Causes and Impact of Farmers-Pastoralist' Conflict in Fika Local Government Area of Yobe State, North Eastern Region, Nigeria

Adamu Saleh Usman, Ali Umaru and Abdullahi Mele Katuzu, Department of History, Umar Suleiman College of Education, Gashua, Yobe State. Email: adamusaleu@gmail.com

Abstract

This paper examines the nature of conflict between pastoralists and farmers in Fika Local Government Area, Yobe State, North-East Nigeria. It also examines how itinerant grazing by pastoralists in the area has created significant problems to farmers resulting into constant skirmishes and conflicts that more often than not, escalate into violence with people on both sides killed and properties worth millions of naira destroyed leading to reduction in revenue of the State. The paper identifies climate change, government inaction and population growth as the push factors behind the conflict. Findings in the study revealed that some of the issues that underpin conflicts between the two groups emanate directly from the way and manner the pastoralists carry out grazing activities in the communities in the Local Government Area. The work finally recommends that state government should demarcate all grazing reserves in the state and register all the pastoralists, that a special tribunal should be formed for summary trial of encroachers on farm land.

Keyword: Climate Change, Eco-violence, Grazing Reserve, Pastoralists, Resource Conflict

Introduction

Many countries around the world including Nigeria currently face development challenges relating to the unsustainable use of natural resources and the allocation of natural wealth (Abbas, 2012). Generally, there is bound to be tension when people or groups compete against each other for natural but scarce resources. The exploitation of natural resources and the related complications can become significant drivers of violence (Shettima and Tar, 2008). Natural resources endowments for any country as potential sources of wealth are invariably becoming serious sources of conflicts, especially when not properly managed or regulated (UNEP, 2009).

Conflict is said to be unavoidable in any human society and has become a subject of controversy today among the various inhabitants of many countries, including Nigeria. Access to natural resources is essential for livelihood production in rural areas of Africa. The most vulnerable tends to be people with poor access to natural resources upon which to build their livelihood strategies (Pasteur, 2017 as cited in Young and Sing Oei, 2011).

Subsistence farmers and pastoralists depend on the availability of usable land and pasture for their livelihood. Many aspects of rural livelihood continue to be at conflicts with each other and the natural ecosystem. The question of ownership and right of access to natural resources may become more critical in areas where livelihood and food security are substantially tied to these resources. Resource conflict is therefore detrimental to individual and groups' livelihood, food security, and social co-existence. This appears to be the challenge in the Yobe State.

Although across time and space, interaction between crops cultivators and pastoralists has been in existence, this relationship is at times cordial and complementary, while at other times, the relationship is antagonistic and hostile. However, in the contemporary time, population increase coupled with increased farming and the drying up of the Sahel region, especially the northern part of Nigeria (Blench, 2010), has brought about an unhealthy competition for available arable land for grazing animals and farming between farmers and pastoralists, which more often than not, has resulted to violence in many parts of Nigeria. This situation as it plays out in Nigeria is a direct reflection of what is obtained in other part of Africa. In the East African Region, for instance, incidences are recorded where nomadic pastoralists had been having clashes with local farming communities around the Embroi Murtangosi Forest Reserve for decades (IPSN, 2017).

Similarly, in the Central African Region, conflict between sedentary farmers and pastoralists has gone beyond national boarders because the migration of Peul Mbororo pastoralists from the Democratic Republic of Congo to Central African Republic has recorded more conflict situations than cooperation. Indeed, the situation in these regions parallels what is obtained in Nigeria. It cannot be overemphasized that in Nigeria, and in the North-East region in particular, the conflict has been witnessed in several parts of the region especially in Adamawa, Bornu and Yobe states mostly as a result of the high level of pastoral activities that take place in them. In Yobe State where the present study is located, the Fika Local Government Area is among the epicentre and hotspots of the conflict. This is not to say that other parts of the State have not had their fair share of the conflict. The other local government areas in the State too have experienced the conflict in one way or other.

