

*Full Length Research Paper*

## Causes and Consequences of Forest Clearance in Kwainbana Game Reserve, Zamfara, Nigeria

Sa'adu Mafara ABUBAKAR<sup>1\*</sup>, Muhammad Nuraddeen DANJUMA<sup>2</sup> and Salisu MOHAMMED<sup>2</sup>

<sup>1</sup>Department of Preliminary Studies, Abdu Gusau Polytechnic, Talata Mafara, Zamfara, Nigeria.

<sup>2</sup>Department of Geography, Bayero University, Kano, Nigeria.

Accepted 24<sup>th</sup> October, 2016

### Abstract

Forest clearing is one important human activity that changes the Earth surface globally. Forest clearance is a genesis of many social and physical problems in the Nigeria. It presented a huge consequence because the larger populace depends on forest resources for a livelihood. The aim of the study is to assess the consequences resulting from forest clearance in Kwainbana Game Reserve, Zamfara between 2009 and 2014. There are thirteen communities affected by the recent forest clearance by the government in Kwainbana Game Reserve. Out of the thirteen, this study purposively sampled four communities, i.e Dansadau, Madada, Kwakwaci and Babbadoka due to the high number of reported conflicts in their vicinity. Questionnaire was used to elicit information from three hundred and forty respondents drawn from four study locations of the study area. Pilot testing of the questionnaire was done in Dansadau village. Three hundred and thirty two (representing 97.6 percent of the instrument) was retrieved in two days later. Data was analyzed in Microsoft Excel software. The findings of the study reveal that indicated that the illegal allocation of some portion of the game reserve of the state government in 2002 and commercial fuelwood extraction are the main drivers of forest clearance in the study area. This study also found out the following: Dansadau and Kwakwaci villages are the main flash points of conflicts among farmers, herdsman, loggers and community members, year 2011 and 2012 recorded the highest number of conflicts while 2014 recorded that least and close to a quarter of the respondents (340) were affected directly by the conflicts. Seven lives were lost in Madada village as a result of the conflicts between 2009 and 2014 and many injuries were recorded in all study villages. The Direct impact is reported high in the Dansadau village (22 respondents) and Kwakwaci village due to proximity to deforestation areas. This study recommended that public policies should consider people and the importance of participation in programs that will reform the forest and ensure rapid replacement of already destroyed vegetation.

