



PASTURE PLAN FOR LIVESTOCK DEVELOPMENT AS A STRATEGY FOR CONFLICT RESOLUTION IN SUDANO-SAHELIAN ZONE OF NIGERIA

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ABSTRACT

This study was conducted in three Nigerian northern states of Borno, Jigawa and Sokoto to determine the status of pasture in the three States located in Sudano-Sahelian zone of Nigeria. Purposive sampling procedure was used to select the study area. This was due to the role it plays in livestock production in the country. Random sampling was used to select 210 respondents on whom questionnaire instrument was administered to collect the data for the study. The data collected was analyzed using descriptive statistics, mainly frequency distribution, means and percentages. The results showed that the mean age of the respondents was 41 years, 91% were male and had an average household of 27 persons and 53% reported pasture was in short supply and scarce. They were aware of the potentials of pasture plan to reduce conflicts between crop farmers and livestock herdsman in the zone. The study therefore, proposed pasture model to be implicated by famers to reduce the conflict and stabilize the zone for congenial human and livestock survival.

Keywords: Pasture, Fodder, Pasture degradation, Livestock, Sudano-Sahelian zone.

INTRODUCTION

Nigeria has a land area of about 923 769 km²; a north-south length of about 1,450 km and a west-east breadth of about 800 km. Its total land boundary is 4,047 km while the coastline is 853 km (FOS, 1989). The Federal Ministry of Environment of Nigeria estimated irrigated land at 9,570 km², arable land about 35%, pasture at 15%, forest reserve at 10%, settlements at 10% and the remaining 30% considered uncultivable (FMEN, 2001). Boomie (2008) corroborated the irrigated land at 9 570 km² with arable land at 33%; permanent crops at 3%; permanent pastures at 44%; forests and woodland at 12% and others at 8%. Pasture for livestock farming is mostly found in northern Nigeria where livestock farmers live. Sudano-Sahelian zone of Nigeria is found in the extreme north, stretching from Borno State in the northeast to Sokoto State in the northwest. The annual rainfall is low and the rainy season lasts between three to four months. The vegetation is not only sparse but the grasses are very short. This zone is characterized by plants such as *Cenchrus biflorus*, and *Acacia raddiana*. The shrubs that are predominantly scattered in the zone are African myrrh (*Commiphora africana*) and *Leptadenia*

spartum. Occupation of the people in the zone is livestock herding, and grass provides the pasture available for grazing livestock. The zone of Nigeria is experiencing unprecedented environmental change due to human and livestock increase on one hand and reduced quality and quantity of land resources on the other (Onyewotu *et al.*, 2003; Foley *et al.*, 2003). The changes most have emanated from the way humans put their land in use, resulting to conflicts (Saleh, 2016). The approach by government to stem down conflicts is not based on pasture development which is the main cause and the conflicts continue at alarming rate. Growing human population over the years, coupled with climate change has brought dearth/scarcity of pasture and farmland in the zone. Consequently, conflicts between livestock and crop farmer over the resource control become rampant with resultant loss of life, property, the pasture land reduction, low productivity of land resource and poverty in general. The phenomenon calls for a deliberate pasture plan for sustainable peaceful co-existence in the zone. Different grasses and legumes are found in the different agro-ecological zones (Olubajo, 2014) and presented in Table 1.

Table 1: A summary of forage crops for different Vegetation Zones of Nigeria

Forage	Vegetation Zones*				
	SDS	DS/SGS	NGS	SS/ShS	M
Grasses					
Andropogon gayanus	X	X	X	X	
Andropogon tectorum	X	X			
Brachiaria decumbens	X	X	X		
Cenchrus ciliaris	X	X	X	X	
Chloris gayanus		X	X		
Cynodon dactylon	X	X	X		
Cynodon plectostachyus	X	X	X		
Digitaria decumbens	X	X	X	X	
Digitaria smutsil			X	X	
Hyparrhenia rufa	X	X	X		



Forage	Vegetation Zones*				
	SDS	DS/SGS	NGS	SS/ShS	M
Melinisimi nutiflora	X	X	X		
Panicum maximum	X	X	X		
P. maximum cv Gatton		X	X	X	
P. maximum var. trichoglume		X	X	X	
Pennisetum clandestinum					X
P. pedicellatum				X	
P. purpureum	X	X	X		
P. typhoides cv Maiwa			X	X	
Setaria anceps		X	X		
Sorghum alum			X	X	
Tripsacum laxum	X	X	X		X
Legumes					
Cajanus cajan	X	X	X	X	X
Centrosema pubescens	X	X	X		
Desmodiumin tortum		X	X		X
D. scorpiurus		X	X		
Gliricidia sepium	X	X	X		
Lablab purpureus	X	X	X	X	
Leucaena leucocephala	X	X	X		
Macrotiliumatro purpureum		X	X	X	
Macrotyloma axillare			X	X	
M. uniflorum		X	X	X	
Neonotonia wightii		X	X		
Puerariapha seoloides	X	X	X		
Stylosanthes guianensisc v Schofield	X	X	X	X	
S. guianensisc v Cook		X	X	X	
S. hamata cv Verano		X	X	X	
S. humilis		X	X	X	