This unending cycle of violence has continued to characterize relations among the two groups without any solution in sight. Indeed, it was as a result of these killings and destructions that human right activist in Nigeria, Femi Falana, out of frustration once said that if the Federal Government fails to do the needful by discharging its constitutional duty of stopping the continued killings and destruction of properties caused by the conflict and approach the court to compel the Federal Government to act responsibly in the ensuing circumstance (Falana, 2018). In a similar vein, Roger Blench, a leading scholar in conflict studies with bias in pastoralist-farmers conflict, had pointed out that though bloody conflicts between crops cultivators and nomadic pastoralists are reported

in the newspapers almost on a daily basis, no effective action is ever taken by the government to analyze or remedy the cause(s) of the conflict (Blench, 2010).

The conflict between farmers and pastoralists in Fika Local Government Area has actually brought about decrease in farming and pastoral activities in the area. This is due primarily to attacks by pastoral groups on one hand and reprisal attacks by the farming communities on the other hand. The development has generally affected farming and pastoral activities in the local government area thereby affecting revenue drive in the area, and Yobe State in general. This is why the paper deems it necessary to assess its impact on the revenue of the State.

Theoretical Framework

Various scholars have attempted to theorize conflict in different perspectives. However, in the context of this study, the theory of eco-violence is adopted as its analytical framework. The theory of eco-violence is an emerging theoretical construct that seeks to elucidate the relationship between environmental factors and violent conflicts. Developed by Homer-Dixon, the theory holds that a decrease in the quality and quantity of renewable resources, population growth, and resource access act singly or in various combinations to increase the scarcity, for certain population groups, of cropland, water, forests, and fish (Hormer-Dixton, 1999). This can reduce economic productivity both for the local groups experiencing the scarcity and for the larger regional and national economies. The affected people may migrate or be expelled to new lands.

Migrating groups often trigger ethnic conflicts when they move to new areas, while decreases in wealth can cause deprivation conflicts (Hormer-Dixon, 1999). Implicit in the eco-violence theory is the assumption that competition over scarce ecological resources engenders violent conflict. This trend has been aggravated in contemporary times owing to the impacts of climate change, which has exacerbated ecological scarcity across the world (Blench, 2004). In effect, ecological scarcity raises the competitive stakes and the premium that the various societal groups may place on available ecological resources. This condition tends to precipitate violent conflicts. Applied to the present discourse, the theory of eco-violence offers insights into the nature and dynamics of the herdsmen-farmers conflicts in Nigeria.

In this regard, it is to be observed that the conflicts have been driven by the desperation of the affected groups to protect and advance their livelihood interests in the context of an ever shrinking ecological space, characterized by resource-scarcity, a livelihood crisis, population explosion, and resource competition. The crux of the theory of eco-violence is that the desperate quest for survival by groups in a competitive and resource-scarce ecological sphere (eco-survivalism) is likely to precipitate violent conflict.

The theory and its analytical framework help to understand the rising militancy of herders. Militancy is the belief in, and resort to the use of aggression in the pursuit of a group cause. The manifest militant posture of pastoralists must be understood with

reference to their individual and collective worldviews vis-à-vis group subsistence and survival; this has a lot to do with pastoralism. For the average herdsman, pastoralism is a way of living, which is reckoned with as a mark of common heritage. In effect, any threat to his herd amounts to a threat, not only to his survival but also to his common destiny. This way of thinking is encapsulated in the following citation that is credited to a Fulaninomad:

Our herd is our life because, to every nomad, life is worthless without his cattle. What do you expect from us when our source of existence is threatened? The encroachment of grazing field and routes by farmers is a call to war (Abbas, 2012, p. 331).

The implication of the preceding citation is that to a typical Fulani-pastoralist, life will be worthless if the survival and sustenance of his herd come under serious threat. This explains the magnitude of aggression and vindictive violence that the Fulani pastoralists often manifest in their disputes with settled farming communities (Pasteur, as cited in Young and Sing Oei, 2011). The point being emphasized here is that the rising wave of militancy among the Fulani herdsmen in Nigeria is principally driven by a dire struggle for survival in an environment that is competitive and hostile to their collective sustainable livelihood.

Applying eco-violence theory to this study reveals that attempt by any of the two groups to displace, disinherit, victimize, or marginalize the others common ecological domain has been adjudged by the other as an invitation to war. The inevitable outcome of this pattern of inter-group relations in Nigeria has been a vicious cycle of eco-violence and vendetta (Chukwuma and Atelhe, 2014). In respect to the conflicts between farmers and pastoralists in Fika local government of Yobe State, the theory of eco-violence has been adopted as it best explains the issues as they play out in between the two conflicting groups.

