Community Based Breeding Programme

CBBP, Liberia (TCP/LIR/3502)

An FAO funded Project

Food and Agriculture Organization of the United Nations

Central Agricultural Research Institute (CARI)

CONSULTANCY REPORT #3

COMMUNITY BASED BREEDING PROGRAMME (CBBP, TCP/LIR/3502), LIBERIA

"Survey and Characterisation of Livestock Breeds and Their Production Systems in Liberia for the Development of a national Strategy and Action Plan for Animal Genetic Resources"

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This consultancy report is the official mission report to FAO produced during the course of a 20-day assignment in the month of October 2016 as International Consultant (Community Based Breeding Programmes) to the Food and Agriculture Organisation (FAO) project TCP/LIR/3502 in Liberia.

The International Consultant humbly acknowledges the help and cooperation given by staff of the Central Agricultural Research Institute (CARI), the Goat farmers of Bong, Nimba and Grand Bassa Counties of Liberia. In particular, the consultant's counterpart, Dr. Arthur Karnuah who is a very valuable and rich source of information and links the Project well with the Government's parent Ministry of Agriculture. The FAO Representative Liberia, and the Staff in the Regional Office were instrumental in logistically enabling the work to succeed.

The conclusions and recommendations presented here are instructed by the findings of the consultancy work and are not in any way by inference or otherwise the official policy of the Food and Agriculture Organization of the United Nations nor the Government of Liberia. The designations employed and the presentation of the material in this document is the informed opinion and perspective of the international consultant.

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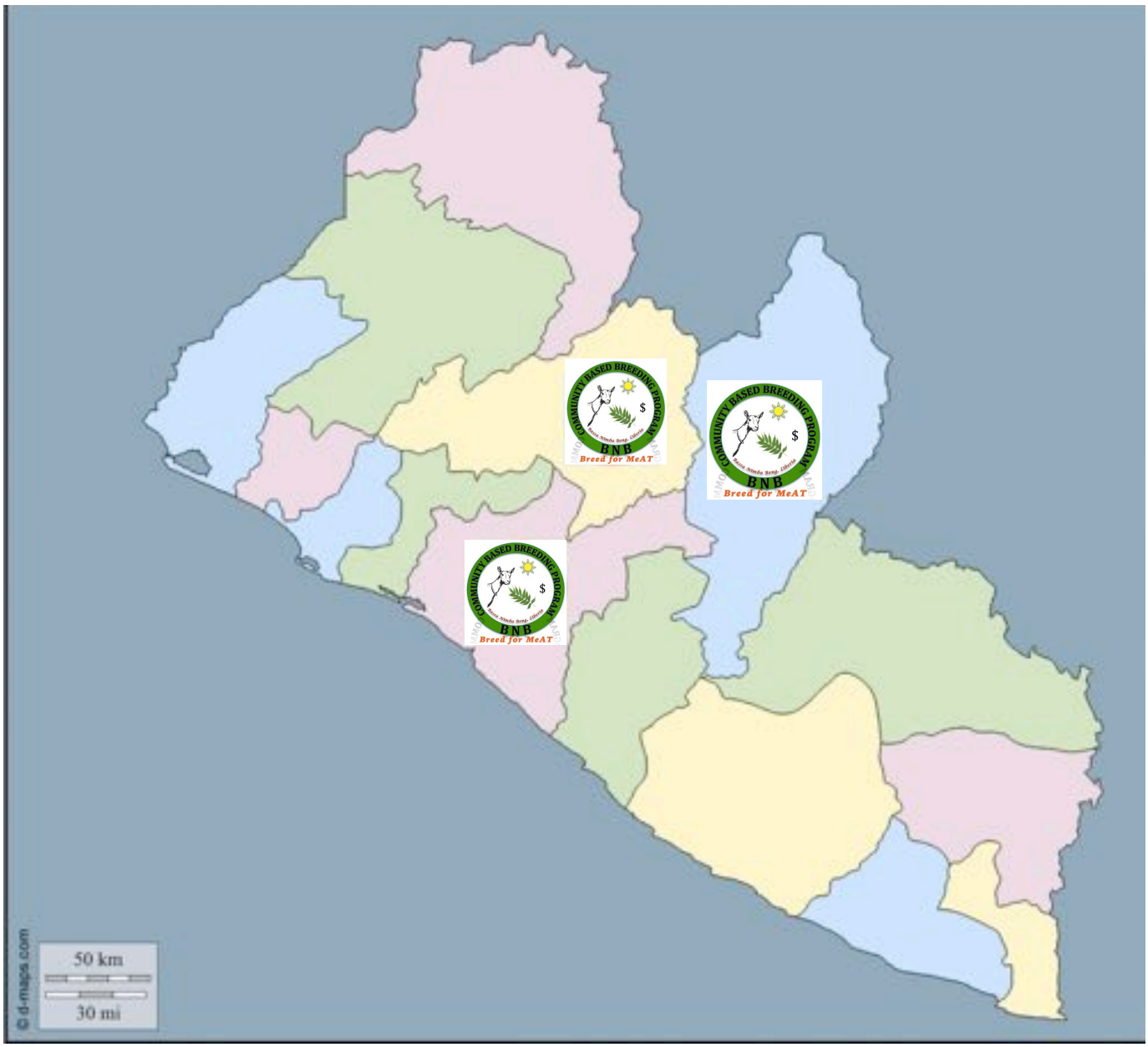

Figure 1. Map of Liberia: marked CBBP Counties, Bong, Nimba and Grand Bassa

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List of Acronyms

CARI	Central Agricultural Research Institute
CBBP	Community Based Breeding Programme
CBOGIL	Community Based Organisations for Genetic improvement of Livestock
ESGPIP	Ethiopia Sheep and Goat Productivity Improvement Program
FAO	Food and Agriculture Orgnaisation
FED	Food and Enterprise Development
GDP	Gross Domestic Product
NARS	National Agricultural research systems
NGO	Non-Governmental Orgnaisation
USAID	United States Aid
USDA	United States Department of Agriculture
WADG	West African Dwarf Goat

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Quote Box #1:

"We can complain because Rose-bushes have Thorns… or
…Rejoice because Thorn-bushes have Roses!"

President Abraham Lincoln,

1 Introduction

Leela Rosamond Andrews, is a post-graduate Alumni of the University of Nairobi, Kenya, her Thesis: "A situational analysis of livestock production in Liberia: A case study of Nimba, Bong and Montserrado counties" (Andrews, 2012). This work brings to light the potential of Liberia, despite the pitfalls that must be overcome. The current situation with livestock production resulted from a battery of contributing factors. Andrews (2012) indicates that livestock production has been the least prioritized bureau within the Ministry of Agriculture with an estimated 2 million ha of pastureland while accounting for a humble figure of 14% agricultural GDP. However, the consequences of this study require that livestock production be prioritized for livelihood creation. The major findings revealed that the livestock population in Liberia is increasing, with little input on farmer capacity building. The recommendations highlighted key platforms for change in the livestock sector, to prioritize actions on livestock development, enhance capacity of stakeholders, strengthening the actors and championing collective action. By 2011, action begun in major fronts in the livestock sector, specifically goat production. The USAID funded Feed and Enterprise Development (FED) project targeting major cash crops and goats injected much needed visibility of the livestock sector in Liberia (FED, 2014). The USDA-Land O" Lakes Goat Project aimed at revitalizing the livestock sector by introducing goat production, and improving meat processing safety and standards also contributed to the stratification of the meat value chain. In 2016, a state of the art

slaughterhouse was launched in Liberia, the Careysburg slaughterhouse (The Daily Observer, 2016). The pillars for sustainability of the meat value chain include constant supply of quality meat. Quality is a function of breeds and breeding. A natural progression towards engaging the meat producers to benefit from the emerging value chain is to encourage quantity and quality meat production. The Goat farmers, in this particular case, have been organised and are being trained to accommodate this goal and benefit from the meat value chain. A simple Goat project to increase both numbers and performance is therefore envisaged.

In developing economies, livestock improvement is achieved through an aggressive involvement of livestock owners. In most cases, these farmers are resource poor and marginalised. To effectively allow for ownership and sustainability of genetic improvement programmes, Community Based Breeding Programmes (CBBP) are designed. A good example is the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP) that launched the village breeding programme (ESGPIP, 2011). Village/Community based breeding programmes are organised breeding activities that are planned, designed and implemented by smallholder farmers individually or in cooperation with technical stakeholders to effect genetic improvement within their livestock.

The difficulty in readily accessing good breeds and quality genetic stock in Liberia has created a greater need for the establishment of a sustainable breeding program that is extensive/low input, small scale, and community' owned. The proposed community based breeding program focuses on indigenous breeds suited to smallholder conditions. The CBBP serves as a working model for Animal Genetic Resource management in Liberia to increase productivity and improve livelihood of livestock keepers. The

CBBP is envisaged to increase the productivity and profitability of indigenous breeds without undermining their resilience and genetic integrity, and without expensive interventions.

It is upon this background that this first report on the CBBP, with specific reference to Goat production in Liberia is presented. The international consultant was mandated to focus on the following main target areas (refer to Annex IV for details on the ToR);

- Train Local Staff and goat farmers on CBBP operating system
- Develop a criteria for selecting community for the CBBP
- Design the Community Based Breeding Programme for Goats

To achieve these outputs, the specific strategies employed were;

- Preparation of the overall project implementation and strategy plan
- To conduct home-based research on Goat Production, identifying secondary characteristics and routine data collection system
- Participatory development of Breeding Goals and establishment of a criteria for community selection and
- The evaluation of the CBBP design and strategy for implementation

1.1 Background Project information

The CBBP Liberia was scheduled for roll out in 2016 targeting goat farmers, in the wake of the value chain projects by USAID-FED, which encouraged and supported formation of communal goat rearing farmer groups. The overall objective of the program is to improve productivity and income of small-scale resource poor goat producers in Liberia by providing access to improved animals that respond to improved feeding and management, while facilitating and targeting specific market opportunities.