*SDS – South of Derived savanna; NGS – Northern Guinea Savanna; DS – Derived Savanna; SGS – Southern Guinea savanna; SS – Sudan savanna, ShS – Sahel Savanna; M – Montane
Source: Onifade and Agishi (2008).

Therefore, to achieve sustainable pasture development in the zone the objectives of these study were: to understand socioeconomic characteristics of the farmers, describe pasture status in the area and propose pasture plan to resolve conflicts in the zone.

METHODOLOGY

This study was carried out in Borno, Jigawa and Sokoto States of Nigeria, located latitude 100N and 140N and longitude 40E and 140E. The sampling frame for the study comprises both crop and livestock farming households in five Local Government Areas (LGAs) each from Borno, Jigawa and Sokoto States. Primary and secondary data were used for this study. Multi-stage sampling technique was used for the study. The first stage involved the purposive sampling of the three Sudano-Sahelian states of Borno, Jigawa and Sokoto due to the presence of aridity and agroforestry practices, from where five local government areas were randomly selected from each state. Second, purposive sampling was used to select the states. Third, purposive was also used to select the local

government areas. Five local government areas were selected from Borno State, which are Kukawa, Damasak, Monguno, Benishiek and Ngala. The LGAs from Jigawa State included Kirikasama, Rigim, Kazaure, Babra and Roni. The Local Government areas selected from Sokoto State are Ilela, Sabon Birni, Isa, Kwari and Goronyo. In the fourth stage, random sampling technique was employed to select 10% of the respondents from each State, giving rise to 102 respondents from Borno State, 98 respondents from Jigawa State and 110 respondents from Sokoto State. Thus, a total of 310 respondents were randomly selected for the study. Descriptive statistics, mainly frequency distribution and percentage were used to analyse the data.

RESULTS AND DISCUSSION

Socioeconomic and demographic characteristics

Result in Table 2 shows that 91% were male and 9% were female, the mean age of the respondents was 41 years. Majority (93%) of them were married and had mean household size of 27 persons who were predominantly (79%) illiterates. Occupational structure revealed that 86.2% were



crop farmers and 5.2% practice animal husbandry. The study also revealed that majority (71.4%) of the respondents was Nigerians and 28.6% were foreign immigrants. This implies that the more the foreign immigrants are allowed to come into the

zone, the prone it is to conflict. The study revealed that 87% of the respondents owned their farmland with 23.3% of them had their farmlands ranging between 2 and 4 hectares.

Table 2: Distribution of Socioeconomic Characteristics of the Respondents (n=310)

Age (year)	Percent
20 – 24	4
25 – 29	5
30 – 34	6
35 – 39	20
40 – 44	27
45 – 50	9
50 – 54	13
55 – 59	9
60+	7
Household size (number of person)	%
1 – 5	15
6 – 10	35
11 – 15	16
16 – 20	17
21 – 25	8
26 – 30	7
31+	2
Level of education (years sent in schools)	%
Cannot read and write	40
Koranic education	39
Primary education	11
Secondary/TC education	2.8
Tertiary education	2
University education	3.3
Occupation (listing of primary occupation)	%
Arable farming	86.2
Herding	5.2
Civil service	8.6
Land ownership type (1=owned, 2=communal, 3=hire, 4=lease)	%
Owned	87
Communal	2
Hired	2
Lease	7
Owned and lease	2
Farmland (Hectare/Household)	%
2 – 4	23.3
5 – 7	64.3
8 – 10	8.6
11 – 13	2.4
14 – 16	1.0
17+	0.4
Total	100

Status of pasture in the area

Status of pasture was also investigated by the study (Table 5). The finding shows that 52.8% reported that pasture was inadequate all the seasons, 34.8% reported that pasture was only available during the rainy season and 12.4% could

not observe any change in the status of pasture. However, it is a known fact that livestock exploit natural pasture feeds (herbaceous and leguminous plant species). Also, pasture products (wood, grass) exploitation by humans affect plant groups in different ways.

