1st Workshop on Progressive Control Pathway for FMD Control Value Chain Analysis

Mission Report

23-26 February 2015

Nouakchott, Mauritania

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Mission report
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FIRST WORKSHOP ON PROGRESSIVE CONTROL PATHWAY FOR FMD CONTROL VALUE CHAIN ANALYSIS
Nouakchott, Mauritania 23-26 February 2015

1. Background

The European Commission for the Control of Foot-and-Mouth Disease (EuFMD) workplan 2015, component 2.3 (Support to REMESA), includes activities to assist Mauritania for the development and implementation of a Risk Based Strategic Plan for FMD control and for improving the knowledge on FMD circulation in the country. The Progressive Control Pathway (PCP) for FMD, a tool originally developed by EuFMD and now used as a joint tool by EuFMD, FAO and OIE, has been developed to assist and facilitate countries to progressively reduce the impact of FMD. It relies on six successive stages in which countries are progressing from stage 0 (no or limited FMD surveillance and control activities) until they reach FMD free status with vaccination (stage 4) or without vaccination (end of stage 5).

Mauritanian national authorities recently showed interest in initiating a PCP for FMD control. So far, FMD activities have been limited and Mauritania is considered as being currently at stage 0 of the PCP. Thus, the support of EuFMD to Mauritania at this initial phase is mainly intended to train and work with professionals of the Veterinary Services and Laboratories to collect, analyze, discuss the information needed to design and prepare the Risk-Based Strategic Plan (RBSP).

The present workshop was the first one of several workshops that are planned to be organized in Mauritania in order to complete the initial phase, i.e. the preparation of the RBSP. In particular, the objectives of the 1st workshop were the following:

- Principles of PCP for FMD control
- Husbandry system and livestock production
- Livestock movements/trade
- Stakeholders identification
- FMD occurrence/distribution in the country and hypothesis of circulation
- Key risks and important gaps regarding FMD control
- Activities required to further develop the RBSP

More details about the 1st workshop programme are provided in Annex 1.

2. Impressions of the workshops

The workshop was attended by 18 participants from the international, national and regional levels, including a FAO staff member, veterinary services and laboratory personnel (see Annex 2). In general, participants showed high interest in preparing and implementing a FMD control programme in Mauritania, although they admitted that farmers might have lower interest, mostly because of lack of awareness of the economic impact of the disease. Indeed, FMD provokes low mortality in cattle and small ruminants in Mauritania and thus is perceived

as less important than other diseases affecting the Mauritanian livestock, such as Peste des petits ruminants (PPR) and Contagious Bovine Pleuropneumonia (CBPP).

2.1 Organization of the Animal Health System

Animal Health authorities are represented at national level (under the Ministry of Livestock), at provincial level (so-called 'Chief service' with one or two veterinarians in each of the 13 provinces (Wilaya)), at department level (with one official representative of the animal health authorities sometimes being a veterinarian) and at village level (with numerous veterinary auxiliaries/animal health workers who were trained by different organizations, for example via 2-week training by NGOs). The central veterinary laboratory located in Nouakchott (called CNERV = Centre National d'Elevage et de Recherches Vétérinaires) works under the umbrella of the Ministry of Livestock but not under the national veterinary services (i.e. the CNERV and the national veterinary services are located in different departments). Finally, Mauritania also took part in the PVS evaluation and the gap analysis missions of the OIE, but the reports are not publicly available.

A network for epidemiological surveillance of infectious diseases (called REMEMA = Reseau Mauritanien d'Epidemiosurveillance des Maladies Animales) is officially in place since 2001 and was created as part of the Pan African Programme for the Control of Epizootics (PACE programme). Six diseases are targeted by this network: FMD, PPR, CBPP, Rift Valley Fever (RVF), Rabies and Avian influenza (AI). For each of them was produced i) a "surveillance protocol" describing the case definition and the measures to be taken in case of suspicious or confirmed case (contingency plan) and ii) an information sheet for animal health stakeholders in the field. There is currently a legal basis for the control of the six targeted diseases; in particular, they are officially notifiable. The surveillance protocol is currently used in the field for response to certain diseases (e.g. CBPP), but not for FMD because it is not considered as an important disease. Despite its name, the surveillance protocol does not include guidelines for the implementation of active surveillance activities. Passive surveillance was ongoing in 2004-2005, with PACE programme providing resources (e.g. sampling material and equipment, motorbikes) and financial incentives to veterinarians and veterinary auxiliaries for reporting cases and sending samples to the central laboratory in Nouakchott. However, the programme ended in 2006 as a result of the eradication of rinderpest and this led to a decreasing activity of the passive surveillance system which is now very low.

2.2 FMD activities conducted so far in Mauritania

- Surveillance of FMD:

As discussed above, there is currently very little reporting of FMD cases. Only major events (with high mortality or a large region infected) are reported. In that case an investigation is conducted in the field, samples are taken for confirmation and the outbreak is registered at central level.

No active surveillance of FMD is currently in place in Mauritania and no serological prevalence studies have been conducted so far. However, two FMD diagnostic studies were conducted using sera from the serum bank and ELISA kits provided by REMESA (RELABSA training activities).

  - In 2004 and 2005: 800 cattle blood samples from 8 regions were tested by serology for 7 FMD serotypes. 249 samples were positive for serotype O and 283 were positive for serotype A.

- In 2012: 447 cattle samples from 4 regions and 447 small ruminants from 5 regions were tested for FMD. The seropositivity was 59% in cattle and 8% in small ruminants.