The specific objectives include;

1. Genetic improvement of goats – The West African Dwarf Goat (WADG).
2. To have a centralized within-breed selection and cross breeding programs.
3. To have local communities and institutions involved in the design, implementation and ownership of breeding strategies.
4. To improve productivity and increase income of goat producers

It is proposed that the breeding plan include the whole population of participating community flocks, separated into breeding and base populations with selection at the base population for the best males and females as replacement breeding stock. Under this structure, each farmer group will be responsible for some tasks such as performance recording, pedigree recording and rearing of male candidates. It is therefore expected at the end of this project that breeding goals defined in a participatory manner by farmers would be developed; a methodological framework for the development of community based breeding programs for smallholder producers with modalities of institutional arrangements designed; impact assessment of the breeding system at individual, flock, community and national level reported; and a better understanding of the constraints to market access by goat producers achieved.

1.2 The Project Strategy

1.2.1 Activity I: Characterisation and Identification of target breed of goat

The characterization and identification of goat farming communities-previously organized by Food Enterprise Development-USAID (FED) facilitated the selection and recruitment of Goat farming communities into the CBBP was accomplished and the target goat breed selected, the WADG. Goat farmers in three counties (Bong, Nimba and Bassa) were pre-selected for assessment and possible recruitment into the proposed

CBBP. In each of these counties, one farmer group will be recruited upon satisfying the selection criteria for participation in the proposed CBBP. The survey focused on cooperation, motivation and willingness among members of the goat farming community group. Assessment report from this activity is attached (Annex I).

1.2.2 Activity II: Designing CBBP Operating system and implementation strategy

Participatory approaches towards designing the breeding programme. Farmers to be involved in identifying appropriate breeding objectives and selection criteria for goats through capacity building training modules. Training to include village breeding programmes operationalization, goat management, breeding objective development, identification and recording of goats and goat performance, selection and mating as well as group dynamics. Three farmers from each selected farmer group representing the three counties will be assembled for training and in the setting up of the CBBP structure.

1.2.3 Activity III: Purchase of inputs (breeding animals and veterinary materials)

Purchase of breeding Bucks and veterinary materials is envisaged in support of the breeding programme. Farmers forfeiting opportunity to sale quality breeding animals for meat in the live goat markets would be compensated through the Buck/doe purchase programme to sustain the CBBP. Animal health as a pillar of any livestock production enterprise will be supported through the purchase of veterinary inputs and drugs.

1.2.4 Activity IV: Sustainability protocol

The institutional support to the CBBP will include capacity development and technical assistance as well as monitoring the CBBP program and implementing modification as need arises. The Central Agricultural Research Institute (CARI) is expected to spearhead this role.

Quote box #2:

"It is no coincidence that in countries where agriculture has taken off there have been large investments in research and infrastructure."

Kanayo Nwanze, (IFAD)

2 The CBBP-Liberia

The international consultant arrived on 5th October 2016 at Activity II of the general work plan to facilitate the launch of the Community Based Breeding Programme and to undertake the responsibility of training the actors and designing the CBBP operating system. In the first week of arrival, the consultative meetings between the consultant and FAO representative together with the CBBP Project Coordinator were accomplished in Monrovia. These meetings marked the official kick-off for this section of the Project. The tentative work-plan was developed for implementation during the consultancy period (Annex II). The first three days in Monrovia allowed for the international consultant to undergo security briefing for UN staff for purposes of issuance of UN Pass Identification Card. The Project coordinator travelled from Gbarnga to Monrovia for the consultative meetings to allow for pre-planning before the international consultant relocates to Gbarnga, the field operation station.

On the 8th of October 2016, the international consultant together with the Project Coordinator travelled to Gbarnga, CARI station to set up the Workstation for the current activities on the CBBP objective. The work-plan was reviewed and action taken to call and prepare the farmers for the follow-up field visits towards selecting farmer groups and consequently representative farmers for the Training on CBBP operating system. The

Ministry of Agriculture County Livestock Officers were contacted as technical support and included in the Training programme. To develop CARI capacity, six technical staff of the Department of Livestock and Fishery were recruited to participate in training.

Figure 2. CBBP Launch photo: The International Consultant, Dr. Rewe (Right) with the FAO Representative Liberia, Mr. Marc Abdalla (Centre) and the CBBP Project coordinator, Dr. Arthur Karnuah at FAO Offices, Monrovia Liberia (6th October 2016)

Field Station: Monday 10th October 2016

An office was assigned to the international Consultant at the CARI station in Gbarnga. Main activity; preparation of training materials for the CBBP operating system workshop and preliminary report writing; Review of project documents.

Field Visits to Goat Farmers' Associations:

Following Muller et al. (2015), the strategy to effectively design structure and orgnaisation of the CBBP require full participation of the main stakeholders, the farming community in understanding their production system and defining appropriate breeding objectives. The international consultant and the National project coordinator made field visits to potential candidate farmer groups for recruitment into the CBBP. The objectives of the visit were;

- To appreciate the assessment report and assess progress to date

- To discuss Goat quality, its preservation and multiplication
- To introduce the concept of breeding and breeding objective
- To score farmer group preparedness for the CBBP training workshop

To achieve this objective, a focused group discussion incorporating members of the farmer groups was organised during the field visits. The major highlights of these visits include the fact that the Goat structures and farm sites originally developed by the FED projects are generally well kept and the goats are communally managed.

Tuesday 11th October 2016

Two Farmer groups were visited on the 11th October 2016, Namely, Kukatonon and Kergeamah Goat farmers' associations. Table 1. below indicates the outcome of discussions with farmers in the two farms. The goat populations in both sites are stable, no major losses or increases in numbers. The membership has also remained stable, with just two additional members in Kukatonon group. A noticeable setback is the termite attack on the goat structures that threatens to destroy the pillars and potentially collapse the structures. The farmers were advised to apply locally available repellants and wood preservatives/treatments against termites. Both groups indicated that they would continue multiplying the goat population before embarking on sales to the market. Both groups also indicated that the goat is a "live bank", and that size and body condition are the main drivers of prices in the goat market. It was clear that the main consumers eventually utilize the goat for meat.

Table 1: CBBP Status of Kukatonon and Kergeamah farmer groups

Group discussions points	Kukatonon	Kergeamah
Comment generally on	Our goat population has reduced from	Membership has remained

your group progress so far	53 to 47 due to mortalities, even though some more kids have now been born. Our membership has increased by 2 to 23 (10 male and 13 female)	the same (13 members) and our goat population increased because of kidding. Our farm size is large so our goats have enough grazing areas. Although the numbers are still low at around 19.
Can you share your reason for keeping the goat	1. Income, for raising school fees and cash for use 2. Insurance, as "live banks" to mitigate against emergencies 3. As Gifts for community leaders 4. For use in cultural festivals	1. Income, for raising school fees and cash for use 2. Insurance, as "live banks" to mitigate against emergencies
When they buy your goat, what makes yours better than others?	1. Health	1. Health 2. Size
What do you consider as healthy goat	-	1. Good looking with good legs not emaciated and small
So the people buy your goat for what purpose?	- to keep for sale - to eat at festivals	- to keep for sale - to eat at festivals
How do they know you have the goat	- Make Radio announcement - We have a sign board on the road side	-
What makes your goat have value for meat?	-	- Size
When do you see your goat	- Seasonally, when there are festivals - However, when the Chines were here, they bought almost daily	- Seasonally, people come from as far as Monrovia
Which is the best	- One who can buy frequently	-

customer?	not seasonally	
Challenges?	- Doe leaf infestation at Goat Shelter - Termite attack on wood - Theft	- Termite attack on wood - Theft
Coping Mechanisms?	- Bush clearing and establishment of pasture - To apply oil on wood - Build watch-house inside Goat shelter area	- To apply oil on wood - Build watch-house inside Goat shelter area

Off The Field Experience:
During the deliberations on the importance of quality in goats and how quality must be preserved and multiplied as opposed to the selling of good animals that could reproduce and give out good offspring for sale and for breeding, one farmer remembered his experience with his Rooster, that was very productive and of higher quality than others yet he sold the Rooster to finance an emergent situation at that time, now he regrets because the Rooster currently in use is performing very poorly.

Figure 3. Farmer field visits. Clockwise: Kukatonon farmer group discussion; Kergeamah farmer group discussion; Grazing goats at Kergeamah goat shelter; Kukatonon farmers engaging the team

The information on both sites was then compiled and prepared for use in developing the overall criteria for recruiting the farmer groups into the

CBBP. The team of researchers reported back on station to prepare for the next visit to Nimba County.

Wednesday 12th October 2016

Two farmer groups visited were Yarwaseh and KpiekPoah Farmers associations in Nimba County. The Goat shelters are well maintained for these two groups, no sign of termite attack, but advised to apply wood protection. Table 2. below indicates the responses from the focus group discussions held in the two farms.

