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ANALYSIS

Valuing indigenous cattle breeds in Kenya: an empirical comparison of stated and revealed preference value estimates

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Abstract

In this study we compare revealed and stated-preference approaches to value traits of cattle in Kenya. The premise is that much can be learnt about non-market values of indigenous animal genetic resources (AnGR) from the use of multi-attribute stated-preference methods, if these compare well with revealed-preference results. The objective is to investigate the performance of choice experiments (CEs) in Maasai cattle trading, by conducting an external test of preference consistency. We compare value estimates for cattle attributes from CEs data with those from hedonic analysis of actual transactions by the same population of traders, in the same markets and over the same period. If CEs perform well, they can be used to investigate values of those genetically-determined livestock traits currently not prominent in pastoralists' populations, but desirable candidates for breeding or conservation programmes (e.g. disease resistance). The results indicate that CE estimates pass the external test and appear to be adequately precise in estimating values for cattle traits that are relevant in market transactions for Maasai traders. Accounting for taste and variance heterogeneity does not change this conclusion. CEs may, therefore, be a promising tool for valuing phenotypic traits expressed by indigenous AnGR.
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1. Introduction

Of all the forms of biodiversity, the one that is most important to human kind is probably that upon which we rely for food. The conservation

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and correct assessment of existing biodiversity of plants and animals employed in agriculture is paramount for sustainable development. Following the aims declared in the Convention on Biological Diversity (Convention on Biological Diversity, 2000), many national and international public agencies are now committed to the challenge of conservation of biodiversity and its genetic base.

The management of animal genetic resources (AnGR) requires many decisions that would be easier to make if information on the economic value of populations (e.g. breeds), traits and processes (e.g. alternative breeding and/or conservation programmes) were available. In the context of the CBD, valuation is essential for the development of 'benefit-sharing' frameworks. At national levels, governments need economic values of breeds and traits as an input into the development of incentive schemes for in-situ conservation programmes.

While some attempts have been made at developing methodologies for placing economic values on genetic resources, this has been limited to plant (including forest) genetic resources (Evenson et al., 1998). Moreover, methodologies for determining to what extent market values reflect the real value of AnGR are completely lacking. They are particularly needed in developing countries where many important functions of livestock are embedded in traits that are not traded in the market. These include such traits (functions and products) as traction, manure, form of investment, dowry payment, use in traditional ceremonies, etc. A complicating factor in these production systems is that yield stability, which is often more valuable than yield per se, is a manifestation of complex traits, such as adaptive attributes (e.g. disease resistance, drought tolerance).

Thus, nowhere is efficient resource allocation in biodiversity conservation more needed than in developing countries. On one hand, so much of the livelihood of local communities is at stake, and on the other, so meagre is the resource base with which to achieve this objective. In these societies, assessing the role of non-market valuation tools as decision aids is paramount, particularly because of the absence of efficient markets for many of the functions that animals perform.

It is our contention that the difference between the market value of a particular livestock genetic resource and its total economic value to humans is particularly large in developing countries. Little is known as to the magnitude of this divergence as few empirical studies have attempted to estimate it directly. To compound the problem, estimates of these values are likely to both have great variance and be more complicated to determine in developing countries. For example, intuitively we can put a very high value on genes determining adaptive fitness in indigenous AnGR under extreme environmental conditions. However, conventional economic analysis may fail to account for such resilience and reach normative conclusions that favor the adoption of policies encouraging the introduction or promotion of high-input, high-output exotic breeds. Introduction of exotic germplasm, through crossbreeding and breed replacement, can result in extinction of the unique, well-adapted indigenous AnGR (Hammond and Leitch, 1999).

1.1. Why choice experiments to value AnGR

Because many of the benefits derived from the existence of well-adapted indigenous AnGR are not transacted in any market, non-market valuation tools are required to identify the magnitude of these benefits.

In the last 30 years valuation methods based on stated preferences have been receiving increased recognition in the context of non-market valuation (Freeman, 1993). Among stated preference methods, the contingent valuation of public programmes is the most frequently employed valuation tool in environmental economics (Bateman and Willis, 1999). However, the contingent valuation method is inadequate to value single attributes of a multi-attribute good, such as the genetic attributes embedded in the phenotype of an animal of a given breed. A promising tool in this field, instead, is choice modeling (choice experiments or CEs) (Louviere et al., 2000), as it allows a systematic investigation of the single attributes of a bundled good.

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