**Table 3: Status of pasture in the study area of the Sudano-Sahelian zone (n=310)**

Status of pasture	Frequency	%
Not adequate all seasons	111	52.8
Available in rainy season only	73	34.8
No change of status observed	26	12.4
Total	210	100.0

Pasture development plan

Federal and State Government can realistically define pasture conflicts between livestock and arable farmers in the zone. It is in line of this thinking that a plan for Pasture Development Directorate is proposed for Sudano-Sahelian zone of Nigeria.

The following therefore are considered in formulating the plan:

- i. Operation of the proposed plan should be focused on peaceful living of the livestock and arable farmers. It should also be operated in an ecologically appropriate manner to avoid over conflicts in the zone.
- ii. Public education to create awareness about the danger of conflicts.
- iii. Access of improved fodder and crop seeds and other inputs must be carried out on continuous bases until full adoption of the technologies is attained.
- iv. Community participation in the programme plan and implementation (i.e. design, implementation and evaluation) in the zone.
- v. The plan is designed in a flexible manner to allow initiatives from individual farmer while the action is on.

Implementation of the plan

The plan aimed at using the already identified government institutions and none governmental organizations to modify the old practices of livestock grazing and crop production create conflict in the zone. The plan is organized in up and down ward action movement of information flow between departments down to farmer's level and visa-visa, i.e. planning and implementation are the responsibility of the three tiers of the government (Federal, State and Local) and Non-

governmental Organizations (NGOs), while the local communities give feed back to their local government chairman for onward action. The plan of action is as follows:

Level 1: This is highest level at which all governmental and non-governmental agencies involved in conflict resolution and development activities will come together to offer technical, financial, administration and any other advanced services leading to creation of pasture and crop land for farmers in their respective State. There shall be a Directorate of Pasture research, planning, monitoring and evaluation. The directorate is responsible for grazing reserve or ranch, whichever the State Governor approved to be implemented in the State.

Level 2: Here, all activities are done at local government level. At this level various departments shall be created by the Directorate to serve grass root development associations which will be responsible for peace campaign in the area. This committee formed for collective participation of livestock and crop farmers. The committee shall have direct access to the Directorate for day to day pasture development in the local government. The committee shall be responsible for creation of community pasture agency under it with various functional offices to carry out day to day activities solve problems that may result to conflicts.

Level 3: This is the implementation level. At this level, there shall be formed district and village pasture development associations through which sustainable pasture development will be achieved. Sustainable pasture development is possible if the various offices created under the community pasture agency are made functional to discharge their duties effectively by diversification of approaches to include entrepreneurial trainings planed for youth in order to divert their attention from conflicts in the zone.