Table 2: CBBP Status: Yarwaseh and KpieKpoah Farmer groups

Group discussions Points	**Yarwaseh**	**KpiekPoah**
Comment generally on your group progress so far	Our goat population has reduced from 19 to 16 due to mortalities, even though some more kids have now been born. Our membership has remained the same at 31 members.	Membership has remained the same (24 members) and our goat population reduced because of deaths and sale. Our farm size is small so we have to cut feed and carry to our Goats. Although the numbers are still low (16)
Can you share your reason for keeping the goat	1. Income, for raising school fees and cash for use 2. Insurance, as "live banks" to mitigate against emergencies 3. For use in cultural festivals	1. Food for family 2. Income, for raising school fees and cash for use 3. Insurance, as "live banks" to mitigate against emergencies 4. For use in cultural festivals
When they buy your goat, what makes yours better than others?	1. Price 2. Size	1. Mature – more meat 2. Size
What do you consider as good goat?	-	1. Big goat
So the people buy your goat for what	- to keep for sale - to eat at festivals	- to keep for sale - to eat at festivals

purpose?		
How do they know you have the goat	-	-
What makes your goat have value for meat?	- Size	- Size
When do you see your goat	- Seasonally, when there are festivals - However, when the Chines were here, they bought almost daily	- Seasonally, people come from as far as Monrovia
Which is the best customer?	- One who can buy frequently not seasonally	- One who can buy frequently not seasonally
Challenges?	- Doe leaf infestation at Goat Shelter -	- Cut and carry, unsustainable with large flocks - No Buck at the moment
Coping Mechanisms?	- Bush clearing and establishment of pasture -	- Establish Pastures and browse at goat shelter area - Purchase a Buck

Notes:
The need for development of a goat products value chain to diversify the packaging of meat to ease access for local consumers who cannot purchase live goats at the current market price on a regular basis, and could readily afford goat meat sold in smaller packets.

The information from the two sites was compiled and prepared for use in developing the overall criteria for recruiting the farmer groups into the CBBP. The team of researchers reported back on station at CARI Gbarnga to prepare for the next visit to Grand Bassa County.

Figure 4: Farmer field visit: Above; National Project Coordinator at KpiekPoah goat shelter; Farmers concentrating on focus group discussions: Below; Group discussions at Yawaseh

13th October 2016

The international Consultant received a special invitation to the Weekly CARI Seminar presentation meeting. The CARI staff together with those of Africa Rice were present to share notes on the topic of interest. The International consultant presented on the Topic: Action Research and Development Projects: A Case study of the EADD Project in Kenya. The meeting was well attended with active participation. The take home message was holistic approaches towards problem solving research required interdisciplinary partnership and simple solutions applicable in the short run but with long-term consequences. The application of Action

research was noted as a driving factor in the success of community livestock breeding programmes.

Figure 5: The CBBP National Project Coordinator Concluding the Weekly Seminar Meeting after the Talk on Action Research and Development Projects by the International Consultant.

The team then embarked on the process of selecting farmer groups for invitation to the CBBP training workshop based on the information from the assessment reports and the field visits.

14th October 2016: Grand Bassa County

The two farmer groups visited were Neepuah and Morris Town Farmers associations in Grand Bassa County. The Goat shelters are well maintained for these two groups. Table 2. below outlines the responses from the focus group discussions held in the two farms.

Table 3: CBBP Status: Yarwaseh and KpieKpoah Farmer groups

Group discussions points	**Neepuah**	**Morris Town**
Comment generally on your group progress so far	Our goat population has increased from 40 to 46 due to new births. Our membership has remained the same at 15 members.	Membership has remained the same (20 members) with over 70 goats.
Can you share your reason for keeping the	1. Income, for raising school fees and cash for use	1. Income generation 2. Supply of breeding stock

goat	2. Insurance, as "live banks" to mitigate against emergencies 3. For use in cultural festivals	
When they buy your goat, what makes yours better than others?	3. Price 4. Size	1. Good Breeder
What do you consider as good goat?	- Big goat	- Good Breeder
So the people buy your goat for what purpose?	- to keep for sale - to eat at festivals	- Breeding stock - restocking
How do they know you have the goat	-	- Advertising
What makes your goat have value for meat?	- Size	- Good Breeder
When do you see your goat	- Seasonally, when there are festivals - However, when the Chines were here, they bought almost daily	- Often, - when projects need to assist other farmers
Which is the best customer?	- One who can buy frequently not seasonally	- NGOs -
Challenges?	- Doe leaf infestation at Goat Shelter	- Distance from the Market
Coping Mechanisms?	- Bush clearing and establishment of pasture	- Use Motor Bike

Figure 6: Farmer group discussion at the Goat shelter in Neepuah, Grand Bassa County

Notes:

The existence of a resource goat farmer in Grand Bassa County is a strength that could be exploited in progressing the long-term objectives of the CBBP. The information from the two sites was compiled and prepared for use in developing the overall criteria for recruiting the farmer groups into the CBBP.

3 Selection of CBBP farmers

Haile et al. (2011) proposed selection criteria for use in recruiting rural livestock keepers into a community based breeding programme. The selection criteria adopted here borrows much from the recommendation of the latter guidelines while adopting case specific criteria to suit local conditions. In this exercise, a simple evaluation tool was developed, namely, the CBBP Recruitment Matrix (CRM). The tool is composed of a table with various criteria depicting both necessary and important features of a farmers' group. The criteria were weighed by a factor of one (1) denoting Necessary, or 0.5 denoting important but not necessary. Farmer groups were evaluated on whether they exhibited the criteria (1=Yes)) or not (0=No) and the total score added objectively. Table 3. represents the CRM tool. The figures in the column after the criteria denote the weight of the criterion. The CRM tool was designed to reduce bias in selection of CBBP farmers so as to allow the farmers to appreciate inherent qualities that are necessary for breeding programmes. It is expected that farmers will learn from the information to improve their score. The results of this particular analysis are to be fed back to the farmers at the Training Workshop and during follow-up visits. The 5-day training workshop was scheduled from the 17th to the 21st of October 2016.

Table 4: CBBP Recruitment Matrix (CRM)

Criteria and weight		Bong		Nimba		Grand-Bassa	
		Kukatonon	Kergermah	Kpiekpoah	Yawaseh	Neepuahn	MorrisTown
Group organisation	1	1	1	1	1	1	1
participating in antagonistic projects	-3	0	0	0	0	0	1
Presence of community leaders in the group	1	1	0	1	0	0	0
Willing to commit and invest time and resources	1	1	1	1	1	1	1
Availability for training/capacity building	0.5	1	1	1	1	1	1
Farm accessibility	1	1	0	1	1	0	1
Market Access	0.5	1	0	1	1	1	1
Support from government or NGOs	0.5	0	0	0	0	0	1
Animal Population size	1	1	1	0	0	1	1
Market orientation	0.5	0	1	0	0	0	1
Feeding regime	1	0	1	0	0	1	1
Health care	0.5	1	1	0	1	0	1
Communication	1	1	1	1	1	1	1
Group Cooperation	1	1	1	1	1	1	1
Total Score		8.5	7.5	7	6.5	7	6.5
Remarks		SELECTED	RESERVED	SELECTED	RESERVED	SELECTED	RESOURCE

Source: Rewe and Karnuah, 2016

Key: Criteria Score weight: 0.5=important or 1=very important
1=Yes: Present, 0=No: Absent; reflects status of group with respect to criteria
Selected: Recruited for piloting CBBP; Reserved: Earmarked for out-scaling

Tip-Box: Using the tool

Insert the status of the Farmers group either one "1" or Zero "0" in their respective column against the criteria along each row. The tool multiplies the column value with the weight of the criterion. The total score is automatically calculated by the in-built formula. The farmer group with the highest score within competing groups is marked SELECTED. The unselected group is marked RESERVED in the Remarks section.

NB:

- *The weight of the Criterion is decided by the CBBP stakeholders and will depend on the specific conditions of the actors.*
- *The minimum score was set as 7 for this current scenario, this is also up to the discretion of the stakeholders*

4 The CBBP Training workshop

On the 17th October 2016, the CBBP stakeholders compromising, selected farmer groups, CARI and FAO technical converged for the CBBP training workshop with the main objective being consultative development of the CBBP operating system and the Strategic plan. Table 4 below depicts the workshop programme. It was envisaged that the farmers would consultatively develop the breeding objectives traits for the Goat breed of choice, identify the measurable selection criteria characters and Operationalise a simple genetic evaluation, selection and mating system.

Table 5: CBBP Training Workshop programme

CBBP-Training Workshop Programme

17th – 21st October 2016 CARI, Gbarnga, Liberia

DAY	TOPIC	Facilitator	Moderator
17th MONDAY MORNING	Official Opening Ceremony	Director General	Miss [illegible]
	Overview of the [illegible] Project of Liberia/CBBP	Dr. Arthur B. Karnuah	
	Goat Management (husbandry/[illegible])	Dr. Arthur B. Karnuah	
Lunch Break			
17th MONDAY AFTERNOON	Group Exercise – Unity in Strength	Dr. Rewe Thomas	Dr. Arthur B. Karnuah
	Goat Nutrition and Feeding	Mr. Edward [illegible]	
	What is Breeding?	Dr. Rewe Thomas	
RECESS			
18th TUESDAY MORNING	Goat health and disease management	Mr. Gregory [illegible]	Mr. Edward [illegible]
	CBBP Breeding / Structure of CBBP	Dr. Rewe Thomas	
	Resolutions		Dr. Arthur B. Karnuah
Lunch Break			
18th TUESDAY AFTERNOON	Goat Production (Products and [illegible])	Dr. Arthur B. Karnuah	Mr. Joel [illegible]
	Breed choice and Breeding objectives/Criteria	Dr. Rewe Thomas	
	Resolutions		Dr. Arthur B. Karnuah
RECESS			
19th WEDNESDAY MORNING	Goat Identification	Dr. Rewe Thomas	Mr. William [illegible]
	Performance Recording (hard and soft data)	Dr. Rewe Thomas	
	Resolutions		Dr. Arthur B. Karnuah
Lunch Break			
19th WEDNESDAY AFTERNOON	Practical: Routine husbandry practices	Mr. Edward [illegible]	Dr. Arthur B. Karnuah
	Practical: Identification and disease management	Mr. Gregory [illegible]	
RECESS			
20th THURSDAY MORNING	Goat evaluation and selection	Dr. Rewe Thomas	
			Dr. Arthur B. Karnuah
	Mating systems		
Lunch Break			
20th THURSDAY AFTERNOON	Strategic Plan	Dr. Rewe Thomas	
			Dr. Arthur B. Karnuah
	Goat Value Chain/Marketing options		
RECESS			
21st FRIDAY	FINAL RESOLUTIONS	Dr. Rewe Thomas	
	CERTIFICATION		Dr. Arthur B. Karnuah
	CLOSING CEREMONY	Dr. Arthur B. Karnuah	
LUNCH BREAK AND RECESS			

Day 1: 17th October 2016

The Deputy Director of CARI, Dr. Patrick Adebola, officially opened the CBBP Farmers' training workshop. The opening ceremony included a motivational talk by the Country Representative Africa-Rice, Dr. Inoussa Akintayo who narrated how his father educated him through income generated from livestock farming. The National Project Coordinator presented a brief overview of the Animal Genetic Resource Programme spearheaded by CARI and funded by the FAO. This important presentation set the stage for the introduction of the CBBP, and the Objective of the Training workshop, including a presentation on Goat Management.