Causes of Farmers-pastoralists Conflict in Yobe State

Yobe State is located in the tropic with definite wet and dry seasons. The wet and dry seasons are characterized with frequent dry continental Northeast trade wind that originates from Sahara Desert, and the moist maritime South-westerly monsoon that originates from the Atlantic Ocean (Reader, 1997 as cited in Abubakar, 2018). The rainy season in Yobe spans between May and October with peak rainfall in August, and the dry season last between November and April. The mean annual rainfall is about 500mm with highest ambient temperature of about 40° C in the hottest month of April and May. The average daily temperature ranges between $27-31^{\circ}$ C.

The vegetation of Yobe State is characterized by sparse shrubs, grasses and trees such as *Acacia albida* (Gum Arabic shrub), *Acacia nilotica* (Gum Arabic shrub), *Pennisetum maximum* (Guinea grass), *Cenchrus ciliaris* (Buffel grass), *Cynodon nlemfuensis* (Star grass), *Pennisetum purpureum* (Elephant grass), *Andropogon gayanus*

(Gamba grass), *Andosonia digitata* (baobab tree), *Butyrospermum parkii* (Shea tree, *Kadanya* in Hausa), and *Azadiractha indica* (Neem tree). The area has seasonal grasses that dry up completely during the dry season (Oruonye and Abubakar, 2008).

Agriculture and pastoralism are the main occupational activities of the people of Yobe State, even though there are other mineral resources present. The sustainability of agriculture and pastoralism in Yobe economy requires a strategic balance in the ecological and socio-economic activities as well as political considerations. In this region, rainfall occurs seasonally with a pronounced dry season. The seasonal rainfall and prolonged dry season bring about dynamics in the ecosystem and sour relationships resulting in a sharp division between the Fulani pastoralists and farmers. The implications of the conflicts have brought about high degrees of loss of human, animal and material resources.

North-East Pastoral corridors are replete with conflicts of survival between farmers and Fulani pastoralists. Almost every November as harvest season approaches, Yobe State government would organize an interactive stakeholders' forum between the leadership of Fulani pastoralists and farmers in the State in order to prevent or at least reduce the annual conflicts between the two parties. The meeting is usually called to arrest the looming conflict between pastoralists and farmers over complaints that some local and migrant Fulani pastoralists go into farms with their cattle thereby destroying the crops. Regrettably, these meetings have always achieved little to arrest the conflict.

When one examines the geography of Yobe State, it is likely that the first impression one will have is that there is more than enough arable land for crop cultivation and animal grazing. However, more often than not, this resource is at the heart of conflict between both the farmers and pastoralists because of climate change, drought, etc. Unfortunately, these conflicts, more recently, have dislocated communities hitherto living in peace. As earlier explained, some of the arguments advanced are that farmers versus pastoralists conflict in Nigeria or elsewhere occurs because of resource scarcity primarily due to climate change (Ibrahim and Mohammed,2017). Reader captures this scenario thus:

Where climatic change is an important factor, it operates through competition. Climatic change will alter the nature, abundance and distribution of environments and resources within those environments. This will lead to changes in competitive relationship between and within the species, and it is this competitive relationship that is likely to lead to *evolutionary consequences*. The consequences might be extinction of populations as the most direct effect, or speciation as a less direct one arising either out of reduced intra-community competition or the opening up of new ecological opportunities (Reader, 2017, p.41).

Change in Nigeria's climatic conditions, especially in the Northern part of the country concerning the distribution of rainfall patterns, is a major catalyst for the conflict

between herders and farmers in the North and Yobe State in particular. Drought, increasing desertification of the Sahel-Savannah and land degradation compel pastoralists to continuously be on the move in search of greener pastures for their livestock.

As the desert encroaches, clashes between these two groups are inevitable. In the desperate search for water, pastoralists trespass on farmlands to feed their cattle. Very often, the farmer may confront a herdsman whose animals are eating up his crops but the pastoralists may challenge the farmer's authority over the land instead of seeking peaceful settlement. This more often than not, results in violence.

Another cause of pastoralists and farmers' rift is the increasing population growth rate in the region that has continued to exert pressure on available land resources with varying environmental and socio- economic implications. With dwindling land resources for both the herds and crops, tensions and struggle for the limited resources are inevitable. In fairness, the Central and Southern parts of Nigeria provide comparatively more conducive environment for grazing than the North-East zone and hence the downward movement in search of pasture. It is, therefore, not surprising that the country has witnessed these bloody clashes in these areas. (Baba,1986).

