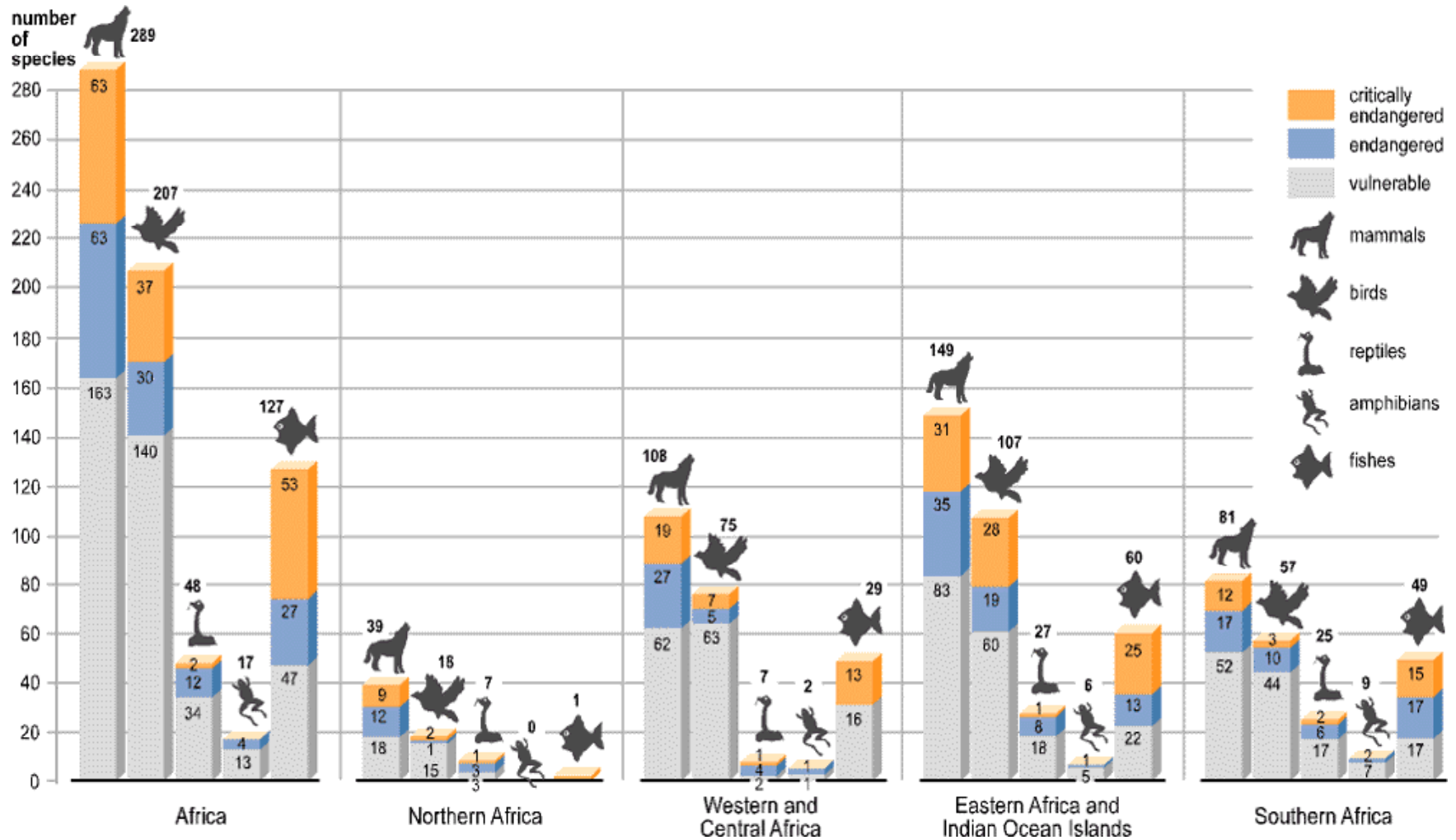


Figure1 :Threatened animal species

Source: WCMC/IUCN 1998

Scientific evidence of the benefits of organic farming in biodiversity and conservation

Benefits to biodiversity

- **Nearly all non-crop, naturally-occurring species observed in comparative farm land practice studies show a preference in organic farming both by population and richness (Hole *et al.*, 2006; Gabriel and Tschardtke 2006).**
- **Spanning all associated species, there is an average of 30% more on organic farms versus conventional farming methods (Bengtsson, Ahnstrom, and Weibull 2005).**
- **Increased biodiversity, especially from soil microbes such as mycorrhizae, have been proposed as an explanation for the high yields experienced by some organic plots, especially in light of the differences seen in a 21-year comparison of organic and control fields (Fließbach *et al.*, 2006).**

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.



