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**THE QUESTION OF FOOD SECURITY IN ARID AND SEMI-ARID LANDS IN AFRICA:  
INDIGENOUS KNOWLEDGE AND IMPLEMENTERS OF DEVELOPMENT**

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**Abstract**

*Development in Africa's ASALs have been fraught with problems and failure for years because development needs have usually been diagnosed by outsiders who may have little real understanding and appreciation of such land use systems. In Kenya, ASALs is estimated to be four- fifth of the land area supporting 25%-30% of the human populations living in the ASALs. This paper has delved into factors influencing food security in ASALs, its causes and approaches suggested by different proponents. It discovered that the ASAL situations in Kenya vary depending on the aridity. The theoretical framework developed indicated that there is need for bottom up approach to improve food production in the HHs.*

**Keywords:** *Arid Land, Semi-Arid Land, Africa, Problems, Perspectives*

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**Introduction**

Whenever arid and semi-arid lands are referred to, many people think of dry lands, and the image that follows is that of lack of water, famine, difficult life, humidity and all other descriptions that negate the possibility of life in ASAL areas. Edmund (1996) gives a plausible reason, that development in Africa's ASALs have been fraught with problems and failure for years because development needs have usually been diagnosed by outsiders who may have little real understanding and appreciation of such land use systems. In Kenya, ASALs is estimated to be four- fifth of the land area supporting 25%-30% of the human populations living in the ASALs (GOK, 2008). According to Edmund (1996), the other sources of problems in ASALs are: lack of understanding of the importance of risk and resilience in ASAL environments; an emphasis on macro-

national economic benefits, not on micro-level economies; an emphasis on projects and quantification of benefits, not sociological and attitudinal change and the exclusion of the people living in dry lands from project planning and evaluation. This paper would, therefore, study the main features and types of ASALs, with the aim of building a strategic approach towards solving the problems that affect these areas, with particular focus on the experience of arid and semi-arid lands in Kenya, Africa.

### Main Features of ASALs

ASALs are known to be characterized by the presence of a lot of livestock, famine, sometimes floods, humidity, environmental degradation (Groot et al.; 1992, Edmund 1996), lack of water (Mutiso, 1991), and adverse weather. It is also characterized by extreme weather and climatic conditions that are harsh. This influences the entire economy which depends mostly on agricultural products like cash crops, food crops and livestock production (Kenya Natural Disaster, 2008). The population in the ASALs is sparsely and mostly malnourished (Tsubo, 2003) as compared to other areas. The rains in the ASALs are minimal ranging between 600 to 700 millimeters of annual rainfall (Edmund, 1996), and in some cases it varies from 100mm in the arid zones to 1500mm in humid zones (Le Houerou et al., 1993).

### Types of ASALs

In Kenya ASALs are classified according to the degree of aridity as shown in the table below. This classification is dependent on the area, that is, they have different percentages depending on the degree of aridity. In Mbeere for instance, the degree of aridity is at 8% percent. This means that the population in this area can grow crops and at same time rear livestock as compared to Turkana for example that is at 62% ASAL.

