



## Impacts of Climate Changes in Animal Genetic Diversity

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### Abstract

Ecological changes taking place around the world will influence in living things and their environment in many ways. One of the most important factors is climate changes, threatening not only to the existence of species, plants or animals but also to their genetic diversity. Genetic diversity is the variation in genomes of living things that is inheritable from generation to generation. Furthermore, it is a raw material for us to observe how species to adapt to their new environmental conditions against climatic fluctuations. A wide genetic variation in animal species is quite substantial for agriculture. Especially in livestock animal productions, populations that are composed of a wide variation refer to animals with inherent resistance to certain diseases or harsh environmental conditions in spite of yielding less economically important traits. Climate changes have certain effects in genetic diversity based on population size, gene flows and distributions among different geographical areas, and selection in terms of pressure, therefore should be under investigation how a species can be protected in the original habitat in order for mankind to maintain genetic variation.

**Keywords:** Climate Changes, Genetic Diversity, Livestock animals

### INTRODUCTION

Over the past century, human activities in technologies and industries have resulted in polluted site effects around the world. Air pollution is one of the most important problems such as released large amounts of carbon dioxide and other greenhouse gases into the atmosphere. In addition, another dilemma is rising global temperatures accompanied by changes in weather and climate.

Genetic diversity (GD) of farm animals has a certain role to play in feeding the world, allowing farmers to develop new breeds in response to changing environmental conditions, new requirements of human nutrition, changing market conditions and their societal needs along with rural developments [3]. Genetic variation refers to different individuals in a population that are likely to carry different genetic sequences for corresponding regions of the genome. GD is the raw material on which natural selection acts to adapt populations to their environment, making it critical for population persistence during global climate changes (GCC) such as floods, droughts, or intense rain, as well as more frequent and severe heat waves and air pollution. The global pattern of expanding urban centers and increasing agricultural intensity is leading to more frequent interactions between air pollution emissions from urban and agricultural sources [4]. Furthermore, GCC or climatic fluctuations give rise to reduce in genetic diversity [6].

#### Effects of GCC

GCC affects mainly every living things and its impacts on GD are not as obvious as many other changes. However, it may affect genetic diversity both changes in the geographical location and extent of the range and in the local selection strategies, inducing impacts on the genetic make-up of a particular population [8]. Changes in GD are primarily driven by changes in population size, connectivity, distributions and selection pressures. Consequences of changes in GD for biodiversity involve in loss of diversity, inbreeding depression and evolvability [1 and 5].

Along with the public awareness of nature conservation issues, advantages of molecular genetics tools and techniques to estimate of genetic diversity loss and grades of inbreeding in populations have led to the rise of conservation genetics over the past two decades, which allows to reveal the extent of gene flow in time and space [8]. Including genetic diversity into GCC studies promises much improved projections of species vulnerability and future distributions when considered in species that have become extinct and adapted to their environments.

### CONCLUSION

Climate changes obviously affect livestock production systems and the associated animal genetic resources (AnGR) in many ways. There must be adequate research and information on specific environments and on distinguished genotypes of farm animals. Combining all, it is also needed to establish a main data network all around the world in order to challenge GCC.

As a result, the factors influencing the movement of genes in the landscape and the genetic differentiation can cause the loss of genetic diversity [7]. Some of the suggested actions to prevent loss of genetic diversity due to GCC are as follows;

-New methods are required for characterizing adaptive traits relevant to climate-change adaptation (heat tolerance, resistance to certain diseases, adaptation to poor diets, and harsh environmental conditions etc...) [2].

-It is important to identify potential climate change-related threats to specific AnGR [1 and 2] and improve the knowledge and awareness of climate-change adaptation.

-There must also be concerned certain efforts to develop models in nature for distribution and characteristics of production environments in future.

-In regards to the evaluation of threats and the identification of areas for particular breeds in the future, improved genomic tools will be needed to realize evolutionary responses to climate change and finally provide information

on vulnerable species or habitats to assist in the development of appropriate management schedules [6].

It could be concluded that climate changes have certain effects in genetic diversity based on population size, gene flows and distributions among different geographical areas, and selection in terms of pressure and intensity, therefore, should be under investigation how a species can be protected in the original habitat in order for mankind to maintain genetic variation.

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