Figure 7: Group photo of the CBBP Participants: Front row from left to right: A Farmer (Mr. Kallon) standing with the National project Coordinator (Dr. Karnuah), The Country Representative, AfricaRice (Dr. Akintayo), CARI, Head of Administration (Mrs. Kromah), CARI Deputy Director General (Dr. Adebola) and the FAO International Consultant (Dr. Rewe)

The Afternoon session included a Group exercise on "Unity is Strength". The participants competed in a "Treasure hunt" where 4 teammates leading four blindfolded teammates were required to find "The Treasure". The participants used this exercise to practically learn the principles of;

1. Communication – "not only talking but listening and following advise"
2. Cooperation – "Trust even those not known to you"
3. Unity – "work as a Team"
4. Common purpose – "Managing a common goal"

Figure 8: Group Exercise: "Treasure Hunt"

The participants were introduced to Goat Nutrition, with special mention of alternative feeding options in Liberia conditions. The lesson on introduction to Breeding was presented through a video depicting successful Goat production, a case study of Goat farmers in Kiambu,

Kenya. The farmers and other stakeholders discussed and reacted to the presentations in panel discussions.

The Goat farmers agreed their Goat of Choice; the West African Dwarf Goat is mainly a meat goat. The pillars sustaining production were classified as; Management, Feeding, Health and Breeding. The farmers agreed that all other pillars except Breeding could be introduced by human intervention. Breeding involved, to quote one farmer *"in-built God given quality"* which the participants were able to discover are called genes (genetics) and so would require special techniques to preserve, multiply and conserve. The farmers agreed that they most often sold their best animals therefore squandering quality and loosing production in their farms due to lack of knowledge. The farmers were brought to understand that mating and breeding are not one and the same thing; Mating results to reproduction but breeding results to genetic improvement. The concept of choice, because not all animals are the same, was articulated with participation from the plenary. The farmers agreed that quality to them would mean heavy animals (indicating meat) and more kids per doe (indicating reproductive efficiency). These discussions set the stage for the building of a common platform of action towards harnessing the benefits of Goat production through breeding i.e. the development of the Community Based Breeding Programme.

Day 2: 18th October 2016

The participants were trained on disease diagnosis and management, with practical examples applying indigenous knowledge of disease management in Goats. Group identity was then explained and the farmers empowered to begin the process of forming the organisation. The farmer groups learnt about branding organizations, developing a vision, mission and motto. An exercise on Logo design allowed the farmers to come up with the Logo for

the proposed organisation. The branding exercise required selection of different options from which the farmers collectively suggested the best name for their CBBP. Using the chosen name as the starting point, the farmers were then tasked with the mandate to design a Logo for the proposed orgnaisation. Figure 9. shows the list of suggested names, the highlighted name was chosen to read; **BNB**-CBBP, meaning, Bassa, Nimba, Bong – Community Based Breeding Programme. The Logo crafted out of this name is also presented in Figure 9.

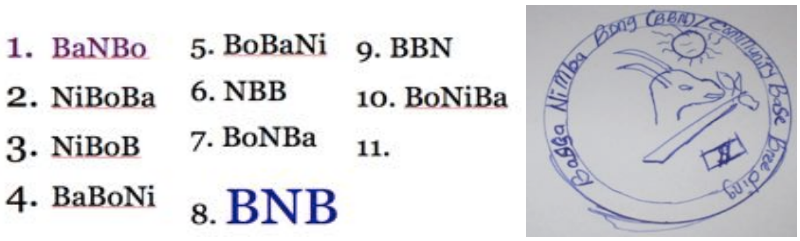


Figure 9: Liberia Goat farmers CBBP Names and suggested Logo for three pilot counties

The afternoon session introduced Goat production, to underscore the different breeds of Goats, the products from Goats, the Market and Marketing. The farmers were then required to develop the organizational structure of the newly formed BNB-CBBP. After deliberations, discussions, negotiations and lobbying the farmers agreed on three officials, namely:

1. Team Leader – Mr. Weylevue Guah (Nimba)
2. Group Secretary – Mr. Mussa A. Kallon (Bong)
3. Group Treasurer – Mrs. Patience Paye (Grand Bassa)

Figure 10. Farmers in prayer during their deliberations (right), selected team leaders (left)

The vision and mission as coined by the BNB members is presented below,

VISION: *Source of Quality Meat Goat for Livelihoods and Business*

MISSION: *To raise quality Meat Goats for farmer and market*

**MOTTO: Breed for MeAT – agreed on 20th October 2016*

The Motto for BNB-CBBP was not agreed upon on Day 2. The farmers retreated to discuss it and present the next day for discussion, approval and adoption.

The next phase of the training concentrated on articulating the Vision of the BNB-CBBP, through the definition of the *Breeding Objectives.* The farmers were introduced to the concept of traits and trait levels, and that reference to quality in breeding terms was basically a description of traits. The farmers and stakeholders in a participatory/all-inclusive process identified several traits considered important in goats as presented in figure 11. This was then followed by associating the traits with the vision for their organisation, allowing the farmers to knock out unnecessary traits and select the most economic traits towards their vision. Two categories of traits were agreed upon; breeding objective traits and selection criteria traits or characters.

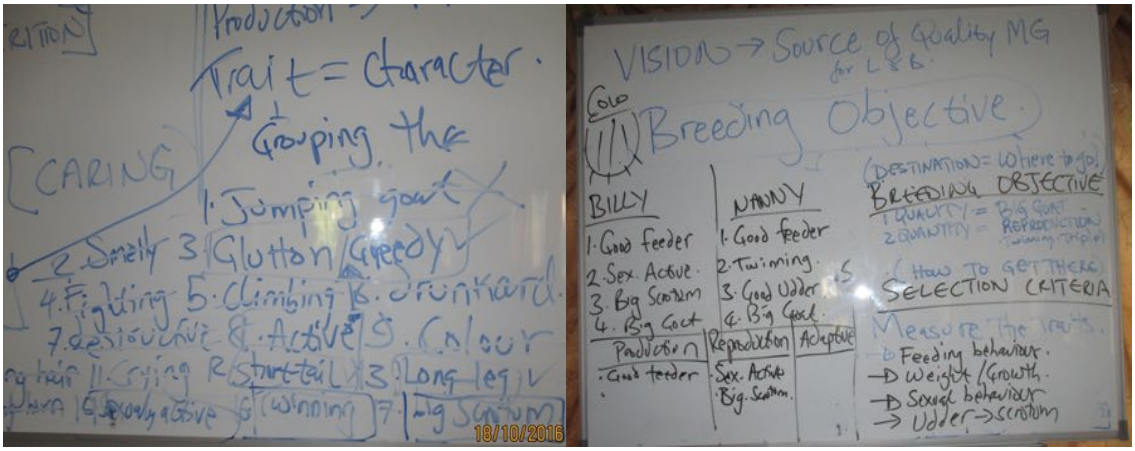


Figure 11: Goat traits as enumerated by farmers and stakeholders

The farmers were then tasked with the assignment to draw and present their visual perceptions of the traits and trait levels. This assignment was expected to take time, and therefore, was expected on Day 3 of the workshop.

Day 3: 19th October 2016

Participants performed exercises of towards identifying traits during the morning session using drawings; these drawings were assembled and synthesized to highlight the process of trait identification and trait measurement. The training now focused on purpose of trait identification, which is; to distinguish performance of animals based on those traits. This required the proper identification of the animals under scrutiny to allow for assigning performance to an individual.

An interactive training on unique identification of animals was done, farmers shared on their indigenous techniques of animal identification, which included, simple ear notching and neck strings. The main purpose for goat identification practice was reported as tracing ownership. This concept was extending to include tracing performance of goats. Basic animal identification methods were discussed; tattooing, branding, ear notching and ear tags. The coloured neck string method was considered very simple and effective for village conditions for purposes of tracing genealogy. The farmers rated the methods and considered ear tags over most other methods based on practicability and animal welfare.

The process of recording as well as farm records was articulated through a group exercise where farmers in three groups were tasked with inputting information into a typical animal record. Figure 12. shows the activity of recording that resulted into the appreciation of animal recording as a necessary requirement for selection.

Figure 12: Animal recording exercise during the Training Workshop

The afternoon session was a practical session; the farmers were shown the Goat quarantine facility at CARI, which has now been reconstructed as a nucleus breeding flock shelter. The practicals demonstrated were, animal housing and sanitation, disease diagnosis and treatment, animal feeding and animal identification. The demonstration on preparation of mineral lick with locally available material was moved to Day 4 because of time constraints. Figure 13. Depicts the practical sessions at the Quarantine facility at CARI. The shelter is currently not in use, the physical facilities on the ground are well established and offers an opportunity for a national Buck testing station.