**Table 1: Types of ASALs**

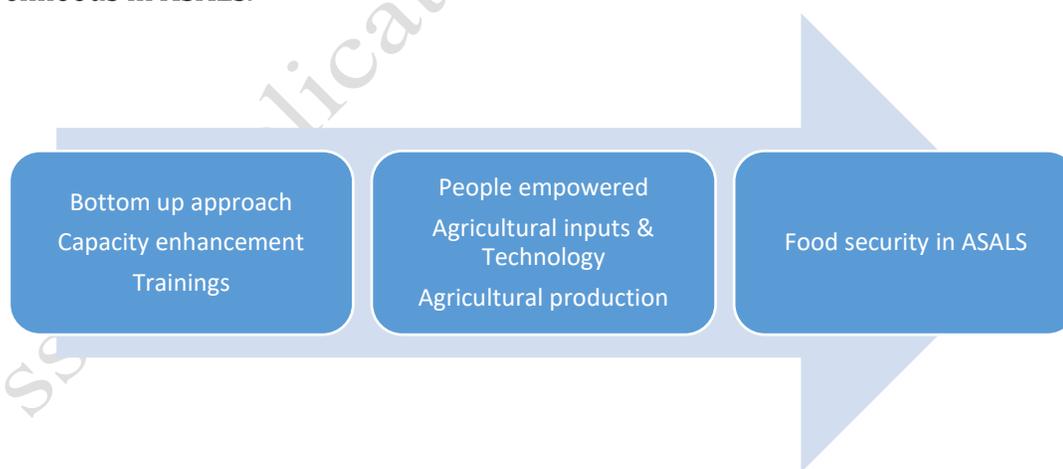
ASAL districts classified by extent of aridity category	District	Total ASAL%
A. 100% ASAL	Turkana, Moyale, Marsabit, Isiolo, Wajir, Mandera, Ijara, Garisa	62%
B. 85-100% ASAL	Kitui, Makueni, Tana River, Taita, Samburu	25%
C. 50-85% ASAL	Machakos, Mbeere, Tharaka, Laikipia, West Pokot, Kwale, Kilifi, Baringo, Meru North	8%

D. 30-50% ASAL	Lamu, Narok, Malindi, Keiyo, 3% Marakwet
E. 10-25% ASAL	Nyeri (Kyeni), Rachuonyo, Suba, 2% Kuria, Thika, Koibatek

*This Table is adapted from the Republic of Kenya, National Policy (2004)*

### Theoretical Frame work

The theoretical frame work in this study was developed from the theories of the farmer first and the theory of diffusion of innovations by Everett Rogers. The farmer first theory was developed by Chambers et al (1987) after the green revolution that was developed to improve food production did not bear fruit in some areas especially in Sub-Saharan Africa. Their theory is therefore guided by the bottom up approach, capacity enhancement through training where people are empowered and use the new agricultural inputs and technology developed and hence good agricultural production. This theory has worked in Asian countries where green revolution led to improvement in food security. The theory of diffusion of innovation is a process by which innovation is communicated through certain channels over time among the members of a social system. We therefore have innovators (research institutions), early adopters, early majority, late majority and laggards. These two theories are suitable for this study for they give an approach and process of improving livelihoods in ASALs.



### Strategic approaches to Improve ASALs

According to FAO (2000) report on the state of food insecurity in the world 2000, about 800 million people in the developing countries do not have sufficient food. The largest affected population is in the ASALs where the vagaries of weather and climate change continually complicate food insecurity and drastically changing

farming activities (CGIAR, 2011). The most affected is Sub-Saharan Africa, where the number of the people suffering is estimated at 239 million (Sassion, 2012). The key cause of food insecurity according to Sassion (2012), therefore, is inadequate food production in the affected areas. However, it is good to note at the onset as Sassion (2012) puts it that food insecurity in Sub-Saharan Africa is not just about food production, its availability and intake, but also poor quality of the food and sometimes lack of political will. In the Horn of Africa (Somalia, Ethiopia, North Eastern and some parts of Eastern Kenya (Turkana, East Pokot, Kitui, Mbeere and Tharaka), it is estimated that 12 million people suffered from starvation stricken by the drought in the past 60 years, and this has increased most recently in 2010 and 2011.

Researchers and food security specialists have, therefore, been engrossed in finding a solution. According to the United Nations Population Division (2011), population growth also exerts pressure on food system that is estimated to grow to 9 billion by 2050. Africa's population alone is set to grow from 1 billion to 2.2 billion (UNDP, 2011). As the population grows, pressure is exerted on land whereby the land available per capita has shrunk from 13.5 ha per person in 1950 to 3.2 ha per person in 2005 and is projected to diminish to 1.5 ha per person in 2050 (UNPF, 2007).