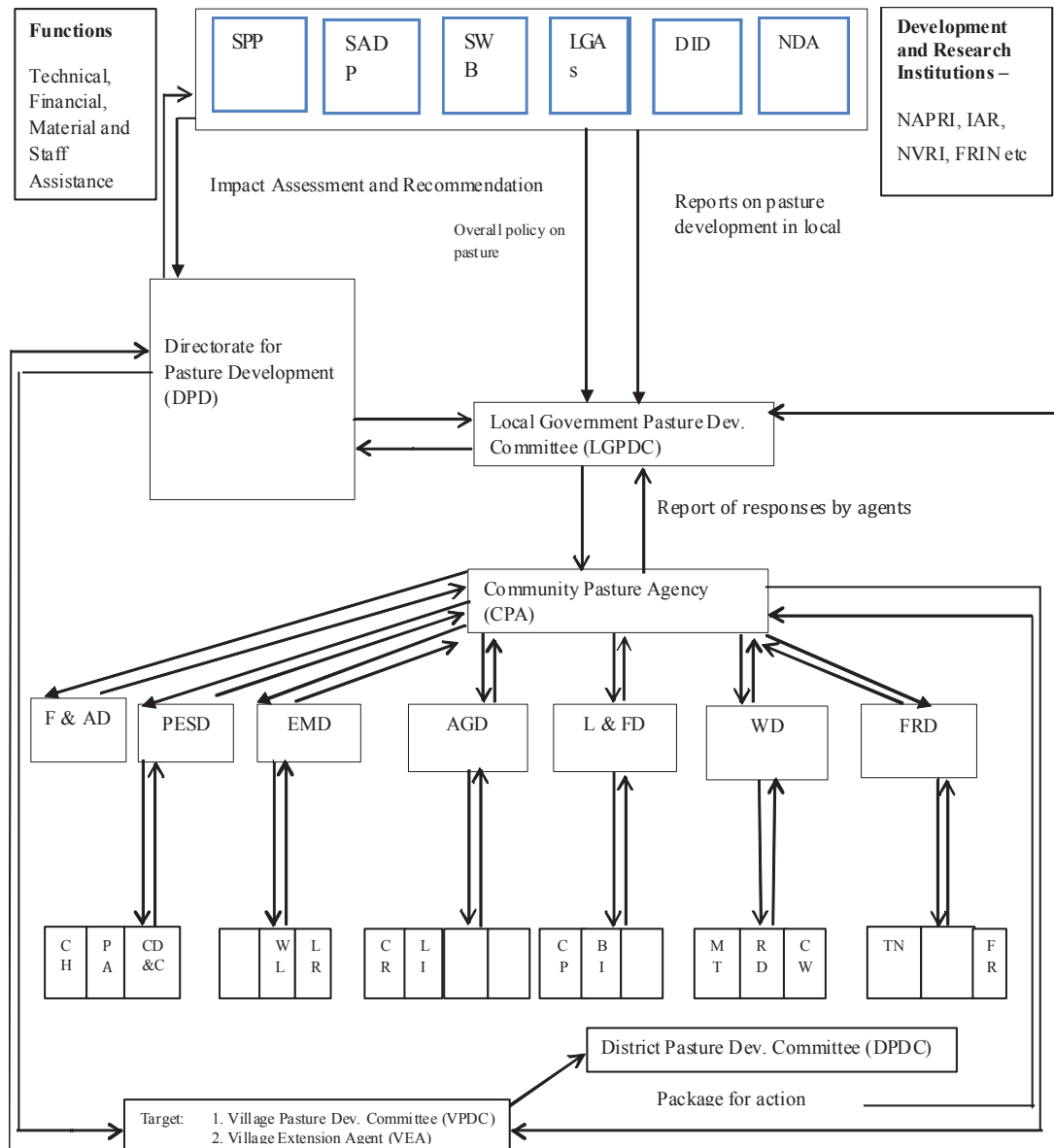


Fig. 1: Organizational Model for Pasture Development in Sudano-Sahelian Nigeria

Key

Level 1

- SAP = State Pasture Development Project (to be created for pasture services)
- SADP = State Agricultural Development Programme (crop and forestry services)
- SWB = State Water Board
- LGAs = Local Government Areas
- NDA = National Orientation Agency
- NGOs = None Governmental Organizations

Level 2

- F and AD = Finance and Administration Department
- PESD = Pasture Development Extension Services Department



EMD	=	Environmental Monitoring Department
AGD	=	Agricultural Department
LDD	=	Livestock Development Department
WD	=	Works Department
FRPD	=	Forestry Resource Protection Department

Level 3

CH	=	Community Health
PA	=	Public Awareness
CD and C	=	Community Development and Clubs Organization
WLI	=	Wood Lots Improvement
LRI	=	Land Resource Improvement
CrPI	=	Crop Production Improvement
LI	=	Livestock Improvement
CPI	=	Community Pasture Improvement
BI	=	Breed Improvement
CWI	=	Community Well Improvement
MII	=	Market Infrastructure Improvement
RI	=	Road Improvement
TNI	=	Tree Nursery Improvement
FRI	=	Forestry Reserve Improvement

Components of the plan

At the top of the plan are the existing and newly created government and non-governmental agencies. The reason for placing these agencies at the top is for pooling the synergy that exist between the them for technical, material and personal support of the newly created directorate.

Directorate for Pasture Development (DPD)

The Directorate shall be established in the State Governors' Office. It shall be responsible for planning pasture/grazing land based on type (grazing reserve or ranches.) as approve by the State government. It reports directly to the governor on the state pasture situation in the state. The DPD would be charged with the following responsibilities:

1. Plan and undertake a community research and extension in various dimensions of pasture in the State in liaison with identified Departments and Institutions.
2. Monitor the state of pasture development in the State.
3. Advice government and the Pasture Development Agencies on all policy guidelines for sustained pasture development in the state.
4. Monitor, evaluate and coordinate activities of Local Government Committee Pasture Agency (CPA) and report the same to the Federal and State Governments' development agencies.