Figure 13: Practical sessions at the Goat Quarantine Shelter, CARI

The training session ended before the farmers could confirm the motto they had chosen for their CBBP. This was expected in the following session.

Day 4: 20th October 2016

The main focus of day 4 was Performance evaluation and the importance of the breeding objectives and the selection criteria in the process of goat evaluation. The farmers were tasked with different exercises to experience the challenging task of evaluation. The critical role of animal records was demonstrated when participants were presented with pictures of animals to evaluate without information, when the information on the animals was added the farmers changed their choices. This indicated to the participants the importance of information in the process of animal evaluation. The farmers also used the opportunity to announce their new Motto: "***Breed for MeAT"***, where the word MeAT is both in reference to *meat* as well as an abbreviation for *Meat Agribusiness and Trade* – to read; "*Breed for Meat Agribusiness and Trade*".

The Breeding Objectives for the BNB-CBBP developed as at 20th October 2016 through Participatory discussions and demonstrations are:

1. **Mature Weight (agreed at 7 months/Bucks and 6 months/Does)**
2. **Reproductive efficiency**

The selection criteria traits to be recorded were agreed upon as:

1. **Birth weight – to be measured using a simple weighing scale**
2. **Weaning weight – to be measured using a simple weighing scale**
3. **Kidding rate (twinning, triplet, quadruplet) – measured by observation**
4. **Body conformation: Udder confirmation, Scrotal size – measured by observation, physical structure, appearance and size**
5. **Mature body weight – Measured by heart/girth meter**
6. **Good feeder – feeding behavior**
7. **Good mother – kid care and suckling**

Choice cards depicting trait levels were designed to help the farmer group members appreciate the selection criteria. Figure 14. shows the illustration of the selection criteria, to be used as a guide in Buck and Doe selection.

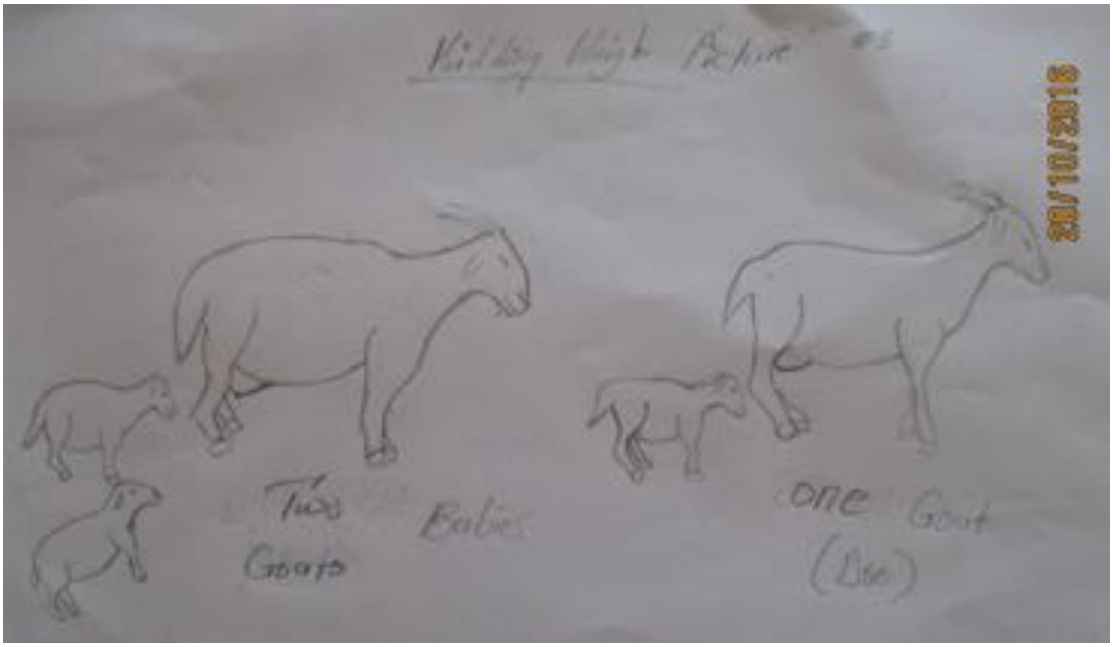


Figure 14: Choice card depicting alternate levels of the selection criteria, kidding rate

The farmers then participated in designing the breeding scheme. After deliberations as BNB-CBBP, the farmers agreed to start with one Buck and five Does in the breeding flocks in each of the three participating goat shelters. The base population was not limited, but the starting population of the breeding flock was set at one Buck and five Does. The farmers proposed an open nucleus-breeding scheme having understood that good goats from the base population could supply much needed genetic boost in the nucleus/breeding flocks.

A very important task in the training included the analysis of the meat goat value chain. The workshop participants were organised into an

"innovation platform" and ideas were shared on how to develop an efficient meat goat value chain to support the BNB-CBBP long-term objectives. The options discussed towards building a working model for the meat goat value chain were;

- Developing a regular goat auction market
- Developing a local butchery
- Developing a goat meat pepper soup business
- Developing a refrigerated slaughter house

The participants were finally introduced to Strategic planning, and were tasked with developing a short-term strategic plan to kick-start the work of the BNB-CBBP. The farmers agreed to present a plan during the closing ceremony to be held on Day 5.

Figure 15: Goat evaluation and mineral mix preparation by BNB-CBBP farmers at CARI, Liberia

The participants were then brought to the field station, to perform a task of selecting among three Does and two Bucks. The exercise proved very

fruitful with farmers exercising newly learnt skills to score the goats. A demonstration on preparation of mineral lick block was done by farmers with the help of facilitators (Figure 15).

Day 5: 21st October 2016

The final day of the training workshop was designed to allow the farmers to have their first meeting as a breeding organisation. The fist task was to develop a short-term plan of action. Table 6. is the outcome of the first meeting deliberations that produced the short-term plan for the BNB-CBBP.

Table 6. The BNB-CBBP short term strategic plan

N0	ACTIVITIES	RESPONSIBILITY	SUPPORT	TIMELINE
1	Launch of BNB-CBBP	BNB	CARI, FAO	Oct, 2016
2	Formation of BNB structure	BNB	BNB	Jan. 2017
3	Preparation of constitution	BNB Members	CARI/ MOA	Nov., 2016
4	Preparation of a bill board	BNB	CARI	Dec. 2016
5	Securing of office	BNB/CARI	CARI	April, 2017
6	Registration of BNB as CBO	BNB/MOJ	BNB	Jan. 2017
7	Recruitment of new farmers	BNB	BNB	April, 2017
8	Training for newly recruits	BNB	CARI	May, 2017
9	Management Training for leaders	CARI/MOA	CARI	Nov. , 2017
10	Construction of structures for breeding	New recruits	BNB	May, 2017
11	Buck and doe selection	BNB/MOA	CARI	Nov 2016
12	Mating begins	BNB	BNB	Nov 2016
13	Opening of bank account	BNB	BNB	Feb. 2017
14	Creating a website/email	BNB/CARI/MOA	CARI/MOA	Nov 2018
15	Goat fare/Auction	BNB/CARI/MOA	CARI/MOA	Dec, 2018

The farmers received constructive criticisms on their strategic plan, to allow for plans that were actually achievable in the short run. The consultative talks expressed concern with immediate recruitment of new farmers into the CBBP, it was agreed that the formation of the breeding flocks among the current group of farmers selected to pilot the CBBP be prioritized, to allow for identification and recording before a full scale farmer recruitment exercise commences. The BNB-

CBBP agreed on the proposed logo for the organisation, with minor adjustments, which were done and completed (Figure 16).

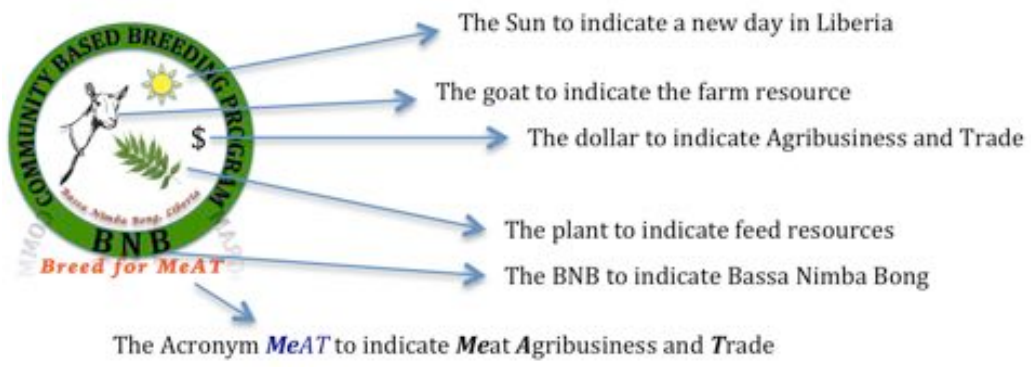


Figure 16: BNB-CBBP Logo

The meeting was followed by the Certificate issuance ceremony, officiated by the acting officer in charge-deputy director general/CARI, Dr. Quaqua Mulbah assisted by the Chief Administrator, Mrs. Abibatu Kromah, Head post harvest and value addition/CARI.

Figure 17: The Interim Group Secretary, BNB-CBBP receiving his certificate from Mrs. Kromah

The official closing ceremony was then conducted with speeches from the representative Ministry of Agriculture, Mr. Edmond Grieves (county coordinator of agriculture/Grand cape Mount County), International Consultant and the National Project Coordinator. The Team leader BNB-CBBP administered a closing prayer.

