

LINKAGES BETWEEN BIODIVERSITY AND POVERTY: A CONCEPT PAPER

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Conservation of biodiversity takes place largely in landscapes that are managed for farming and pastoralism. Biodiversity provides not only food and income but also raw materials for clothing, shelter, and medicines. Biodiversity also breeds new varieties of agricultural crops and animals. In addition, it performs other services such as maintenance of soil fertility and biota, and soil and water conservation. All of these biodiversity provisions are essential to human survival.

Rural people use and manage biodiversity in developing their livelihoods. Through generations of innovation and experimentation, they have nurtured diversity of plants and animals, either wild or domesticated, and accumulated rich knowledge on biodiversity management. The process of learning, experimentation and innovation continues throughout the developing world. Much has been written on loss of managed biodiversity under threats from commercial and intensified production. But only limited work has been done on how farm households manage their resources so as to sustain and enhance them. To develop practices and system for sustaining managed biodiversity in Sudan, this research work has been motivated by a threefold primary objective.

- 1) What are the principal mechanisms (frameworks) within which farmers select and or manage biodiversity at all levels, agro-ecosystems, species and genetic diversity.
- 2) What are key factors that make some biodiversity-rich farming practices profitable and productive in a market economy? Can these practices sustain food security in the future?
- 3) What are the challenges those efforts to sustain farmers' management of biodiversity will have to meet, nationally and internationally?

In order to grasp firmly these objectives the current paper has critically examined the functional relationships between the states of biodiversity as related to poverty and its consequences. More specifically, this research paper examines two operational arguments (hypotheses) working on opposite direction. The first hypothesis states that "areas with rich biodiversity supports better livelihood and hence low poverty levels". The second hypothesis states the opposite that "areas with low biodiversity are originally areas with high poverty". The second hypothesis therefore, attributes the deterioration on biodiversity to the socioeconomic behaviors of basically poor farm households, perhaps have been subjected to market economy effects. These two arguments can be stated mathematically as follows:

$$POV = f(BVD, \text{other socioeconomics}) \text{ first hypothesis} \quad (1)$$

$$BDV = f(POV, \text{Other socioeconomics}) \text{ second hypothesis} \quad (2)$$

POV represents a set of poverty indices and BDV a number of biodiversity variables. These two equations are estimated, each as single equation, using Hechman method, because of the discrete variables involved. The two equations are also estimated as growth trends in biodiversity and poverty indices, using a log linear specification on discrete variables. Other socioeconomic continuous variables are also added to the right hand-side terms of each equation. The indices of poverty are the depth and severity variables while those of biodiversity include 1) Range and pasture, 2) Livestock, 3) Forestry, and 4) Agricultural biodiversity, and 5) Biotechnology and biosafety.

The P-alpha measures are used to estimate the indexes of depth and severity of poverty using data from inter and intra household surveys designed and conducted by the author for CARE_INT in Sudan, during the period 1994-2000, in Kordofan region. Indices of biodiversity are imputed from the Sudan Country Study on Biodiversity carried out by the UNDP in 2000. This research study is carried out in Kordofan region, with an official estimate of more than 90% of population is below the poverty line. Its anticipated results are to determine the biodiversity linkages to poverty and accordingly advise in designing poverty alleviation programmes based on biodiversity dimensions for inherently agrarian communities whose livelihoods are totally dependent on farming.