At local government level, the model proposed the Establishment of Local Government Pasture Development Committee (LGPDC) which reports to the development institution concerned. The LGPDC uses general guidelines issued by the development institutions to formulate local government policies on pasture development for implementation by the Pasture and Agency for

Rural Communities (PARC). The membership to this committee should include:

- i. The local government chairman who should automatically be the chairman of the committee.
- ii. The head of agriculture in the local government shall be the secretary of the committee.
- iii. Leaders of development associations and clubs such as Women's Associations, 'Elders' Group, Farmer's Cooperative Society, etc.
- iv. Leadership of Miyetti Allah Cattle Breeders, hunters, blacksmith, etc,
- v. Forestry officer of the local government.
- vi. Agricultural officer of the local government.
- vii. Community development officer of the local government.
- viii. Local water board manager of local government (if any)
- ix. Area irrigation engineer (if any).
- x. National Orientation Agency Officer,

The next level at local government is the proposed Pasture Agency for Rural Communities (PARC). This is the implementing body for all the policies agreed upon and passed from local government Pasture Development Committee (PDC). The PARC is to be headed by a Director who is assisted by Departmental heads. The proposed departments are:

Finance and Administration; Social Services; Environmental Monitoring; Agriculture; Livestock; Works and Pasture Resources.

Responsibilities of PARC

Finance and administration department

The department is responsible for administrative and financial management of the



agency. It should liaise with the DPREMandE for financial assistance and should be responsible for receiving the money realized from sales of fodder seeds of the agency,

Extension services department

This department should be a link between the target population and the agency activities. The head of the department is capable to organize, educate and mobilize the rural communities into collective action on pasture and other relevant community development activities. The department should monitor the causes of inter communal conflicts between the farmers and herders with the means of finding a lasting solution.

Environmental monitoring department

The department is charged with the responsibility to collect meteorological, economic and social data at local government level and analyze them. The department also charged with the management of land resources and carry out occasional environmental impact assessment in the L.G.A.level and issues signals about possible conflict.

Agricultural department

This department works directly with DPREMandE for research in the introduction of new arable and fodder crop varieties.

Livestock department

This department should extend research findings at solving the problems of herders and general animal rearing in the area. The department should be charged with duties of identifying range lands and ways of maximizing their carrying capacities.

Since fishing is one of the most popular activities in the area, the department should also be charged with fisheries activities helping the farmers construct fish ponds and introduction of new fish species and formulation of cheap fish feeds. She should liaise with FRMP for financial and material assistance from both the state and federal governments.

Works department

The department is charged with maintenance of the PARC machinery and tools. It also works on technology aimed at improving the environment, production of fuel efficiency on local stores and solar energy harnessing those that are functional in the rural areas to reduce over utilization of fuel wood. It should also work on improvement of ox-drawn ploughs and cart using local materials, development of housing scheme using local materials, road development through self-help organization and portable water supply. This department should work directly with DPREMandE and jointly with extension services department.

Pasture resource department

The department shall work directly with DPREMandE and liaise with the National Animal

Production Research Institute (NAPRI) for genetic improvement of seeds of local fodder crops and diversify their potentials. The department is to establish community fodder seed production at strategic locations and over-see the maintenance of natural pasture reserves. Also, it should design and help to develop community and individual woodlots and extend the technology for harnessing fuel-wood on a sustained basis without much damage to the environment.

Structure and organisation of the model

These structures and organizations are government institutions and agencies for Rural Development, DPREMandE, LGAPDC, PARC and DPDC. The staff of the bodies is expected to be made up of government officials, the next two bodies are composed of members of the public who are to be organized in collective action (i.e. the target population). The two bodies are the village Pasture Development Committee (VPDC) and village Pasture Extension Agents (VPEA). They will have ten members from each village unit or units and the village extension agent. The village extension agent will be the secretary and the village extension agent reports to the APRC Social Services Department along with DPRMP extension agent.

At district level it also comprises ten elected members. The District Agroforestry Development Committee (DPDC) liaises with the VPDC. It is also linked with LGPDC through their respective chairmen acting as liaison officers. Both VAFDC and DAFDC provide input advice on policy needs before taking decisions.

Problems of operation, implementation and suggestion

The major operational problem of rural development model of this type is expected to include:

- i. Leadership particularly at the village and district levels;
- ii. Mistrust among members, especially of the leadership and
- iii. The adoption pace of the rural communities. Most problems associated with rural development are leadership, organizational framework and cultural conservatism (Kandawire, 1980).

From the organizational points of view, the model is structured to give a sound framework but the leadership roles may pose some problems especially at village and district levels. All interest groups should be well represented in leadership.

Finance

Recurrent costs should be paid by the LGA concerned while capital should be shared between Federal, State and Local Governments. The rural communities would be marking their contributions in kinds. Loans should be channelled



through the VPDC; it will also serve as guarantors for the loans.

CONCLUSION AND RECOMMENDATION

The model therefore aims to pool together the financial, material and human resources in the area for effective pasture development. These can be achieved by bringing all development agencies together and integrate their functions for effective development.

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