4.1 On-farm selection trials

To verify the effectiveness of the one week training workshop, on-farm selection field trials were done. The farmer groups were tasked with the responsibility of forming the nucleus flocks. The process of recruiting the nucleus Buck and five nucleus Does was witnessed by the National Project coordinator together with the international consultant. The farmers used their choice cards with drawings of the selection criteria to communicate the trait levels to all participating members. The main strategy was live goat evaluation with memory-based records as additional information. The farmers were then required to identify the nucleus animals using ear tags. It was recommended that kids born to the nucleus Does must be identified and their records taken. Initially these kids will be identified using coloured neck strings in reference to their Does, since only one Buck will be in use. Eventually, all the nucleus flocks will be ear tagged. The animal registers as well as the production and reproduction record were introduced. All goats in the flock (nucleus and base) are to be recorded in the animal register. The production and reproduction record was prepared for recording the kids expected from the nucleus Does.

Figure 18: Selection field trials at Kukatonon farmers group

5 The CBBP working model

The information from the initial assessment as well as the follow-up farm visits was used in objectively selecting farmers for the CBBP. The following section reports the results of this evaluation and the outcome of the Training workshop that was used as a platform to consolidate the CBBP structure as well as drawing the strategic plan for operationalization of the CBBP.

5.1 Farmer-group recruitment criteria

The CBBP Recruitment Matrix (CRM, Table 4.) developed under the current scenario of Liberian goat farmers should be employed as a selection criteria tool. The motivation is to render the evaluation as objective as possible so at to incorporate qualities that would have the highest chance of successful implementation of the CBBP. The CRM tool was used to select among 6 farmers, two from each of the target counties.

As at October 2016, the BNB-CBBP membership is made up of goat farmer groups selected in the pilot exercise to spearhead the formation and the implementation of a community based goat breeding programme. The farmer groups are;

1. Kukatonon goat farmers' group; Bong County, 47 Goats
2. Neepuah goat farmers' group; Grand Bassa County, 46 Goats
3. KpiekPoah goat farmers' group; Nimba County, 16 Goats

5.2 The Breeding, production and marketing systems

Breeding system: It was noted that all farmers have the West African dwarf goat. They practice pure-breeding based on the West African dwarf goat under natural mating.

Production system: The farmer groups practice Semi-intensive system, with night shelter and day grazing/browsing for goats. Goats are also

supplemented at the shelter from cuttings of different browse feed. The health care support services are expected from the locally trained community health workers with assistance from the County government livestock staff.

Figure 19: A typical west African dwarf goat at a goat shelter, Neepuah, Liberia

Marketing system: The markets are traditional systems, mostly reliant on seasonal markets related to festivals and cultural events. The BNB-CBBP has an objective is to develop a regular market for meat goats through the development of a meat goat value chain.

5.3 Branding and Structure of the CBBP

An artist impression of the BNB-CBBP logo is presented in Figure 20. The proposed template was approved in the first meeting of the BNB-CBBP, Liberia on the 21st October 2016 at the CARI-CBBP training workshop. The farmers agreed that they are goat farmers, raising quality breeding goats as well as meat goats for the market. The BNB-CBBP leadership has three interim officials mandated to coordinate the implementation of the CBBP operating system within the target zones with the view to expand as more farmers are recruited into the CBBP in the future. The

leadership is composed of a Team-Leader (Mr. Guah), Group Secretary (Mr. Kellon) and Group Treasurer (Mrs. Paye). The offices of the BNB-CBBP shall be located at the goat shelters in the initial phase of the implementation plan.

Figure 20: approved Logo of BNB-CBBP

5.4 The CBBP Operating system

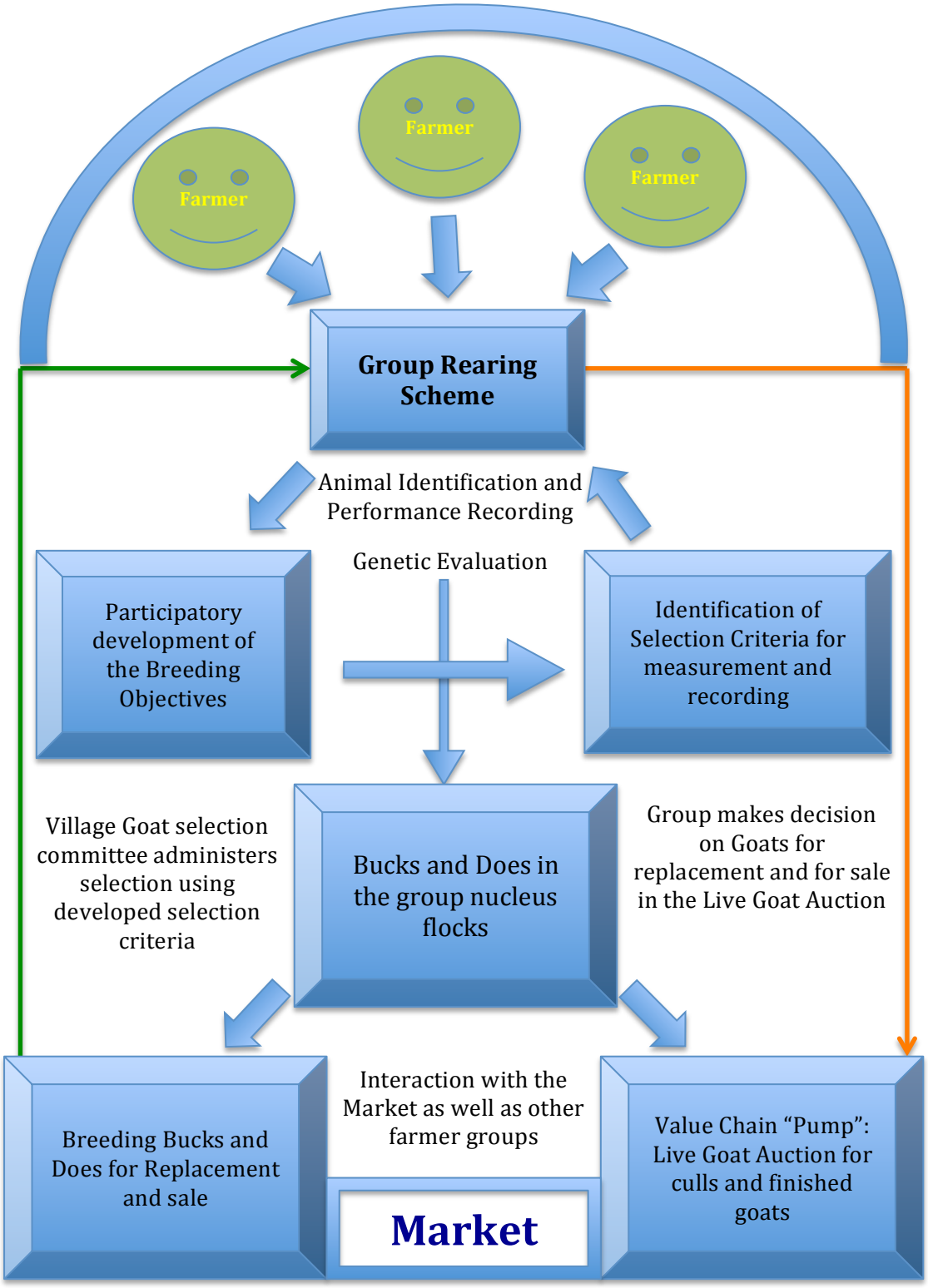


Figure 21: The CBBP Operating System

6 The CBBP Strategic Plan

The farmers were assisted to develop the BNB-CBBP farmers' handbook in an interactive session during the training workshop. All the farmers' decisions were captured through resolutions that were recorded in the farmers' handbook. The BNB-CBBP strategic plan was discussed and documented here as Table 6. Below is an upgraded proposed strategic plan for use by technical partners in planning interventions towards empowering the CBBP.

Table 7: BNB-CBBP Strategic plan

BNB-CBBP Description	Responsibility	Partners	Indicators	Source of Verification	Timeline	Proposed Support
Overall Objective: Source of Quality Meat Goats for Agriculture and Business	BNB-CBBP	CARI MoA	Increased Population of, Availability and access to Quality Meat Goats Developed Meat Goat Value Chain	BNB-CBBP Market research	A going concern Continuous process	CARI, FAO MoA Strategic development partners
Purpose: To Breed quality Meat Goats	BNB-CBBP	CARI	Quality Bucks and Does	BNB-CBBP	in 5 years	CARI, FAO, MoA
Activities						
A1: Farmer recruitment	BNB-CBBP	CARI	Membership	BNB-CBBP	By end of October 2016	CARI, FAO
A2: Farmer Training	CARI	CARI	Farmers using information	BNB-CBBP	By end of October 2016	CARI, FAO
A3: Breeding objective/ selection criteria development	BNB-CBBP	CARI	Choice Cards	BNB-CBBP	By end of November 2016	CARI
A4: Animal Identification and Recording	BNB-CBBP CARI	CARI	Animal Identification Tags, Farm records	BNB-CBBP	By end of November 2016	CARI, FAO
A5: Goat evaluation and selection	BNB-CBBP	CARI	Quality Bucks and Does	BNB-CBBP	By end of December 2016	CARI

A6: Breeding scheme Implementation (Buck movement and evaluation)	BNB-CBBP	CARI	Breeding flocks (nucleus),	BNB-CBBP	By end of December 2016	CARI
A7: Breeding scheme monitoring and evaluation	BNB-CBBP	CARI	Buck rotation and replacement	BNB-CBBP	In 3 years	BNB-CBBP CARI
A7-1: Genetic evaluation (data analysis)	CARI BNB-CBBP	University?	Genetic and phenotypic parameters for growth and reproduction traits	BNB-CBBP	In 3 years	CARI
A7-2: Flock health (veterinary supplies)	MoA BNB-CBBP	Veterinary practitioners	Treatment and mortalities	BNB-CBBP	From November 2016	CARI, FAO Strategic Partner
A7-3: Identification and recording inputs (ear tags, weighing scales)	BNB-CBBP CARI	CARI	Animal identification and production data	BNB-CBBP	From November 2016	CARI, FAO Strategic Partner
A7-4: Buck station/ centralised Nucleus flock	CARI BNB-CBBP	CARI	Test Bucks in central nucleus flocks	CARI	Planned	Strategic partner
A7-5: Goat meat value chain analysis and development	BNB-CBBP CARI	CARI	Alternative marketing options	BNB-CBBP	Planned	Strategic partner

Quote box #3:

"If the towns-people are happy, ... look for the Chief!."

