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Information and Communications Technologies (ICTs) and Livelihoods Enhancement in Agro-Pastoral Communities in Kenya

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Abstract:

Pastoralist communities in Africa occupy rangelands that are underdeveloped with harsh climate conditions worldwide. They live a nomadic lifestyle and derive their livelihoods from extensive livestock keeping. In Kenya pastoralists are faced with the same challenges but they are particularly vulnerable to poor infrastructures, draughts, perennial cattle rustling and isolation from access to social services. Information and Communication Technologies have the capacity to develop sustainable livelihoods of individuals' and communities. However, the major challenge is integrating ICT into the agricultural development of pastoralists whose lifestyle is nomadic. The purpose of this study was to look at the role of ICTs in enhancing the livelihoods of agro-pastoral communities in Kenya. The study employed the e-Resilience Framework. Purposive-sampling technique was adopted while qualitative data was collected using document analysis, interviews and reflective conversations methods. Primary data was collected from 10 keys from Pastoralists, Kenya Research and Communication Network, key stakeholders from the Ministry of Agriculture and Non-Governmental Organizations. Qualitative methods were thematically analysed and for triangulation purposes. The findings established; that the pastoralists are able to market their products to other people in the country due to access to ICT. Secondly, that ICT has created employment opportunities for and amongst the pastoralist communities and that ICT access has made it easier for pastoralists to access innovations such as breeding of livestock. Therefore, the conclusion is that ICT has made it easier for agro-pastoralists to network with agricultural organizations for their own benefits. On the challenges the communities face when using ICTs, illiteracy was highly mentioned because according to the respondents' lack of proper education prevents them from accessing information which is important in agricultural practises. Secondly, most pastoralists actually live in absolute poverty hence have no means of buying the best pesticides to fight diseases or market their farm produce. This has ultimately resulted to low education level or none at all thus exposing them to middlemen who take advantage of them. Finally, the respondents pointed out that access to government policies or lack of awareness is a challenge because of isolation and marginalization when it comes to livestock rearing. The study recommends that development of key ICT infrastructures, skills to use the technology and affordability of the same should be considered by counties inhabited by pastoralists in order to improve their livelihoods which are dependent on agriculture.

Keywords: Pastoralists, Tele-centers, communications technology, communities, livelihoods

1. Introduction

According to Netherlands Development Organization SNV (2012), Sub-Saharan Africa has more than 25 million pastoralists' depending on livestock-keeping for their livelihoods and over 200 million agro-pastoralists that combine livestock-keeping with other agricultural activities like farming. These figures represent over a quarter of the total population in Africa and occupy 43% of the continent's total land mass (SNV, 2012).

Pastoralist communities in Sub Saharan Africa are located in areas that are underdeveloped with the world's most severe environments. Furthermore, they occupy range lands and live a nomadic lifestyle deriving their livelihood from extensive nomadic livestock keeping which entails moving from place to place in search of pastures for their livestock (SNV, 2012). ICTs have been embraced globally as one of the means of reducing poverty by devilling rural communities like pastoralists' in developing countries like Kenya, it is also argued that the use of modern ICTs such as mobile phones, internet and radio services can be applied as strategies to bridge the gap in development between urban and rural areas (Heeks, 2010).

Whereas ICTs are currently being used in crop production in agriculturally viable areas, there is minimal evidence about the same being done in arid and semi-arid areas where pastoralism is being practiced. This further affirms that the

challenges of ICT use among pastoral communities of Kenya have not been effectively explored by researchers thus lending further credence as to why this study is necessary. Therefore, integrating ICTs into areas such as agricultural extension services, information and knowledge in livestock and crop production are essential in empowering pastoralists for sustainable livelihoods.