### 1. Technology and Capacity Building

There are those who argue that for the livelihood in ASALs to improve, there is need for supportive political environments and modification and adoption of known manageable technologies, that is, good agricultural practices (Groot, 1992). The major technology employed by smallholder or peasant farmers are manual labor, hand hoes and ox-ploughs as found out by Havnevik and Harsmar (1999) in their study in Tanzania. The predominance of hoe cultivation, therefore, reflects technical constraints both in relation to productivity of labor and yields as well as the area cultivated land. It is even worse in Evurore as they use *muro* for planting and weeding.

Groot (1992) further points out that this is not enough for there is need for capacity building of the local community and need for prioritization of the needs of the local people. As such now, it should not be seen in isolation for it touches upon social transformation which deals with social, economic, political and environmental issues on which development depends (Eade, 1997). This now means that for capacity of the people in ASALs to be improved there is need to understand the milieu in order to

understand who lacks what capacities in any given context (Eades, 1997, Edmund, 1996).

Most of the time what happens is that development agencies and partners presume that the targeted women and men lack capacity, but in the real sense, however marginalized, they have capacity to improve their lives. Eade (1997) therefore argues that for the livelihoods of the people to improve, it is good to factor in that individual capacities and needs and the opportunity to act on them depend on a myriad of factors, that is, the capability, some are employed, ownership of land and livestock that differentiate human beings from each other and shape social identity, relationships and life experiences.

## **2. Indigenous Knowledge**

What happens most of the time is that the knowledge of the people in ASAL is ignored as the implementers of development come with their already made ideas that will fix the problems (Chambers, 1983). According to Edmund (1996) the reasons why there are no success stories in ASALs is that the knowledge of the locals is ignored by the researchers, NGO's and government. Edmund, (1996) therefore advocates for planning of the projection of drought and rainfall variability. Secondly, he advocates for participation of the HHs in every project that is meant to improve their lives. This should be people based. White (2013) agrees with this view and argues that participation should be people based and must go hand in hand with communication which should be carried out in a language that people know and understand. White (2012) therefore vouches for the use of popular theatre and social drama, singing and dancing of traditional song, storytelling and proverbs. In this way, people will come to understand their own life situations and therefore come together to discuss what should be done. Where it lacks, there will be failure in extension of development projects. This is exactly what happens to many projects. They fail because there is no concept of ownership from the community from the onset. Lastly, Edmund (1996) proposes that for any success to be achieved there is a need to preserve the indigenous skills and knowledge and give them a better understanding of technology and management practices. That is to be used in informing the approaches to be used to improve food production.

## **3. Research**

Research is another approach used to determine food insecurity in ASALs. The major impediment to food security is lack of support for agricultural

research on what type of crops to be planted in dry lands from the side of the government (Mwale, 1995), for most of the funding in the research institutions come from the donors. Once the donors withdraw, that particular research comes to a halt. Secondly, there is lack of 'farmer groups'. 'Farmer groups' refers to groups composed mainly of members of the rural community, along with one or more agricultural researchers and extension officers (Chambers, 1993). The purposes of farmer groups are: building interaction and communication between researchers and farmers, eliciting and changing information from farmer to farmer, farmer to researcher and researcher to farmer, analysis by farmers, with researcher support of their problems and needs, reinforcing and fostering their own knowledge and capability

According to Ronnie (1993), the research should be dovetailed with training activities for transferring their results through traditional teaching and indigenous knowledge of continuing education methods. After the research has been carried out there is need for it to flow back to those it is intended for: the HHs, extension workers, technicians and politicians (Ronnie, 1993, 93). He further argues that research on food must have an objective that is geared to improving the development of food strategies and policies by decision makers with rigorous analysis of the impact of various policies on microeconomic players: producers, merchants and consumers (Ronnie, 1993, 97). Another challenge is that the instrumental reasoning is embodied in modern expert institutions that operate through bureaucracies which rely on highly trained and specialized experts who develop policy, make decisions and implement programs on behalf of society (Roling, 1998). In Kenya for instance, we do have research institutes (KARI, KEFRI, ILRI, ICRISAT, ICRAF) that carry out research to inform the government and development agencies on the way forward. The translation of these research outputs into practical use and application by farmers, agriculture and food industries, policy makers and NGO's will be critically important in meeting the future challenges. The only challenge is that, information on technical knowledge by research centers and agricultural universities does not trickle down to the small semi-subsistence cultivators who are the basis of agricultural production in Africa (White, 2008). This can only be achieved if the FPR (Scoones and Thompson, 1994) method is used. With this method, the search for information must always begin with farmers. According to White (2008), this happens because the farmers themselves devise coping

mechanism and are always experimenting and searching for ways to increase productivity.