**Key words:** Forest clearance, deforestation, conflicts, Kwainbana Game Reserve, Zamfara, Nigeria.

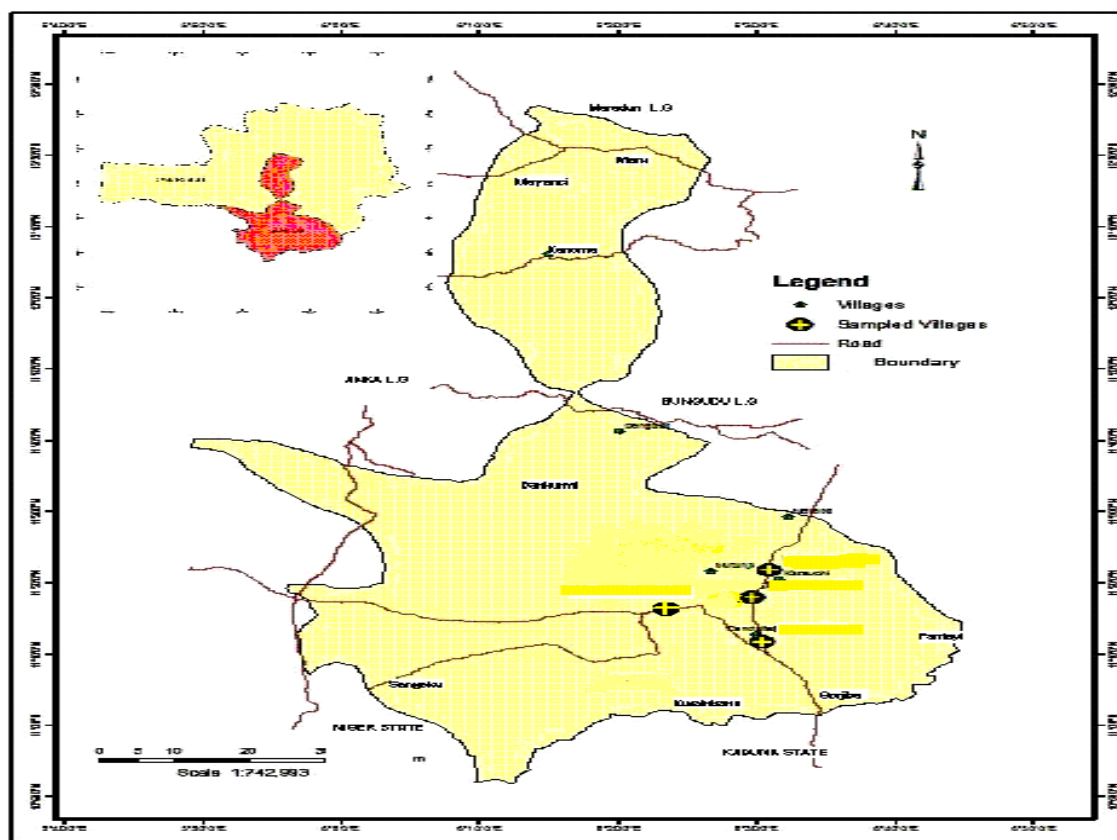
---

### INTRODUCTION

Forests currently cover about 4 billion hectares; about 31 per cent of the earth's land surface (FAO, 2010). Forests are important components of the ecosystem without which the future of life on the Earth is at stake. At all

spatial scales, from local to global, trees and forests play a critical role in human livelihoods, as well as in ecosystem functioning and health. Local communities depend on forests for livelihood by engaging in fuelwood-gathering and harvesting of wood and non-wood forest products (Danjuma, Usman and Abdulkarim, 2016).

Forest clearance, which is deforestation, has increased over three decades following the United Nations



**Figure 1.** Map of Communities surrounding Kwainbana Game Reserve, Zamfara

conference on Environment and Development in 1987 (Williams, 2002). The world rates have increased due to rise in population and consumption in developing countries. The phenomenon, though slowed globally in the 1990s is still alarmingly high in developing countries of the tropics (Myers, 1994). With the unprecedented economic growth that has been achieved at the expense of natural resource sustainability, numerous studies have shown that massive deforestation is recorded in various parts of the world (Daly, 2011).

As a result of massive forest clearing, Bryant *et al.*, (1997) reported that almost half of the Earth's original forest cover is gone, much of it destroyed within the past three decades. Variations in the rate of forest clearing, however, exist from one country to another. The high rates have been experienced in West Africa. In Ivory Coast and Nigeria, for example, the rate has been as high as 5-6% a year (The World Resources Institute, WRI, 1990). The five countries with the largest annual net loss of 2000-2010 were Comoros (-9.3 per cent), Togo (-5.1 per cent), Nigeria (-3.7 per cent), Mauritania (-2.7 per cent) and Uganda (-2.6 per cent) (Chakravarty, Ghosh, Suresh, Dey, and Shukla, 2012).

It has been noted in various studies that deforestation has no single factor. It is rather a problem with multiplicity

of factors. Policies primarily drive forest clearance in various parts of the world. Other drivers include inappropriate land tenure systems, pressure to expand agricultural areas and increasing demand for forest products (Sitarz, 1994). The more direct causes are agriculture, logging for timber and industry and large scale development projects (Gibbs *et al.*, 2010). The expansion of agricultural production accounted for most forest clearing, but economic development and the related, often unsustainable, use of forests for raw material and fuel was another contributing factor (Food Agriculture Organization, FAO, 2014).

Consequences of forest clearance are many; often vary from country to country and from region to region within each particular nation. Forest clearance impact heavily on indigenous communities, thus the arrival civilization (which comes with deforestation) usually means the destruction/change of their traditional lifestyle and the breakdown of their social institutions and displacement from their ancestral area (Colchester and Lohmann, 1993). The intrusion of outsiders destroys traditional lifestyles, customs and religious beliefs which intensifies with infrastructure development like construction of roads which results in frontier expansion often with social and land conflicts (Schmink and Wood, 1992). A clear example of the consequences resulting from forest clearing

**Table 1.** Population and Sample of Respondents

Study Location	Population	Sample of Respondents
Kwakwaci	719	102
Dansadau	1809	142
Babbadoka	500	46
Madada	513	50
<b>Σ</b>	<b>3631</b>	<b>340</b>

**Source:** Statistics office, Maru L.G.A. (2016)

clearing in Nigeria was in Bonny Island, where people have protested against the destruction of their mangrove forests. Many conflicts result in different social problems. The main aim of the study is to assess the consequences resulting from forest clearance in Kwainbana Game Reserve, Zamfara between 2009 and 2014 with a view to proffer a suggestion which will help to secure livelihood of the next and subsequent generations in the area.

