ADOPTION OF ASSISTED REPRODUCTIVE TECHNOLOGIES AND SAHIWAL CATTLE BREED AND THEIR IMPACT ON HOUSEHOLD FARM INCOME IN NAROK AND KAJIADO COUNTIES OF KENYA

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A thesis submitted to the Graduate School in partial fulfilment for the requirements of the Collaborative Master of Science Degree in Agricultural and Applied Economics of Egerton University.

Egerton University
July, 2015
DECLARATION AND RECOMMENDATION

This research thesis is my original work and has not been presented in this or any other University for the award of a degree.

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RECOMMENDATION

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DEDICATION
I dedicate this thesis to my mother Florence Amiru, my wife Millicent Okumu, my Son Steve and brother Peter Khainga for their continued support and prayers.
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ABSTRACT

Livestock production in Semi-Arid Lands (SALs) of Kenya has continued to decline over the past decade, thereby threatening the livelihood of pastoralists. In the recent past, there have been concerted efforts by the Government to supply more hardy cattle breeds with ability to produce enough meat and milk for pastoral communities. Despite introduction of high performing breeds such as Sahiwal, the dissemination of this genetic material among the pastoralists remain low. Whereas pastoralists’ demand for the Sahiwalbull has outstripped its supply, the economic assessment for viability and implications of the alternative Assisted Reproductive Technologies (ARTs) among pastoralist communities remain a mystery. Using a random sample of 384 livestock farmers from Narok and Kajiado Counties, this study evaluated the actual and potential adoption of Artificial Insemination (AI) as an alternative breeding technology to the use of bull. Data were analyzed using ordered probit model, double bounded dichotomous choice model and Average Treatment Effect (ATE) estimation framework. The results from ordered probit model show that the decision to adopt AI as well as farmer perception is influenced by different factors. These factors differed across the AI perception and adoption decision, and they include: age and education level of household head, household size, herd size, access to extension services, group membership, experience in livestock keeping, technology awareness and the production system. The Double bounded dichotomous choice model results indicate that most of the pastoralists’ willingness to pay (WTP) was 1,853.19 Kenya shillings (KES), which reflects a premium of 23.55% for AI compared to the existing market price of KES 1,500. The bidding decision by the farmer was determined by his/her access to extension services, herd size, off-farm income and awareness of AI services. The ATE for the treated revealed that there is potential for adoption of Sahiwal breed since adopters earn an average of KES 661,179.87 compared to their counterparts who earn KES 564,779.67 from sales of live animals and milk. This reflects an annual increment of 17% in farm income over and above what Sahiwal non-adopters earn which was quite substantive given the difficulties involved in livestock production in SALs where access to water and seasonal changes affect the overall production yield of the farm.
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<tbody>
<tr>
<td>AI</td>
<td>Artificial Insemination</td>
</tr>
<tr>
<td>ARTs</td>
<td>Assisted Reproductive Technologies</td>
</tr>
<tr>
<td>ATE</td>
<td>Average Treatment Effect</td>
</tr>
<tr>
<td>CAIS</td>
<td>Central Artificial Insemination Station</td>
</tr>
<tr>
<td>CV</td>
<td>Contingency Valuation</td>
</tr>
<tr>
<td>DLPO</td>
<td>District Livestock Production Officer</td>
</tr>
<tr>
<td>EAZ</td>
<td>East African Zebu</td>
</tr>
<tr>
<td>ET</td>
<td>Embryo Transfer</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HPI</td>
<td>Heifer Project International</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
</tr>
<tr>
<td>KALRO</td>
<td>Kenya Agricultural and Livestock Research Organization</td>
</tr>
<tr>
<td>KARI</td>
<td>Kenya Agricultural Research Institute</td>
</tr>
<tr>
<td>KLBO</td>
<td>Kenya Livestock Breeders Organization</td>
</tr>
<tr>
<td>KMC</td>
<td>Kenya Meat Commission</td>
</tr>
<tr>
<td>KNAIS</td>
<td>Kenya National Artificial Insemination Services</td>
</tr>
<tr>
<td>MOLDF</td>
<td>Ministry of Livestock and Fisheries</td>
</tr>
<tr>
<td>NSS</td>
<td>National Sahiwal Stud</td>
</tr>
<tr>
<td>PSM</td>
<td>Propensity Score Matching</td>
</tr>
<tr>
<td>SAL</td>
<td>Semi-Arid Land</td>
</tr>
<tr>
<td>SCBS</td>
<td>Sahiwal Cattle Breeders Society</td>
</tr>
<tr>
<td>SDP</td>
<td>Smallholder Dairy Project</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub Saharan Africa</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development programme</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>WTP</td>
<td>Willingness To Pay</td>
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