Land administration and ownership is also another major catalyst for conflicts. Pattern of land ownership administration in local government areas of Yobe State, like in many other parts of Northern Nigeria, is a case in point. This has generated conflicts between farmers and pastoralists. Scholars have traced this problem to the feudal land system that had existed in the North and later exacerbated by the colonial policy to appropriate all the cultivable lands using the emirate system (Ochefu, 2003).

In addition, the defunct Northern Region once demarcated some land strips as passage corridors for trade, cattle and/or transhumance purposes. With the current population increase, however, most of such strips of land have long disappeared as the initial traditional family owners have unilaterally repossessed them. In some instances, though, it may be some local potentates from the community that acquired such strips of land for modern large-scale farming, this has continued to be the source of frustration and tension for the pastoralists who were used to such strips before.

Farming and pastoralism, which were hitherto, twin occupations existing side by side nose-dived into competition for space due to the colonial pasture and forestry policies. For instance, Farmers and pastoralists have co-existed in the area and their relationship was seen as cordial. However, this policy triggered the first phase of conflicts. The colonial administrators acquired large portions of land and declared these as forest reserves. The immediate impact of this was that it made the pastoralists and farmers to compete over land that had shrunk as a result of colonial forestry policy. Cattle routes were taken over and cultivated by sedentary farmers. Population pressure also increased with a resultant upsurge in violent clashes in many places (Mshelia, 2007). this is caused mostly by high competition over the available ecological resources in the area, for example, water and land.

Before the year 1999 usually after harvest period, farmers used to leave their crop remains, corn stalks and straws in the farm for grazers to use and there were also Government provided grazing reserves and available dams for pastoral use. However, now people are into farming for commercial reasons, likewise looking at the side of the pastoralists too, they have started practicing sedentary life a little nowadays. Consequently, both parties do not understand the nature of changes that are going on with regards to climate changes, population pressure and other factors that are leading to high competition over the available ecological resources within their localities, but instead they regard one another as enemy.

In Yobe State, specifically the study area, there were grazing reserves established by the local government councils and grazing areas provided by local government councils in 1978. The grazing reserves in the study area are; Janga, Lampo, Chana, Darim, Gurjiyaye, Janga Siri, Ngeji, all under Fika Local Government Area, and of all the grazing reserves mentioned above, were attached a with wells or ponds for watering of animals.

Contestation for Land Based Resources in Fika Local Government Area

In Darin, Ngalda, Fika Town, Ngeji, Gadaka and Chana villages the contest for access and utilization of land based resources - principally water and pasture - between the farmers and pastoralists takes place in the context of the peasant and nomadic economic production systems adopted by both groups. The farmers whose livelihood is rooted in agricultural practices see land as the major source of their food for survival. Population expansion that put pressure on available land, making accessibility to land even among farmers difficult, has affected the production level in the study area. Declining soil fertility, erosion, climate change and modernity have collectively influenced traditional agricultural practices in a way that challenges the very livelihood of both groups in the study area.

The pastoralists whose system of production revolves around cattle rearing use mobility as a strategy of production as well as consumption. A number of factors have conspired to challenge their economic livelihood, including the clash of modernism with traditionalism. The pastoralists have resisted modernity and hence their system of production and consumption has remained largely unaltered in the face of population growth and modernization.

Environmental factors constitute a major set of issues affecting the pastoralists' economy, including the pattern of rainfall, its distribution and seasonality, and the extent to which this affects land utilization. Closely related to this is the pattern of vegetation, compartmentalized into arid areas. This vegetation pattern determines pasture availability, accessibility, and insects' predation. Vegetation pattern therefore explains pastoral migration. The disappearance of grazing routes and reserves due to farming activities thus set the tone for contemporary conflicts between the pastoralists and the farmers.

Government Inaction

In the face of growing hostility between farmers and pastoralists, both Yobe state government and local government council of the study area seem not to be making any proactive attempt to take action that will bring an end to the conflict. There have been reports from forest guards and veterinary officers to the State government on either encroachment on grazing lands or cutting down of forest trees or pastoral attacks on farming communities. Unfortunately, government would often, not take any action till when the conflict has started or when the encroachers have damaged the reserves before government would come to take some form, of action.