1.1. Problem Statement

Pastoralists' livelihood system is based on production in the arid and semi-arid lands (ASALs). These areas are characterised by low and erratic rainfall, high temperatures, and consequently, high evaporation rates. Across the region there have been tightening cycles and intensities of drought, flooding and concomitant problems such as food insecurity, human and livestock diseases and other crises. These have challenged the human capacity to cope, eroded the livestock, natural resource and other asset bases and gradually diminished the capacities of pastoralist communities to rebound. The problem that this paper sought to investigate was whether ICTs can enhance the livelihoods of pastoral communities who practice farming in Kenya. There are challenges in the implementation of ICT policy with regard to agriculture. Developing countries that have fully embraced ICTs are enjoying the benefits of the on-going technological revolution across the globe while in Kenya it is not certain whether these benefits are being felt by the pastoral communities whose lifestyles are nomadic. The widening of the digital divide continues to hamper the means and ends of livelihoods enhancement programs especially in the rural areas where pastoralism is a way of life. This study is motivated by the view that the role of ICTs has been recognized to a limited extent for the transformation of the rural poor's livelihoods. Can ICTs enhance the capabilities of agricultural pastoralists' farmers? This is the questions that this paper seeks to answer.

1.2. Research Framework

The Study employed the e-Resilience framework proposed by Heeks *et al.*, (2010). They adopted the framework from the Sustainable Livelihood Approach (SLA) advanced by Scoones (1998). In livelihoods discourse, sustainability refers to coping with immediate shocks and stresses, where local capacities and knowledge need effective support (Scoones, 1998). Similarly, Onayinka (2011) posits that a livelihood comprises people, their capabilities and their means of living including food, income and assets whereas sustainability refers to environmental and social facets.

Scoones (1995) gives an example of cases of mobile pastoralists who face the shocks and stresses as a result of climatic conditions. According to Heeks *et al.*, (2010), e-Resilience is a component of livelihood systems which is able to link ICTs with a set of resilience sub properties. Consequently, adaptability to effects of climate shocks such as draughts and floods are relevant measures to be applied in using this framework. Further, Heeks *et al.*, (2010) points out that a systemic analysis of resilience leads to an in depth of conceptualising mechanisms of adaptation that are far much suitable to address the vulnerability leading to sustainable development for livelihoods. Thus, the e-Resilience framework serves the purpose of integrating the key concepts that are able to link ICTs' role in climate change and shocks, coping mechanisms of vulnerable groups who are affected by environmental disasters that prohibit them from agricultural development for sustainable livelihoods.

1.3. Information and Communication Technologies (ICTs)

The concept of ICTs has received elaborate and in-depth definitions in literature (World Bank 2002). The World Bank (2002) defines ICTs as "hardware, software, networks, and media collection, storage, processing, transmission, and presentation of information (voice, data, text, images)." It can also be described as an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

These technologies described can only function if sound infrastructure is provided. According to Zano *et al.*, (2008), information infrastructure refers to technological tools, methods and access models that are required to ease knowledge management and to transfer today's massive flow of information from various sources of information. Computers, software and other components of telecommunication infrastructure are examples of communication systems needed for the sharing of information.

The contemporary development of Information and Communication Technologies (ICTs) is seen as speedily becoming a dominant factor in eliminating poverty in the rural areas as identified by authors such as Onayinka (2011), Ajani (2014), Bello and Aderbigbe (2014), Jain *et al.*, (2014), Mugwisi *et al.*, (2014), Sreekumar (2007) and Alemna and Sam (2006). Accordingly, a number of ICT-based development projects have been initiated in developing countries to harness social and economic opportunities for vulnerable groups in rural areas, for example, the Msunduzi community anti-crime network project in South Africa (Thioune, 2003), the Grameen phone project in Bangladesh (Gupta, 2004) and the Women of Uganda Network (WOUGNET) in Uganda (Owiny, 2014) among others.