## DESCRIPTION OF STUDY AREA

Kwainbana game reserve falls under Maru local government at about 100km away from Gusau in Zamfara State (Obadeyi, 2005). The headquarters of Maru local government is in the town of Maru located between latitude 12°20'00"N and 12.33°N and 6°24'00"E and 6.4°E. It has an area of 6,654 km<sup>2</sup> and a population of 291,900 at the 2006 census (National Population Commission, NPC, 2006). Kwainbana Game Reserve started in 1936 as a native authority forest reserve by the then colonial administration of Northern Nigeria. However, in 1968 it was upgraded to the status of a game reserve under the authority of the then northwestern state. The reserve border Kamuku National Park, situated in Birnin Gwari in Kaduna State in the South East, Kwadaga Forest Reserve in Kuyello near Dandume in Katsina State to the East. It also borders Murbe forest in Tsafe local government in the same state and linked to Sangeku forest situated in Kwatonkoro in Niger state. Kwainbana Game Reserve covers a landmass of 261,400 ha (World Bank, 1989). The Kwainbana Game Reserve was established like any other game reserve to conserve nature and provide tourists with an aperture to observe the aesthetics of nature made up of plants and animals both on land and in water in their natural habitat.

## METHODS

### Sampling of Study Locations

Kwainbana Game Reserve, which reference is being made is located in Maru local government area. The target areas are thirteen villages within the vicinity of the cleared area. These are: Malabo, Maidabo, Marabu,

Mutunji, Hannutara, Karauci, Fantayi, Dansadau, Babbadoka, Gorjiba, and Kwakwaci. The study covered four villages of Dansadau, Madada, Kwakwaci and Babbadoka. They were purposively sampled based on some attributes important for the study. Kwakwaci and Dansadau were selected because their area is massively cleared as a result of government allocation of farmlands within the forest reserve. Babbadoka and Madada were selected because their area is intensively logged for commercial purposes.

### Procedure for Sampling of Respondents

Table 1 shows population estimates of the four study locations obtained from Maru LGA statistics office. It shows a total of 3631 people in four study locations from which 340 respondents were selected at random.

### Procedures for Data Collection and Analysis

The main data type is quantitative data which we sourced using a questionnaire. Reconnaissance survey was made with the help of local people concerning the major problems caused by the massive forest clearing in the area. This enabled the researchers to develop familiarity with the study area and obtained the views of the villagers (people).

A questionnaire was used to elicit information from the respondents. It consists of ten structured questions which cover the causes and consequences of massive forest clearing in the study area. Pilot testing of the questionnaire was done in Dansadau village. After the pilot testing, a total of three hundred and forty questionnaires was administered in the four locations in the study area. Three hundred and thirty two (representing 97.6 percent of the instrument) was retrieved four days later. Data was analyzed in Microsoft Excel software.

## RESULTS AND DISCUSSION

### Drivers of Forest Clearance

The driver is any natural or human-induced factors that directly or indirectly cause a change in an ecosystem.

**Table 2.** Causes of Forest Clearance

Causes			Madada	Dansada	Babbadoka	Kwakwaci	Total	%
Commercial fuel wood extraction			10	19	22	22	73	21.99
Commercial logging			04	10	10	08	32	09.64
Fire			06	09	03	05	23	06.93
Land clearing for crop production			03	10	-	03	16	04.82
Politics (Illegal Land Allocation)			26	89	10	58	183	55.12
Others			-	03	-	02	05	01.51
							<b>332</b>	<b>100</b>

**Table 3.** Spatial Patterns of Conflicts Resulting from Forest Clearance

Types of Conflicts	Study Locations			
	Dansadau	Madada	Kwakwaci	Babbar Doka
Farmers and Fulani	13	10	15	09
Farmers and Loggers	02	03	03	-
Loggers and Fulani	09	-	02	-
Community members and loggers	05	04	02	03
Fulani and community members	02	-	02	02
Farmers and farmers	-	02	02	-
N	31	19	26	14