Impacted animal species

- In 5 recent studies almost all bird species including locally declining species, both population and variation increased on organic farmland (Hole *et al.*, 2005).
- Making a switch from conventional farming methods to organic practices also seems to directly improve bird species in the area (Murphy, 2003).

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.



- **Butterflies**

- A specific study done in the UK in 2006 found substantially more butterflies on organic farms versus standard farming methods except for two pest species.
- The study also observed higher populations in uncropped field margins compared with cropland edges regardless of farm practice (Feber *et al.*, 2006).



Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.



Soil Microbes

- **Hole *et al.* (2005)** reported that out of 13 studies comparing bacteria and fungus communities between organic and standard farming, 8 of the studies showed heightened level of growth on organic farm systems. One study concluded that the use of “green” fertilizers and manures was the primary cause of higher bacterial levels on organic farms.

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.

Beetles



- According to Hole *et al.* (2005), twelve studies have found a higher beetle population and species richness of carabids (ground beetles) on organic systems.
- The overall conclusion of significantly higher carabid population species and diversity is that organic farms have a higher level of weed species where they can thrive.

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.

Earthworms



- Out of six studies comparing earthworm biodiversity to organic and conventional farming methods, all six suggested a preference for organic practices.
- Hole *et al.* (2005) summarized a study conducted by Brown (1999) and found nearly double the population and diversity when comparing farming methods..

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.



Mammals

- A study done by Brown (1999) found that small mammal population density and diversity did not depend on farming practices, however overall activity was higher on organic farms.
- Another study conducted by Wickramasinghe et al. (2003) compared bat species and activity. Species activity and foraging were both more than double on organic farms compared to conventional farms. Two of the sixteen species sighted were found only on organic farms (Hole *et al.*, 2006).

Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.

Vegetation

- Approximately ten studies have been conducted to compare non-crop vegetation between organic and conventional farming practices.
- It was concluded that broad-leaved species showed far less tolerance to herbicides applied to most conventional farms. (Hole *et al.*, 2005).



Scientific evidence of the benefits of organic farming in biodiversity and conservation cont.

Farmers' Benefits from Increased Biodiversity

- Varieties of bacteria and fungi break down chemicals, plant matter and animal waste into productive soil nutrients. In turn, the producer benefits by healthier yields and more arable soil for future crops (Ingram, 2007).
- From a 21-year study was conducted testing the effects of organic soil matter and its relationship to soil quality and yield, an increased soil microbe community in the manure fields, provided a healthier, more arable soil system (Fließbach *et al.*, 2006).

Caution: Possible detriments to biodiversity through organic farming!



- van Elsen (2006) reported that a series of small clusters does not provide adequate land area for high biodiversity potential.
- Organic farming practices still require active participation from the farmer to effectively boost biodiversity.

Sustaining Organic Agriculture's positive impact on biodiversity conservation



- **Increased research into organic management regimes that influence biodiversity.**
- **Increased monitoring of biodiversity**
- **Provision of compensatory mechanisms for loss of production caused by changes in farming practice to optimize biodiversity.**
- **Increased provision and funding for information, dissemination, agricultural education, training and advisory services that help develop organic farming systems to meet biodiversity conservation goals.**
- **Development of the IFOAM Basic Standards to emphasize biodiversity conservation and landscape preservation practices, and promotion of these to standard setting bodies.**

IFOAM (2004)

CONCLUSION

- **Adoption of organic farming systems should be encouraged.**
- **Biodiversity and conservation efforts should not be sacrificed for organic market expansion.**
- **Africa should explore the possibilities of developing organic production systems as a method for safeguarding rural populations and traditional production systems and providing access to markets.**

Thanks for listening