Thus, ICTs can increase economic growth, enhance social inclusion (through closure of the digital divide), increase health and education services and improve governance at all levels. According to Sreekumar (2007), "ICTs are a unique technological intervention that challenges the traditional barriers to social change and economic development in rural areas." Thioune (2003) echoes the same sentiment by stating that developing countries like Kenya have witnessed significant changes

in rural development through ICTs. These countries have initiated the development of ICTs for the benefit of the rural poor. Good examples of these initiatives have been piloted in Ghana, Kenya, Uganda, Bangladesh, and India.

1.4. Pastoralism in Kenya

FAO (2010) defines pastoralists as nomadic people who inhabit rangelands deriving their livelihood from extensive livestock keeping by moving from one place another. They depend on scarce natural resources with harsh unstable conditions which make them vulnerable to poor infrastructures, draughts, perennial cattle rustling and isolation from access to social services. It is essential for pastoralists to have knowledge on animal husbandry, sustainable rangeland management and informal livestock markets in order to survive (Kerkrade 2008).

FAO (2010) in their study on pastoralists lifestyle established that, over 40 million pastoralists and agro pastoralists in the Horn of Africa are perennially undernourished and food insecure. The study found out that in East Africa, pastoralism is still adopted as a way of life and source of livelihood, unfortunately policymakers do not realize the contribution pastoralists make to economic growth in those countries. They further indicated that climate change has an impact on the environmental, social and economic uncertainty and therefore requires pastoralists equipped with knowledge and experience on livestock management that can be utilised in the overall management of Africa's dry lands.

Pastoralists' contribution to the GDP of Kenya, Tanzania, Uganda and Ethiopia is estimated at 50%, 30%, 12% and 19% respectively. Kenya's pastoralists alone contribute about three-quarters of a billion dollars a year. However, it is unfortunate that pastoralism is seen by many as a backward activity, which is not economically stable hence regarded as destructive to the environment. Notable, hundreds of dry land pastoralists in Kenya live in absolute poverty that is characterised by conflicts and environmental degradation that has been overlooked by government policy makers over a long period of time (Macgregor and Hesse 2013).

They further pointed out that, pastoralism as a sector is estimated to be worth US\$800 million a year in Kenya alone, however in regard to nationally produced goods and services, there are no clear records showing the importance of pastoralism as an aspect of economic development in. Despite all factors mentioned such as their contribution to economic growth and environmental change, pastoralist communities' worldwide face challenges of food insecurity and massive poverty. Zheng *et al.*, (2011) posits that in regard to the findings from several authors mentioned it was clear that pastoral farmers require timely information on weather conditions, advice on maintaining healthy livestock under favourable conditions from relevant persons, and information on markets to empower them for sustainable livelihoods.

1.5. ICTs for Community Development

Zheng and Stahl (2011) defined community development as a concept that describes participatory processes that promote self-help and service delivery when the state is unable to satisfy community demands. However, Thioune (2003) stated that, "it is about interacting with people to assist them to find ways to build understanding and cooperation between individuals and groups to enable them make changes in their own lives and for the greater good". Therefore, Community development can be conceptualized a continuous process concerning community socialization projects that serve the purpose of implementing change for the betterment of the community.

Consequently, development and communications studies indicate that, by implementing the use of and access to ICTs by rural communities in the language they understand, they will be fully interested hence utilise it effectively (Gomez and Gould, 2010). It is clear that by use of the local content, individual and community needs might be easily addressed thus promoting social, cultural and/or economic development of the community.

Mugwisi and Ocholla (2014) explained that the ICT platform can act as an empowerment tool to people in different communities. This has seen an increase in projects like community tele-centres that are important in accessing of ICTs such as mobile phones, internet and community services. Similarly, Gomez and Gould (2010) also regard ICTs as gadgets that link to public connectivity by use of computers and networks. In recognition of this, tele-centres have been identified and applauded as mechanisms of providing both information and communication facilities to vulnerable and marginalised people in developing countries. The argument is that tele-centres can have greater impact if the local community is involved at all levels of the design, implementation, management and evaluation (Gupta, 2004).