**N=total number of clashes between 2009 and 2014**

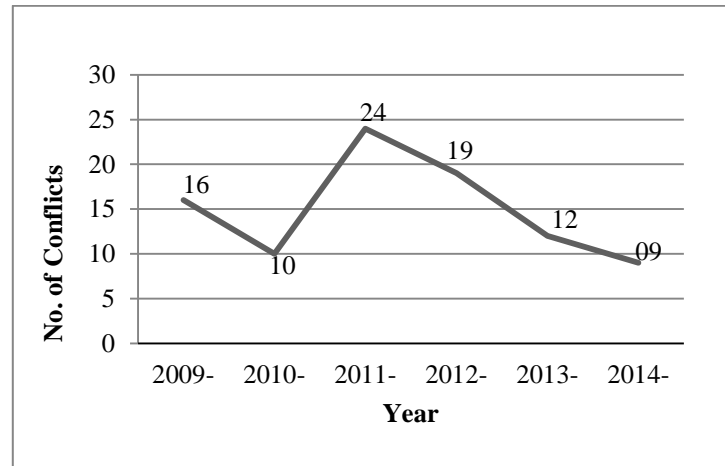
Drivers vary regionally and change over time (Rudel *et al.*, 2009). Drivers of forest clearance can be proximate, which include human activities and actions that directly impact forest cover (Geist and Lambin, 2002). Agriculture is estimated to be the proximate driver for around 80% of deforestation worldwide (Kissinger, Herold and De Sy, 2012). Fuel wood collection and charcoal production, in forests are the most important drivers of deforestation in large parts of Africa. Other drivers include commercial timber extraction and selective logging activities which drive forest clearance in Latin America and (sub) tropical Asia (Schoneveld, 2011). Table 2 shows that illegal land allocation is the main driver of forest clearing in the study locations. More than half responded that illegal allocation has severely driven deforestation in the study locations. Fuelwood extraction on a commercial scale is a significant driver of forest clearance in the study area. The nature and extent of the clearance caused by fire is yet to be determined, but remained another driver of deforestation in the study area. Agriculture is occurring around the study area, but has not significantly drives deforestation according to respondents.

Public policy which allocates forest area has greatly pave way for forest clearance in the study locations. The principal impetus to deforestation in the study area has

come from policies of 2002 which subdivided and allocate major sections of the Kwainbana forest reserve to politicians. Since 2002, the study area has been caught up in a forest clearance and its attendant crises. Fuel wood will remain a major source of deforestation and over the next years in the study area.

Similar findings suggest that while the demand for charcoal is likely to increase due to an expected increase in urbanization, as urban inhabitants use more charcoal than rural ones (Hofstad *et al.*, 2009), fuelwood gathering will be a major driver of forest clearance in the drier areas of tropics. Fire used responsibly can be a valuable tool in agricultural and forest management, but if abused it can be a significant cause of deforestation (Rowe *et al.*, 1992).

Public policies paves way for illegal forest practices. Several illegal practices which include the approval of illegal contracts with private enterprises by forestry officers, illegal sale of harvesting permits, under-declaring volumes cut in public forest, underpricing of wood in concessions, harvesting of protected trees by commercial corporations, smuggling of forest products across borders and allowing illegal logging, processing forest raw materials without a license have been reported in (Contreras-Hermosilla, 2001).



**Figure 2:** Temporal Trends of Conflicts

**Table 4.** Effects of the Conflicts on the Respondents

Study Locations	Consequences					Effects on the Respondents			TnR
	Loss of Lives	Loss of Properties	Loss of Occupation	Injuries	Others	Nd	Ni	Na	
Dansadau	x	+	+	+	x	22	36	83	141
Madada	+	+	+	+	+	08	16	24	48
Kwakwaci	x	+	+	+	+	11	24	63	98
Babbar	x	+	+	+	x	09	20	16	45
Doka									
						<b>50</b>	<b>96</b>	<b>186</b>	<b>332</b>

+: reported, x: not reported, Nd: number of respondents affected directly by the conflict, Ni: number of respondents affected indirectly by the conflict, Na: not affected at all, TnR: total number of respondents

### Spatial patterns of Conflicts

Conflict is any relationship between opposing forces, whether marked by violence or not (Deloges and Gauthier, 1997). Conflicts over forest clearance are many, with devastating long-term impacts. The most immediate impact of deforestation is conflicts which occur at the local level. According to Gibson and Koontz (1998), forest conflicts occur when rules related to access to forest resource are not well-defined.