In Evurore for instance, Trocaire funded projects established model farms where farmers will come to learn on good farming methods and which act as rural research centers through the technical help of BAC. It did not succeed as the farmers were always observing what the technical team was doing. They did not own the idea and the model farm. Therefore, there is need for a two-way knowledge exchange with researchers. Where what happens in the research institutions is cascaded to the farmers for trial in their farms. The major impediment to food security is lack of support for agricultural research from the side of the government (Mwale, 1995) and the communication model used (White, 2008). There is a lot of bureaucracy that assumes that peasant farmers are passive and attached to traditional ways and innovative vacuum (White, 2008).

#### 4. Land

Many have argued that the use of land in ASALs is to blame for its perennial food insecurity as it is a major factor in food security. As such now land is a factor of production, yet in Kenya as a country, productive land is bare. From the total Kenyan land area, it is estimated that only 26 percent is under mixed rain-fed systems, the rest is classified as ASAL (The Organic Farmer, 2013). According to a World Bank report, Africa's arable land remains untouched in comparison to Europe, Americas and Asia (Mumo, Daily Nation, 19/03/2013). This is due to lack of measures that promote and protect the security of land tenure, especially with respect to women and children, and poor and disadvantaged segments (ASALs) of society, through legislation that protects the full and right to own land and other property (FAO, 2005, 18). This should be in line with establishing legal and other policy mechanisms that are in line with the rule of law (FAO, 2005). The mechanisms therefore should have a bearing in the promotion of conservation and sustainable use of land.

Secondly, there is no proper agro-forestry practiced. Agro-forestry is a holistic approach to land use based on the combination of trees and shrubs with crops and pastures or units (Chambers et al., 1983). The problem has been that the local knowledge on agro-forestry and plants has not been harnessed. In addition to this the farmers knowledge, innovations and relation to science is not used (Chambers, et al., 1983). According to Mutiso, (1991), the most important thing to consider in ASAL land use is how to conserve water and soil for livestock crop production.

He adds that there is also need for innovation in land use and the use of local knowledge should be engaged. He finally, unlike others argues that for success to take place in ASAL areas there is need to discuss innovation with the locals in three dimensions that is, physical, social and psychological development of the community (Mutiso, 1991). According to Pope John Paul II (CA, 33), land is still the central element in economic growth, but those who cultivate it are excluded from ownership and are reduced to a state of quasi-servitude. This means that there is need for planning for land use in three dimensions: for agriculture, agro-forestry and pasture.

#### **5. Soil and water conservation**

The lack of soil and water conservation in ASALs has also aggravated food insecurity. Most of the soils in ASALs are exposed to the sun due to lack of cover crops and some washed away when it rains through soil erosion. The other aspect is lack of water conservation measures. Whenever it rains the water just flows away. Many organizations and research institutions have come up with practices that control soil erosion and conserve water. For soil, construction of terraces, building of gabions has been practiced. In addition to this, planting of cover crops like sweet potatoes has been encouraged. To make good use of rain water, earth dams, water pans and tanks are the methods practiced.