Very worrisomely, it is the government that usually allocates the grazing reserves to farmers temporarily to farm on, and without renewal of certificates thereby making the farmers keep the farms as their property for life. Sometimes, because of politics, politicians would defend the encroachers just not to lose their votes during elections as it is the case in Ngalda and Ngeji reserves. In some cases, Police personnel are blamed for corruption, for taking bribe to refuse to do justice to cases reported to them. This accusation is commonly given by both pastoralists and farmers alike. Similarly, judicial officials are also accused of corruption, for always taking money to twist justice in favour of those that have the moneyto bribe them. In similar manner, the refusal on the part of government to pay compensation to those whose lands were taken as reserves, always compel the later to re-occupy their lands thereby resulting in conflict.

The foregoing phenomenon corresponds withthe views of many whoargue that the issues fueling conflicts between the two groups revolves round the fact that much of the passage corridors that were demarcated as cattle routes has been reclaimed by farming communities. According to this group, the defunct Northern Region once demarcated some land strips as passage corridors to serve as cattle routes. With the current population increase, however, most of such strips of land have long disappeared as the initial traditional family owners have unilaterally repossessed them. But this usually leads to frustration and tension for the herdsmen who were used to such routes before now.

Resource Constraints to Livestock Management

The main resource constraint to livestock management in Fika Local Government Area is accessibility to dry season grazing land and watering points. This constraint has become more pronounced with the Fadama dry season farming that people practice in some villages of Fika LGA. The State government and some NGOs have been assisting some farmers to use some wetlands as Fadama lands and some of those wetlands are presently being utilized for dry season farming. The practice of irrigation farming has forced the pastoralists to relocate to previously less watery and productive places or sometimes resist to move. This has placed a lot of stress and uncertainty on the pastoralists. The pastoralist may not be familiar with the traditions and customs of the new area. Thus, a process of acculturation will have to be undergone by the relocating pastoralist to understand the changing dynamics.

The Impact of the Conflict on Yobe State's Economy

The people of Yobe State and particularly Fika Local Government Area are basically agriculturalists either engaged in animal pastoralism, crop farming or a combination of both. Indeed, over eighty (80) per cent of the people in the area areengaged in either of the two occupations on full time or on part time basis to sustain their livelihood. Food and meat is produced for both local consumption and for sale to other parts of the country. It is not contestable that a large percentage of the food and meat that is transported from the North to the Southern part of the country, especially products like beans, maize, cattle and goats, are produced in the State. This suggests that if anything significantly disrupts the production chain, the effect will be felt not just within the communities of Fika LGA alone but the State as a whole.

Obviously, business activities, especially trade in agricultural produce, have been significantly affected in the study area because of farmers-herders conflict. This is because most people in the area depend on farming. Invariably, the highest loss of foodstuffs in the area is essentially blamed on incessant conflict between farmers and pastoralists. With this situation not abating, food security is no longer guaranteed. As food shortage increases, there is high cost of foodstuff, it means the worst is yet to come. This is because farmers have abandoned some farming areas for fear of animals eating up their crops before harvesting.

Similarly, the situation is not in any way different with the pastoralists because the conflict has also impacted negatively on their productivity as can be seen in the recent hikes in the prices of livestock in the markets within the study area. This has forced youth to leave their villages to cities for menial jobs. Generally, the situation has greatly affected the revenue and economy of Yobe State in general and Fika Local Government Area in particular.

Conclusion and Way Forward

This study has examined the conflict between the farmers and Pastoralists in Yobe State with particular reference to Fika LGAlocated in the North Eastern Nigeria. In doing this, the study made concerted attempt to interrogate the conflict within the context of a resource conflict in the region for the purpose of establishing the causes and impact of the conflict. The study has shown how the interactions between farmers and pastoralists have in recent times deteriorated and become strained due to natural and man-made factors. The periodical struggle for scarce resources between farmers and pastoralists has degenerated into violent conflicts in Yobe State, specifically in Fika Local Government Area. These conflicts have become more intense, widespread and destructive. The incidence of ecological factor, climate change and, of course, government policies on agriculture, especially the all-year round fadama farming, are further threats to pastoralists activities. Specifically, additional farms and encroachments on traditional cattle routes have drastically reduced the grazing space and watering points available for

livestock grazing. Furthermore, non-demarcation of grazing lands, government inaction and corruption by security operatives and judicial officers have been major factors that make the conflict to continue.