Table 3 shows the various types of conflicts that occur as a result of forest clearance in the study locations. It depicts that conflict between farmers and Fulani occur more in the study locations than all types of conflicts. The two most dominant resource sharing parties are into constant conflicts in the area due to limited options for livelihood. Kwakwaci and Dansadau villages are flash points, perhaps because they have a high population of farmers and fulani. From the table, conflicts between community members and loggers also occur in all study

locations, perhaps due to increase in logging activities resulting from allocation of some sections of the forest reserve to individuals. Farmers and farmers and fulani and loggers types of conflicts are rare, they occur in small numbers and in a few locations. These types, especially fulani and loggers rarely occur, perhaps because the loggers operate for a short time (4-7 days) and leave. Babbar doka with fourteen conflicts is relatively peaceful compared to other villages studied (Table 3).

### Temporal Trends of Conflicts

Conflict in this study consists of all forms of violence in the forest reserve that has direct or indirect impact and influence on the lives of the people. Forest conflicts are inevitable as long as there are competing rights, claims, interests, values and power struggles that are enmeshed in complex institutions and multiple legal systems of land tenure ship (Marfo, 2003). Figure 2 shows the trend of conflicts that resulted from forest clearance between

2009 and 2014 in Kwainbana Game Reserve. It shows that forest clearance related conflicts escalate by twofold from year 2010 (ten conflicts) to 2011 (twenty four conflicts) and 2012 (nineteen conflicts) respectively. The trend also slowed down in 2013 (twelve conflicts) and 2014 (nine conflicts) (Figure 2). The slowing down is probably due to rise in cattle rustling activities in Zamfara state which drives users from the game reserve.

### Effects of the Conflicts on Respondents

Effects of deforestation on people can be severe. Even though this study cannot claim to have examined all effects of forest clearing on people in the study locations between 2009 and 2014, its findings indicate that there is rising incidence of conflicts among respondents in the area.

Table 4 shows category of consequences resulting from forest clearance related conflicts in the study area between 2009 and 2014. From the table, seven lives were lost in Madada village in 2009 and 2012 in clashes between farmers and herdsmen. The findings of this study reveal that five farmers and two pastoralists lost their lives together with several animals that cannot be accounted for by the respondents. About twenty five people have injuries of various magnitudes between 2009 and 2014 in the four study locations according to the respondents. Social consequences of forest clearance are many in the study area. About three marriage proposals were called off in the study area between 2009 and 2014.

Close to a quarter of the respondents are affected directly by conflicts emanating from forest clearance between 2009 and 2014 in the study area (Table 4). The direct impact is reported high in the Dansadai village (22 respondents) and Kwakawaci village (11 respondents) perhaps due to high population and because of their proximity to areas of the forest that have been cleared by the government. Several studies have shown that forest communities which are most proximate to deforestation fringes often recorded too many clashes compared to those further away.

### CONCLUSION

Forest clearance is one of the most pressing land use problems in the Kwainbana forest reserve area. Public policy and fuelwood extraction have been identified as major drivers of forest clearance in the area. Forest clearing is occurring on a scale never known before in the study area owing to the government's policy that allocated a large portion of the area. This has created a burden of social and environmental scales. The period between 2006 and 2016 was characterized by a rise in social problems resulting from forest clearance in Kwainbana forest reserve. From the findings of this study,

it appears that conflicts escalate between 2009 and 2015 in the study area as a result of eroding potentials of the forest reserve and scramble for natural resources.

### RECOMMENDATIONS

- 1). Public policies should consider people and the importance of participation in programs that will reform the forest and ensure rapid replacement of already destroyed vegetation.
- 2). Conflicts must be fully addressed by a new legislation or approach because such conflicts affect numerous on the forest fringe communities.
- 3). All stakeholders should take the issue of alternative energy sources very serious. Alternative sources should be encouraged and subsidized so that people can afford easily.