Although the media has been known to play a crucial role in community action, it is surprising that a limited number of rural folk embrace ICT as an essential form of communication. The reason could be the funding models that are deemed unsustainable. Research done in Bangladesh among poor women showed that ICTs can have an impact for democratisation (Sam (2013). It has been established that even though there have been successes in the tele-centre approach to community development, there also exists a wealth of literature regarding tele-centres.

Notably, Onayinka (2011) established that within a period of two years, five of the twenty-three original tele-centres established by the Ministry of Environment in rural Mexico were still in operation. Similarly, a longitudinal study by Best and Kumar (2008) to examine 100 internet facilities in more than 50 different villages in rural India, under the Sustainable Access in Rural India (SARI) project in Tamil Nadu, found that although the SARI project was successful, in areas such as social and economic development impacts, it was not sustainable.

2. Research Methodology

The study employed a combination of cross-sectional and case study research designs so as to enable detailed examination of the tele-centre services offered towards and pastoralists for sustainable pastoral livelihood. The focus in case design was on issues that are common or not common to all cases, as well as, unique and specific to a particular case. Purposive sampling technique was employed in this study to determine the respondents. According to Mugenda and Mugenda (2003) purposive sampling is a process sampling unit within the segment of the population with the most information on the characteristic of interest. Government officials drawn from the Ministry of Agriculture and Ministry of Information and Communication were purposively sampled to participate in the study. In addition, officials and experts from NGOs and Agricultural Officers working in pastoralist communities and village elders from the study area were purposively sampled to participate in the study.

Primary data was collected from 40 purposively selected respondents through the use of skype and mobile phone communication interviews. 30 of them were key informants from Virtual Extension Research and Communication Network (VERCON), heads of department from key government ministries that are in charge of agriculture, ICT and rural development and Non-Governmental Organisations that have a role in implementation of programs and policy formulations. The remaining 10 respondents were village elders selected from the study areas through snowball sampling technique.

Prior to the actual data collection, the instruments for the interview were pre-tested to determine their validity and reliability by the researcher who had to establish by directly liaising with relevant sector experts on whether the instruments were good for the research. The feedback from the experts was put into consideration to enrich the data collection tool. On the other hand, secondary sources of data (published and unpublished) was also collected and used to substantiate the discussions.

Thematic analysis approach was used on selected themes based on the semi-structured interviews and questions which captured transcribed data from the individual interviews. According to Schutt (2012), using thematic based data analysis technique to organize and analyse qualitative data improves the process of data analysis by making it easier, faster and enabling the relationships of different codes to be worked out. Prior to conducting the research project, ethical clearance was sought from the School of Agriculture and Policy Development Research Ethics Committee at the University of Reading. Consequently, participants were briefed about the objective of the research and how confidentiality will be guaranteed through a participant's information sheet.

3. Findings

The purpose of this study was to look at the role of ICTs in enhancing the livelihoods of agro-pastoral communities in Kenya.

4. Discussions

Therefore, findings of this research reveal that the Ministry of Agriculture has developed a fodder and water tracking system through ICT to help the pastoralists in Kenya make favourable decisions in relation to where they should relocate to in search of pasture for their livestock. Four major roles that ICTs play in supporting agricultural production among pastoralists in Kenya were identified by the respondents; that the pastoralists are able to market their products to other people in the country due to access to ICT; that ICT has created employment opportunities for and amongst the pastoralist communities and that ICT access has made it easier for pastoralists to access innovations such as breeding of livestock. Therefore, the conclusion is that ICT has made it easier for agro-pastoralists to network with agricultural organizations for their own benefits.