To check the incessant farmers-pastoralists conflicts in the study area, the following recommendations are proffered.

- i. Government should compensate traditional land owners whose lands have been used in the establishment of either grazing reserves or grazing routes.
- ii. There is need for government to reconsider demarcation of all grazing reserves and routes, as well as banning farmers from encroaching on such grazing reserves and routes.
- iii. Taxing users of grazing reserves as source of revenues for maintenance of the reserves.
- iv. Establishment of mobile courts for summary trial of offenders or perpetrators of violence. The mobile courts are required to mitigate the effects of prolonged justice delay in the area.

Reference

- Abass, I. (2012). No retreat, no surrender: Conflict for survival between the Fulani pastoralist and farmers in Northern Nigeria. *European Scientific Journal*. Vol. 8, No 1, pp 331-346
- Abubakar, M. A. (2018). A sociological assessment of nomadic pastoralists and sedentary farmers conflict in Katsina State. Unpublished M. Sc. thesis, Department of Sociology, Ahmadu Bello University, Zaria
- Baba, J. M. (1986). Reconciling Agricultural and Pastoral Land Use System in Nigeria, In: M.J. Mortimore (ed.) *Perspective on Land Administration and Development in Northern Nigeria*, Maiduguri: Unrwin Press.
- Blench, R. (2004). *National resources conflict in North-Central Nigeria: A handbook and case studies*. London: Mandaras Publishers.
- Blench, R. (2010). Conflicts between pastoralists and cultivators in Nigeria. *Reviewed Paper for DFID, Nigeria*, Cambridge: Kay Williamson Educational Foundation, p.9
- Chukwuma, O.and Atelhe, G. (2014). Nomads against natives: A political ecology of herder/farmer conflicts in Nasarawa State, Nigeria. *American International Journal of Contemporary Research*, Vol.4, No.2. pp.76-82.
- Damagum, U. M. (2017). Report on the establishment of Grazing Reserves, Zonal Livestock Office, Zone 11, Potiskum, Yobe State.
- Falana, F. and Ibweke, N. (2018). Negligence of the government leads to killings by herdsmen. *Premium Times Newspaper*, *Tuesday*, *May* 29, 2018, P. 23.
- Homer-Dixton, F.E. (1999). Environment, scarcity, and violence, Princeton: University Press
- Homer-Dixton, (2017). *Environment, scarcity, and violence........12 accessed at:* http://practicalaction.org/media/view/9654
- Ibrahim A.J. and Mohammed A.J. (2017). An analysis of livelihood options among pastoralists of the dry land communities of Yobe state, Nigeria. Research Journal of Social Science and Management. Vol. 7, No.1. p.1- 22.

- Inter Press Service News Agency, (2017) News and Views of the Global South, Thursday, April 21,2017. Retrieved from http://www.ipsnews.net/africa.aspx Retrieved April 21,
- L.A. Young, and K. Sing'Oei (2011). Land, Livelihood and Identities: Inter-Community Conflicts in East Africa. *A Report of the Minorities' Right Group*. https://www.refworld.org/docid/525fc2d64.html [accessed 8 March 2019]
- Mshelia, A. (2007). Pastoral- Farmers Conflict in Northern East Corridor, 1960-2002. A Masters of Arts seminal paper presented at University of Maiduguri, Nigeria.
- Ochefu, Y. (2003). Land use policies and legislative development in Nigeria. In Gefu, J.O. *Land Tenure Systems in Nigeria*. Nigerian Land Network.
- Oruonye, E.D. and Abubakar, G. (2008). History, culture and tourism potentials of Yobe State. Fab Publishing Co.
- Reader, M. (2017). The factor of climatic change in pastoral –farmers conflict. *European Scientific Journal*, Vol. 14. 2.p.41:
- Shettima, A. G. and Tar, U.A. (2008). Farmer-pastoralist conflict in West Africa: Exploring the causes and consequences. *Information, Society and Justice*, Volume 1.2, Pp. 163-184.
- United Nations Environment Programme (UNEP) (2009). From conflict to peacebuilding. The role of natural resources and the environment. Accessed from http://hdl.handle.net/20.500.11822/7867