#### **6. Food storage**

The food storage according to NFNS Policy (2011), must factor in appropriate measures which include research, aimed at addressing post-harvest losses, food quality and safety including aflatoxin infestation. NFNS (2011) further points out that a lot of maize for example is estimated to be lost at a staggering 30-40 %. But the challenge is the handler of grains in Kenya, that is, NCPB. NCPB for instance has a capacity of 28 million bags of maize (90kgs), but it remains largely underutilized with the current use of about 13%. In Evurore, however, we have got an NCPB facility, but it is not helping the community at all as it stores maize from other parts. It store maize imported from outside Kenya. This now gives the farmers an opportunity of wasting their products as they do not have good enough facilities to store the farm produce after harvesting. The same applies to Strategic Grain Reserve whose chief purpose is to cushion farmers from the effects of over-supply in periods of good weather and to provide a first line of defense for coping with food deficits (NFNS, 2011, 15). The mandate of SGR is to maintain a physical stock of 4

million bags of maize and cash equivalent of a similar volume (NFNS, 2011). However, it does not perform as it should. It only comprises of maize grain which is not the main staple food for those communities often facing hunger and famine. The common way of storing food products in Evurore are the use of granary, sacks and silos that is on trial.

#### **7. Crop variety**

There are those that argue that food insecurity will persist as long as the farmers in ASALs use indigenous crops or seeds. To them, the only way to reduce food insecurity is by the adoption of new breed of seeds and crops that are drought tolerant (Maize, sorghum, millet and traditional legumes), (Mwale, 1995) and to promote small-scale rural and home preservation of various foods, including livestock products and grains. In addition to this and planting of new variety of seeds that are drought tolerant, there is also need for seed bulking. With bulking the agricultural sector in Kenya as a whole will be turned into a business that meets more than just food demand (Daily Nation, 19/03/2013). Those in support of the bulking theory argue that what will be required of farmers is to join hands, pool their farm products and sell them at a good price to seed companies.

#### **8. Policies**

According to NFNS Policy (2011), the only way food security can be attained is when boreholes are sunk in ASALs to support irrigation schemes and when rain water is harvested to ensure water is available for irrigation and livestock use in ASALs. They too may end up being white elephants as Mwale (1996) pointed out because what NFNS policy and other policies on agriculture do is just pointing out what should be done. They do not give mechanisms on how this can be achieved, who will be the stakeholders and at what cost. There is therefore, a need for policy changes and development of early working warning systems (FAO and WFP, report 2011).

#### **9. Natural Resources**

The usage of natural resources such as large rivers suited for irrigation to support farming in these lands are not utilized. In Kenya for instance, the irrigations schemes were built by the colonial governments, no new ones have been added. What are there are proposals that have remained in the shelves. Even where these schemes work, poor maintenance and management leads to less than optimal returns. According to FAO (2005), States should therefore strive to improve access to, and promote

sustainable use of water resources and their allocation among users giving due regard to efficiency and the satisfaction of basic human needs in an equitable manner. This now balances the requirement of preserving or restoring the functioning ecosystems with domestic and agricultural needs (FAO, 2005). In Evurore there exist permanent rivers, that is, river Thuci and Mutonga.

However, the usage of the water from these rivers has not been maximized as far as agricultural farming is concerned. In most cases, the water is only used for domestic purposes and for livestock. This is now why the GOK (2009), came up with ASDS for the year 2009-2020 which suggests that to make good use of the water sources, irrigation schemes will be increased to exploit close to 9.2 million hectares of land. In Evurore where we have seasonal rivers, sand harvesting is the order of the day and this now has worsened the situation as water that was retained by sand is no more and people are forced to walk for long distances to fetch water for their domestic use and for livestock. In addition to this, most of the people in ASALs are pastoralists, as such now most of the time there is overgrazing (Field, 2005).

### **Conclusion**

This paper has studied the issue of food security in arid and semi-arid lands in Africa, with particular reference to lands in Kenya, east of Africa. A conceptual framework was developed by the researchers to come up with ways in which food security can be improved. It argued that food security depends on finance, environmental issues and climate change, research institutions and dissemination of what has been developed in the research institutions. The circle is in continuous movement due to changes in technology the variables are interrelated. It also studied the factors influencing food security in ASALs, its causes and approaches suggested by different proponents. The theoretical framework developed indicated that there is need for bottom up approach to improve food production in Kenya and other ASALs in Africa.

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