"Don't look where you fell, ... But where you slipped!"

When building a house, … don't measure the timber in the forest!"

Liberian Proverbs

7 Concluding remarks

The sustainability of the CBBPs would require appreciation of the strengths, weaknesses, opportunities and threats, which are briefly highlighted herein. The SWOT analysis is informed by the National Strategy and Action for Animal Genetic Resources (AnGR) Report (Annex I) for Liberia as well as the information gathered by the international consultant during the field work.

Strengths

- Well built goat shelters
- Group goat rearing schemes
- Farmers' Organisations

Weaknesses

- Illiteracy levels
- Infrastructure (market access)

Opportunities

- Goat quarantine shelter at CARI, potential for central nucleus flocks
- Relationship with CARI (Centralised recording system options)
- Meat goat value chain development

Threats

- Cultural rights on goat ownership and use
- Profit and loss sharing
- Compensation mechanisms (in case of goat mortalitiy)
- Buck rearing, castration and feeding

7.1 Recommendations

- The CBBP should commence gradually beginning with the BNB-CBBP, with deliberate monitoring and evaluation mechanisms. To begin the cooperate goat breeding scheme, each participating group to be supported with **a Buck** and **five Does** owned by the BNB-CBBP to remove the risk of sudden withdrawal of good animals from the breeding flocks due to individual ownership by farmers.

- The BNB-CBBP should be modeled as a decentralized nucleus breeding programme and should be supported to develop capacity for out-scaling to recruit other farmers in their counties to participate in the CBBP.
- Separation of non-nucleus Bucks to be introduced using a more acceptable alternative to castration, indications show resistance to castration by individual goat owners. A Buck enclosure could be included in the goat shelters. The CBBPs should slowly release extra Bucks to the market to reduce burden on feed resources as they adhere to the breeding plan.
- CARI, should take on the responsibility of data banking, by collecting regularly the farm records from the three sites for inputting in computer based animal recording system. This will allow for monitoring of inbreeding levels and implementation of an effective Buck exchange strategy within the participating groups.
- CARI should be given capacity to have animal recording software (e.g. Breed Elite, Goat Manager 007 among similar options)
- The BNB-CBBP model should be replicated in other counties towards engaging all goat farmers in Liberia.
- The CBBPs in different county-groups should be encouraged and supported to join a National Breeding Programme in future with centralised recording system.
- Animal Breeding post-graduate programmes should be launched in Liberia to encourage partnership between Universities and CBBPs.

7.2 Road-Map to National Livestock Breeding programmes

According to the National Strategy and Plan of Action for Animal Genetic Resources (AnGR) for Liberia (NSPA, 2016), specifically, the Strategic Priority Area 2, mention is made for Sustainable use and Development of Farm AnGR. The responsibilities for various arms of government and community are listed and include responsibilities for Individual Livestock Owner. A major resolution

made towards the strategic plan of action that is of interest towards the development of livestock breeding programme is Resolution #3:

Resolutions
3. Currently, the five livestock and poultry species (cattle, goat, sheep, pig and chicken) are considered top in terms of population, diversity and contribution to the national food, environment and livelihood security. Therefore, we propose that these species be declared as BIG FIVE of Liberia. (NSPA, 2016)

This resolution is mandated for action under activity six of the Action plan

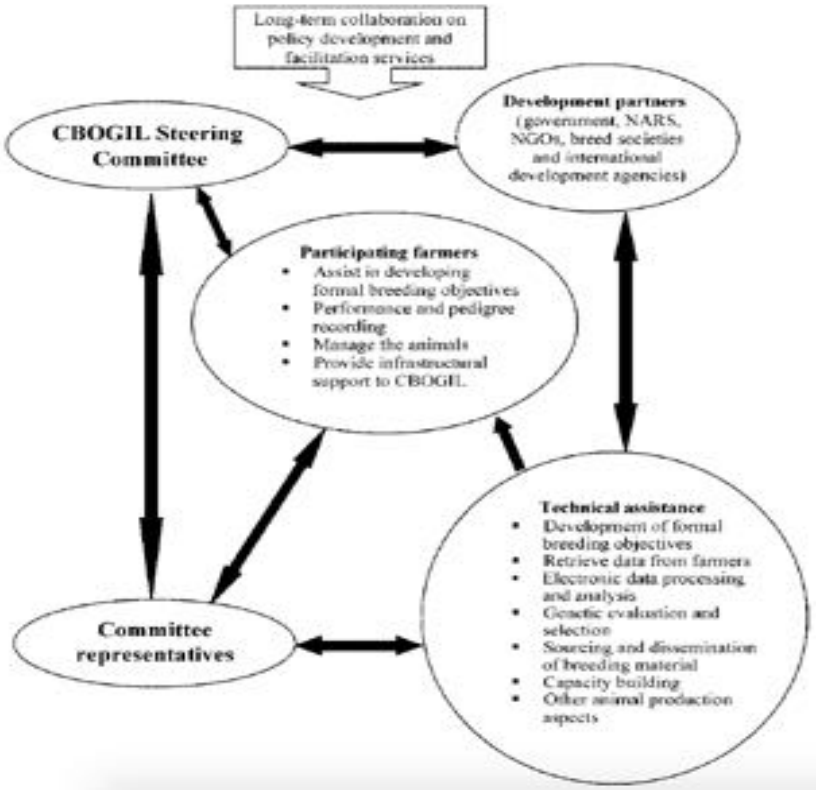
6	Local organization/institutions such as Breed Societies and Animal Welfare Societies should be created and strengthened for all the breeds to provide better inputs and marketing for the livestock owners.	*Some efforts should be made by the Government and livestock farmers to establish Breed societies and action taken by providing some funds to strengthen this activity.*

The implementation of this priority towards sustainable use of the "Big Five" of Liberia requires the establishment of a Livestock Breeding Programmes for these species of interest. The current project on CBBPs for goat farmers should be a prototype of what is possible when all partners acknowledge the need for livestock producers to take full responsibility for their resource. Using this current example, the formations of CBBPs combining at least three (3) counties into a working group will eventually lead to formation of at least five (5) CBBPs for goat farmers in Liberia. The CBBPs would be expected to function as decentralized nucleus supporting their local operations. However, it is expected from the outset that there will be interactions between the CBBPs especially in the exchange of Bucks as a means of reducing the rate of inbreeding. Since the main function for the CBBPs is genetic improvement, then identification and recording of animal performance is inevitable. At a local scale, using simple choice cards, farmers could easily do performance evaluation upon agreeing on the breeding objective and

selection criteria. Simple records can be kept on the farm to inform this process of animal evaluation. However, for a generalized breeding programme affecting the entire country, a strategy for centralised recording is required. Table 8 and figure 21 show the tasks and the expected implementers within a livestock breeding programme.

Table 8: Description of tasks within livestock breeding programmes

Activities	Information and facilities	Potential sources
Description of animal functions (breeding goals)	Livelihood function of the animals Primary traits related to livelihood functions Genetic characters supporting primary traits	Farmers Farmers/experts Farmers/experts
Animal performance and pedigree recording	Characters to be measured Measuring tools Recording stationery (animal cards) Computer hardware and software Electronic data entry	Farmers/experts Farmers/development partners Farmers/development partners Development partners Farmers/development partners
Genetic evaluation and selection	Visual appraisal Genetic evaluation software Data processing and analysis	Farmers Development partners Trained CBOGIL member/expert
Mating systems/dissemination of superior genetics	Breeding males Semen, especially dairy bucks Storage and transport facilities	Farmers Trained CBOGIL member/expert Farmers/development partners



*CBOGIL-Community Based Organisations for Genetic improvement of Livestock

Figure 22: Institutional interaction during implementation of livestock breeding programmes (Kahi et al 2005)

The management of livestock breeding programmes requires institutional arrangement where specially assigned tasks in the operating system are handled by the mandated institution. In most developing countries where these institutions exist, there have been roles for both government agencies and livestock breed societies. The main tasks carried out in a breeding programme include;

- Description of animal functions (Breeding Goals)
- Maintenance of the Herd Book – Animal Register and performance records
- Genetic evaluation and selection
- Dissemination of superior genetics

Examples in other developing countries indicate that institutional capacity is key to the management of livestock genetic programmes (Figure 23).

