

# PRINCIPLES FOR DEVELOPING AN EFFECTIVE BIODIVERSITY DNA SEQUENCING INFORMATION (DSI) DATA MANAGEMENT PLAN (DMP) FOR EFFECTIVE USE IN CONSERVATION AND PRODUCTION

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## Background

The WWF 2020 Global Living Planet report highlights the crisis that our planet is in. It shows that on average we have lost 68% of monitored populations of mammals, birds, amphibians, reptiles, and fish between 1970 and 2016. Species' population trends are important because they are a measure of overall ecosystem health. A decline in species also means reduced ecosystem integrity, stability, and ecosystem services. The African Continent is significantly impacted by our biodiversity as it gives the key impetuses catalyst to the biogeochemical responses expected to maintain the ecosystem benefits that control global physiology.

How species inhabiting global biodiversity are distributed in and on the planet reflects their adaptation to life and life processes within these areas. Common knowledge states that adaptations of any terrestrial vertebrates led to development of area specific biodiversity. The location, abundance and phenotypes of species have been shaped by adaptation to environment that deviates from generality of organisms thriving from one environment to another. This contributes to site specific distribution of life domains in the planet. These environmental areas on the planet have site specific biodiversity distribution which could differ among continents and within continents either at 'health' or 'diseased'. Species' decline is caused by a range of threats that include climate change, urbanization and infrastructure, food production systems, global trade patterns, consumption patterns weak governance systems and limited sustainable funding.

Biodiversity is the sum of the evenness and the richness of the species composing a given community. Evenness is the mathematical representation of how equal the abundance of the different species in an ecosystem. To understand the processes involved in the generation and maintenance of a core regional species, it's important to identify the key ecological processes governing patterns in species distributions in the continent as an ecosystem. Species communities are shaped by a combination of selective and stochastic forces. The balance between these forces varies over space and time and can be difficult to determine based on species abundance distributions alone. Various studies suggest that, both forces play significant roles in structuring communities, due to the large differences in temporal and spatial scales relative to metazoan communities

Like other parts of the world, Africa is losing species. Many endemic African species are on the brink of extinction and, ironically, they may not have been identified or the relationship between the species and its surrounding ecosystem has not been adequately researched. The velocity of climate change, rapid urbanization, growing demand for food, and massive investment in built infrastructure increase the urgency to document African species under threat leveraging on local knowledge and experts supported by formal science. The data and emerging knowledge will inform management and policy options. In Africa, significant biodiversity is found outside state-protected areas in areas under the control and

management of indigenous people and local communities. Therefore, it makes sense that these custodians of nature are included in decisions and plans related to biodiversity.

CSTI partnership with African CSOs Biodiversity Alliance (ACBA) explores the development of DNA Sequencing Information Data Management Plans as a modality to increase the number of Citizen Science researchers and supporters who can safely sample and catalogue the DNA information of species that are endemic to African ecosystems in line with other global efforts.

This newer techniques involving microbial ecology, bioinformatics and computational biology may allow us to untangle key drivers of stability in the continent diversity in relation to resistance to disturbances and further contribute to the tree of life through comparable molecular system ecology.

Local communities understand the complexity of natural systems and biodiversity and empower them to meaningfully participate in documenting species-related data and information to enhance the conservation of biodiversity and ecosystem integrity. For this to happen the capacity of indigenous people, local communities, governments, private sector and CSO's should be supported.

**Outcomes:**

1. Introduce and Understand basic biodiversity in terms of genetics and genomics
2. Mainstream locally led African biodiversity genetic conservation into global scientific discourse.
3. Open opportunities for local discovery and patenting of African nature-based solutions.
4. Enable participants to develop a business case for including biodiversity conservation as an economically viable activity in the budgeting of African countries.

**Target Audience:**

- Biodiversity Researchers - scientific knowledge on genetic diversity
- Indigenous Communities - traditional biodiversity knowledge
- Natural History Museums - cataloging biodiversity
- Community-Based Organizations - biodiversity conservation
- Social Enterprises - development of benefits sharing biodiversity products and services
- Policy Makers - understand linkages between biodiversity health, social health, and economic health