### REFERENCES

- Chakravarty, S., Ghosh, S.K., Suresh, C.P., Dey, A.N. and Shukla, G. (2012). *Deforestation: Causes, Effects and Control Strategies*, Global Perspectives on Sustainable Forest Management. Available from: <http://www.intechopen.com/books/globalperspectives-on-sustainable-forest-management/deforestation-causes-effects-and-control-strategies>
- Colchester, M. and Lohmann, L. (1993). *The Struggle for land and the fate of forest*. Zed books, London.
- Contreras-Hermosilla, A. (2001). Illegal activities and corruption in the forest sector. In: Contreras-Hermosilla (ed). *State of the World's Forest 2001*, FAO. Pp 76-89. FAO, Rome.
- Daly, H. (2011). From a failed growth economy to a steady-state economy. In: *The road to Rio+20*. New York, USA, and Geneva, Switzerland, UNCTAD. [www.unctad.org/rio20/index.php?page=view&type=400&nr=11&menu=45](http://www.unctad.org/rio20/index.php?page=view&type=400&nr=11&menu=45)
- Danjuma, M.N., Usman, Y. and Abdulkarim, I.A. (2016). Roles of Forest Resources in Sustaining Rural Livelihoods around Yankari Game Reserve, NIGERIA. *Pyrex Journal of Geography and Regional Planning*, Vol 2(1):1-15
- Deloges, C. and Gauthier, M. (1997). *Community forestry and forest resource conflicts: an overview*. Paper prepared for the XI World Forestry Congress, Antalya, Turkey.
- FAO (2010). *Global Forest Resources Assessment 2010 – main report*. FAO Forestry Paper No. 163, Rome. [www.fao.org/docrep/013/i1757e/i1757e00.htm](http://www.fao.org/docrep/013/i1757e/i1757e00.htm).
- FAO (2012). *State of the World's Forests*. Food and Agriculture Organization of the United Nations, Rome
- FAO (2014). *State of the World's Forests* Enhancing the socioeconomic benefits from forests. Food and Agriculture Organization of the United Nations, Rome
- Geist, H. and Lambin, E. (2002). Proximate causes and underlying driving forces of tropical deforestation. *BioScience*, 52: 143–150.
- Gibbs, H.K., Ruesch, A.S., Achard, F., Clayton, M.K., Holmgren, P., Ramankutty, N. and Foley, J.A. (2010). Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. *PNAS*.
- Gibson, C.C. and Koontz, T. (1998). When "Community" Is Not Enough: Institutions and Values in Community-Based Forest Management in Southern Indiana. Volume 26:4:621-647.
- Hofstad, O., Kohlin, G. and Namaalwa, J. (2009). How can emissions

- from woodfuel be reduced? In: *Realising REDD+: National strategy and policy options*. Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W.D. and Wertz-Kanounnikoff, S. (eds.), Centre for International Forestry Research, Bogor, Indonesia
- Kaimowitz, D. (2001). *Get serious about averting trouble in the forest*. International Herald Tribune, 30 November.
- Kissinger, G., Herold, M. and De Sy, V. (2012). *Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers*. Lexeme Consulting, Vancouver Canada.
- Marfo, E. (2003). *Theoretical Framework on Management Natural Resources Conflict: The Role of Empowerment*. Unpublished Scientific Proposal, Wageningen University.
- Myers, N. (1994). Tropical deforestation: rates and patterns. In: Brown, K. and Pearce, D. eds. *The Causes of Tropical Deforestation. The economic and statistical analysis of factors giving rise to the loss of the tropical forest*. UCL Press.
- National Population Commission, NPC (2006). *National Population Census*, Federal Government of Nigeria, Abuja.
- Obadeyi, M. (2005). *Zamfara State Gold in the Desert*. Amazingrafiks Limited, Lagos.
- Rowe, R.; Sharma, N.P. and Bowder, J. (1992). Deforestation: problems, causes and concern. In: ed. Sharma, N.P. *Managing the world's forest: looking for balance between conservation and development*. Kendall/Hunt Publishing Company, Iowa.
- Rudel, T.K., Schneider, L., Uriarte, M., Turner, B.L. 2nd, DeFries, R., Lawrence, D., Geoghegan, J., Hecht, S., Ickowitz, A., Lambin, E.F. et al. (2009). Agricultural intensification and changes in cultivated areas, 1970–2005. *PNAS*, 106: 20675–20680.
- Schoneveld G.C. (2011). The anatomy of large-scale farmland acquisitions in sub-Saharan Africa. Working paper 85. CIFOR, Bogor, Indonesia.
- Schmink, M. and Wood, C. (1992). *Contested Frontiers in Amazonia*. Columbia University Press, New York.
- Sitarz, D. (1994). *Agenda 21: The Earth Summit Strategy to Save Our Planet*. Boulder: Earth press.
- Williams, M. (2002). *Deforesting the earth: from prehistory to global crisis*. University of Chicago Press Chicago, USA
- World Bank (1989). *Sub Saharan Africa: from crisis to sustainable growth*. A long term perspective study, Washington DC, World Bank.
- World Resources Institute (WRI) (1990). *World Resources 1990-91*. Oxford University Press, New York