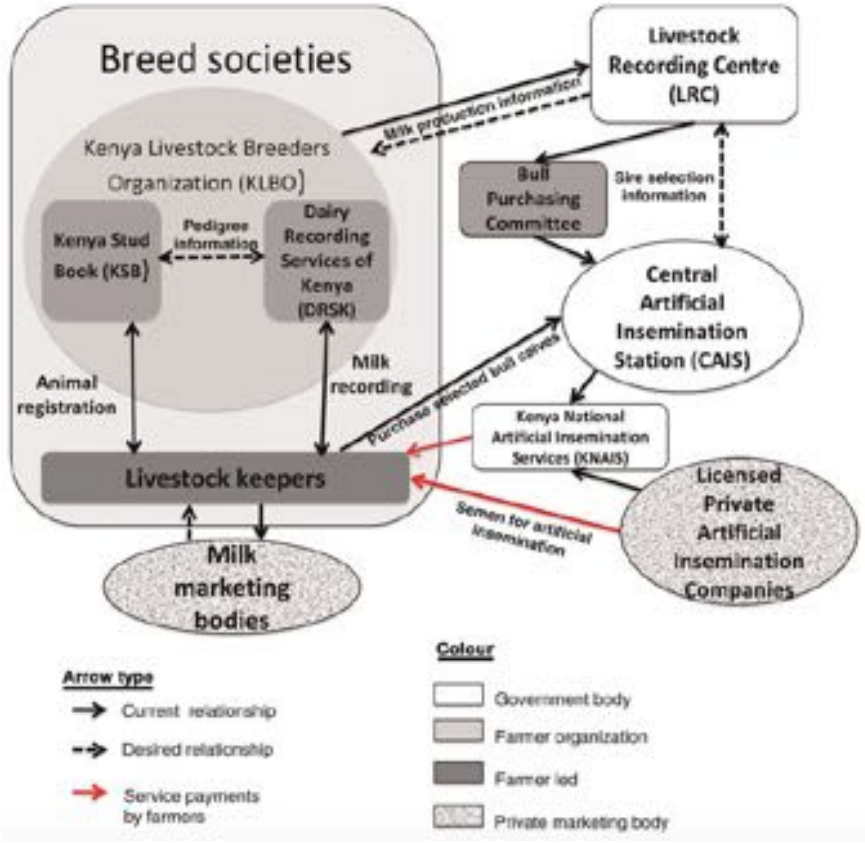
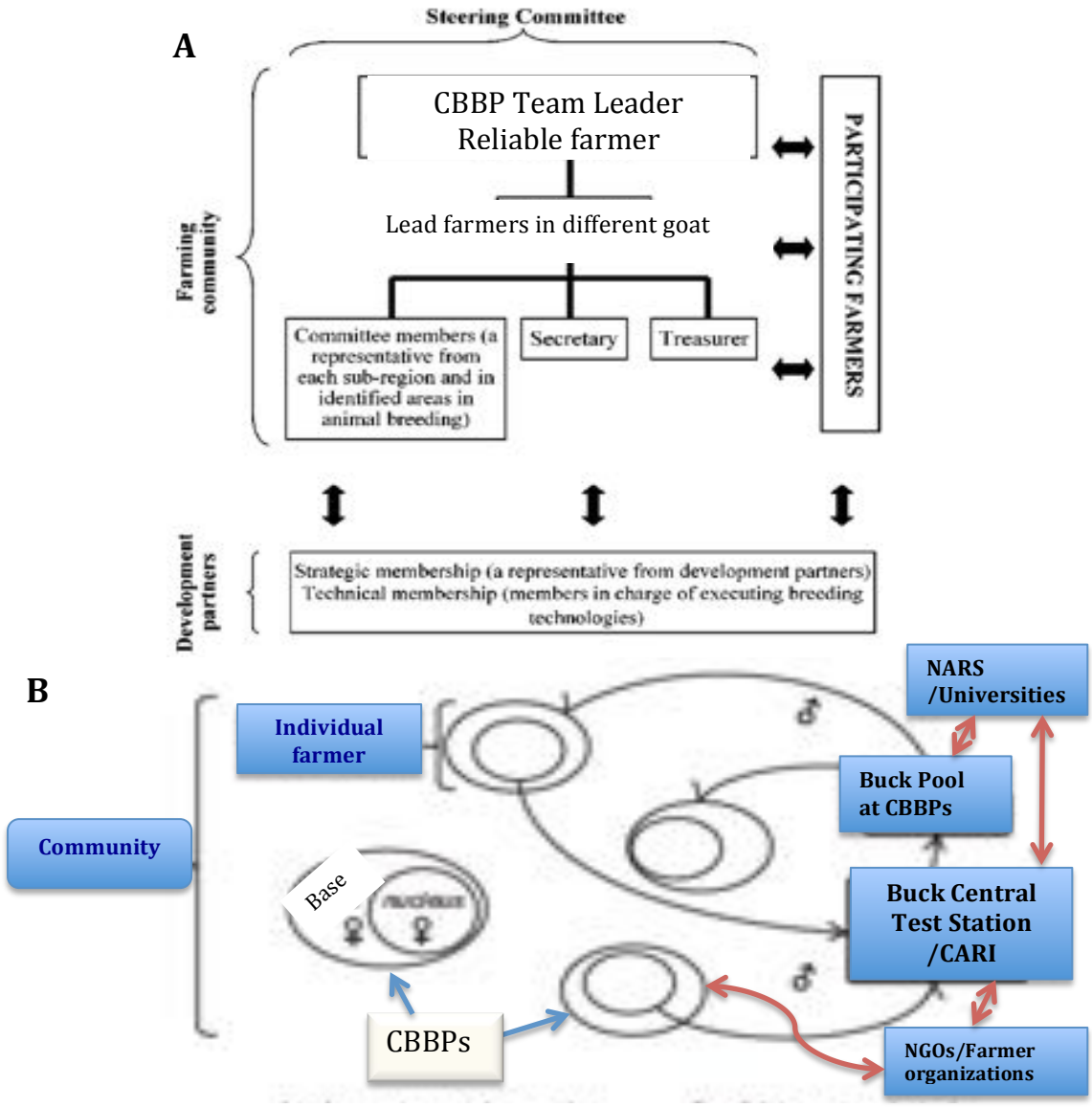


Figure 23: Institutional framework for Dairy recording system in Kenya (adopted from Kosgey et al., 2100)

The interactions of actors in these systems are most often suboptimal, however, the existence of the institutions drive the livestock industry towards organised breeding programmes as indicated in figure 24 below.



*NARS-National Agricultural Research Systems

Figure 24: Structure and actions of a typical CBBP (A); Proposed operating system for a National breeding programme for goats (B); (Adopted and modified from Kahi 2005 and Haile et al 2011)

In Liberia, the BNB-CBBP that has been launched follows the basic recommendation for community based breeding programmes as portrayed in

Figure 24A. Figure 24B reveals a proposed breeding programme for national goat recording scheme. It is recommended that farmer driven and government driven institutions be formed to undertake the vital tasks within the livestock breeding programme. This synergy is necessary in the operating system to allow for the realization of the long-term goals of the breeding programmes. Establishing the operations of a National Livestock Breeding Programme requires that infrastructural and human capacities be developed at the National level then devolved to the individual CBBPs. Focus should be on utilising traditional genetic improvement techniques that require less investment in the form of infrastructure and human capacity. The tasks that farmers may not be able to perform but are necessary for proper functioning of the breeding programme include;

- Electronic data recording
- Genetic evaluation using breeding value estimates

In the CBBPs rarely will the farmers use estimated breeding values for selection, or rather, the breeding value of an animal will most often be a result of qualification by observation with limited information from records. However, the overall information from the decentralized nuclei from all the participating CBBPs could be channeled to the government agency responsible for data storage and management, for instance, Department of Livestock research at CARI. It is suggested here that a university partner would be very essential for the growth of the CBBPs, especially at the national level, to allow for the capacity building of technical support towards production of genetic and phenotypic parameters for use in estimation of breeding values.

It is my humble opinion that the survival of the CBBPs is dependent not only on the national coordination but also on the operationalization of the Goat meat Value chain. Breeding quality meat goats means production of quality meat, which eventually must reach the market. Without regular

sustained market access the motivation to invest in the CBBPs will be threatened. A value chain for goat meat outside the common operating models should be developed. Several suggestions have been made towards this objective, e.g. to introduce local goat butcheries, or recruit goat-meat pepper-soup women groups to act as marketing channels. Innovation platforms are therefore encouraged to unlock market potential of the meat goat beyond traditional marketing channels. Improved returns from goat business will be a pre-requisite for investment in the CBBPs and their eventual sustainability.

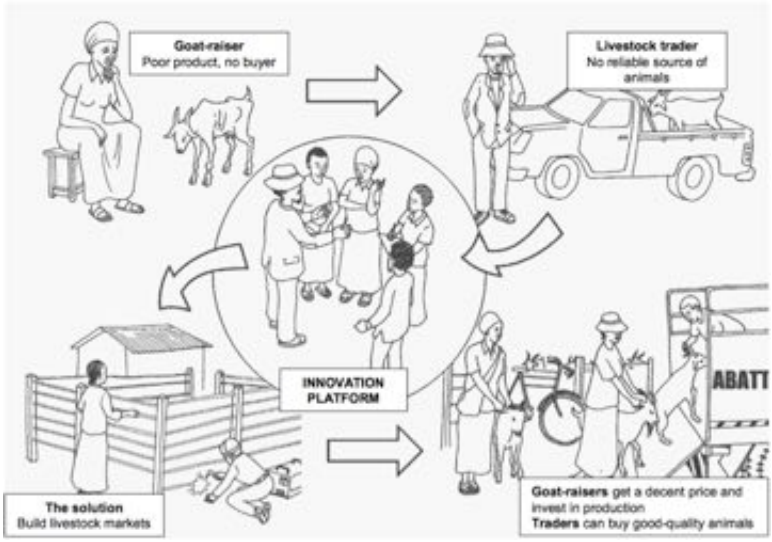


Figure 25: Innovation Platform as a tool to unlock the value chain (source: clippings.ilri.org)


End of Report

Acknowledgement

- The Food and Agriculture Orgnaisation of the United Nations (FAO)
- Central Agricultural Research Institute (CARI), Liberia
- Pwani University, Kilifi, Kenya

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