In respond to the use of ICT as an essential mechanism for access of relevant information on farming, the respondents agreed that mobile phones are indeed available and helpful to those who can afford them. They also identified one major challenge facing the use of mobile phones as poor network connectivity attributed to harsh terrain and low network coverage by the service providers. The respondents indicated that, due to extreme and variable harsh climate conditions, they find it challenging to practice mixed agricultural farming. In regard to animal keeping they explained that livestock keeping is very essential and the only source of their livelihood because they live in dry lands that are characterised by climate shocks such as long spell of draughts and erratic rainfall. They further indicated that weather effects lead to lack of a consistent water source and these is the reason why they move from place to place in search of water and food for their livestock hence making farming (growing crops) a difficult exercise.

Constraints within local dynamics refer to particular views or ideas from the pastoralists' perspectives that characterize accessibility and use of ICTs services provided by the tele-centre in the study areas. The respondents however had the following issues that they alleged makes them not benefit from the use of ICTs; illiteracy was highly mentioned because according to the respondents, lack of proper education is a challenge in accessing information which is important in livestock rearing and happens to be in the written format that they cannot conceptualise. Secondly, most pastoralists actually live in absolute poverty hence have no means of buying the best pesticides to fight diseases or even market their farm produce. This has ultimately resulted to low education level or none at all (Semi illiterate/illiterate) thus exposing them to middlemen who exploit them when it comes to marketing of their animals and other farm produce. Finally, they pointed out that access to

government policies or lack of awareness is a challenge because of isolation and marginalisation when it comes to livestock rearing. This has adversely affected them and made them feel left behind in as a community.

Lastly, the findings revealed that a lot of criticisms and suggestions have been done by the pastoralists' communities regarding high costs, problems of scale, and low levels of accountability in the use of ICTs for agricultural extension services but little attention has been given to them by their respective counties. Therefore, some of the existing lessons herein suggest that ICT-based extension services could probably create improvements in timely information delivery which leads to improvement of agriculture development in areas inhabited by pastoralists' especially in developing countries like Kenya. Therefore, according to the respondent there is need to examine the effectiveness of the current ICT policies and approaches in providing information to pastoral farmers in Kenya. Their suggestion is supported by World Bank (2015) that pastoralists appear to be in a situation that is characterised by pressures to cope with and adapt to a multitude of changes that entail the use of ICTs for developments in sustainability and resilience of traditional forms of pastoral production systems.

5. Conclusions

The study sought to look at the role of ICTs in enhancing the livelihoods of agro-pastoral communities in Kenya. Key themes emerged from the research findings indicating that the progress in the development of ICT service delivery for agriculture production in pastoral communities in Kenya still faces challenges of effective learning and utilization of for sustainable agro-pastoral livelihoods.

5.1. Limitations of the Study

This research achieved its aim of establishing the role of information and communications technologies in enhancing livelihoods of agro-pastoral communities in Kenya. However, some limitations were encountered these includes the following: - in some instances the researcher had difficult time administering the data collection instruments since some of the respondents (pastoralists, community leaders) were semi illiterate and the researcher had a difficult time explaining the complex terms and concepts as related to the study variables.

It would have also been preferable to do a survey on all the pastoral communities in Kenya but it was unattainable considering the limited time and budget constraints. It was also difficult at times to secure appointments with pastoralists since they are nomadic in nature. Lastly the expansive rangelands occupied by the pastoralists were also difficult to access because of poor road networks and rough terrains.

5.2. Policy Implications and Suggestions

Given the findings, it is recommended that ICTs should take centre stage in policy formulation and planning to ensure that the poor communities also benefit. Moreover, the advantages it presents to agro-pastoral farmers should be harnessed to improve livelihoods. As indicated in the Ministry of Information and Communication Technology's strategic plan, the government is making strides towards the improvement of the ICT policy in Kenya. However, comprehensive research still needs to be undertaken to generate useful information for ICT policy-making and implementation especially in rural areas. The government could consider commissioning Research Institutes and Universities to carry-out nation-wide research and gather information that can be used to inform policy and strategy formulation.

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