Additionally, few samples were received in January 2015 from clinical suspicions. They tested positive for serotypes O, A, SAT1 and SAT2. In particular the finding of SAT1 and SAT2 seropositive results is of importance, because there are no recent reports of these serotypes in the region, however without further confirmation and testing the possibility of a false-positive result cannot be excluded. The samples will be sent to WRL Pirbright for confirmation.

The laboratory is not interested in receiving more blood samples because according to laboratory staff they do not bring any additional information. They would prefer receiving tissues or organ samples to be able to conduct more detailed diagnostic tests, but field personnel are not sending them because of lack of resources and lack of knowledge of the procedure. It should however be noted that organ samples are not the internationally recommended type of samples for virus detection.

The laboratory has skills to perform serology, classical and real time PCR. Staff has been trained internationally. Skills and hardware laboratory equipment are present (although currently available ELISA FMD kits provided by EuFMD were recently expired); the main gap concerns the collection and shipment of field samples to the laboratory. Also, the laboratory is lacking consumables for many of the diagnostic test procedures.

- Control of FMD:

No FMD control is currently in place and the contingency plan developed as part of the REMEMA activities is not implemented. FMD vaccines are not available in Mauritania.

2.3 Value chain analysis

- Livestock species and products identification

Mauritania has a major production of small ruminants (goat and sheep, about 14.5 million) and cattle (about 1.6 million), mostly located in the South of the country (along the Senegal river). Dromedary camels are also numerous (especially in the North of the country) but are not known to be susceptible to FMD; thus they were not considered further in the value chain analysis. There is no domestic pig production in Mauritania, but warthogs (*Phacochoerus africanus*) are present in the region at the border with Senegal where there are natural reserves. Small ruminants and cattle are most frequently bred together in extensive farms for meat production. Semi-intensive farms recently developed in the Trarza region (around Rosso) and are mostly devoted to dairy production. The locations of meat and milk productions are displayed on a map in Annex 3 of the document.

Thus, the livestock species considered in the value chain analysis were cattle, sheep and goats. Associated products that were included were the following: meat, milk, wool, horn, leather, manure and animal feet. Two value chains were considered and analyzed separately: i) the extensive small ruminants and cattle production and ii) the semi-intensive dairy production.

- Supply chains

Supply chains for meat and milk are presented an Annex 4 and 5.

Meat production:
In general, traders buy live animals from extensive farmers and bring them to intermediate (i.e. permanent and small size) markets. From there, animals are transported to final markets (located in the neighborhood of slaughter areas), sent for export mainly to Senegal and Mali, or sold to other extensive farmers (animal turnover).

Butchers buy live animals at the final markets, send them to slaughter and receive all the products (i.e. meat and offal) except leather, horn and feet that are sold separately. Butchers later sell the meat and offal at the meat market or at the butchery (more modern shops with cooling systems). Thus there are no by-products after slaughter (only blood and gastric contents are eliminated at the slaughter stage). There is only one proper slaughterhouse in Nouakchott; others are slaughter areas located in Nouakchott and in other towns (at least one slaughter area per province). Additionally, people may slaughter animals at home for their own consumption.

Milk production:
Selling milk is a recent activity in Mauritania that has developed only in the South Western part of the country. Milk is either sold raw to the consumer directly from the producer or via selling points, or processed in small milk factories (called “unités laitières”), most frequently privately owned or coordinated by NGOs. Additionally, a milk factory was recently created with 4 processing sites located in Nouakchott. The milk used in the factory originates from the Trarza region where two collection centers equipped with bulk milk tanks collect milk from semi-intensive farmers located in the area. Milk is transported from the farms to the collection centers in milk pots put on pickups cars. Then it is refrigerated at the collection centers and transported by refrigerated trucks to the processing sites in Nouakchott. Finally, the milk from the milk factory is sold through selling points distributed throughout the southern part of the country.

- Stakeholders agreements and prices

Meat production:
In the extensive meat production system, there is no written contract between the different stakeholders of the value chain. However, there is usually an informal agreement between the farmer and the trader (based on trust) as farmers always work with the same trader. Often the trader has no cash reserve to pay for the animals when he gets them, but he pays back once he was able to sell the animals (usually within couple of months). Only animals sold for export or for slaughter are paid immediately. Similar to the trader, the butcher often has no money reserve to pay upfront for the animals. Thus he asks brokers (so called “courtiers”) to pay for the animals and the butcher pays back once the meat has been sold (again this is based on trust).

There is a pre- and post-mortem inspection by official public veterinarians at the slaughterhouse in Nouakchott. In case an animal is declared unfit for consumption, the losses are split between the different stakeholders (e.g. the butcher only pays back half of the animal price). Butchers have to pay a daily tax which is proportional to the number of animals slaughtered to the Nouakchott authorities and the Nouakchott Slaughterhouse Society (or Société des Abattoirs de Nouakchott). They also pay extra costs for the slaughterhouse personnel, e.g. for those transporting and cutting the carcasses. Farmers also pay a tax (proportional to the herd size) to the municipal authorities; the tax is the same in the whole country.

The Commission for local development (CoDep), consisting of representatives from butchers, national husbandry authorities and brokers, is in charge of establishing official meat prices taking into account the carcasses weights (based on an average of three animals) and production costs. However, especially during the dry season (or "soudure") the official prices are not respected and there are big differences between meat prices. Average beef price in Nouakchott is approx. 1800 to 2000 ouguiya per kg (equivalent to 5.52 euros per kg). However, some private initiatives managed to fatten calves during the dry season and to sell them at very low cost (1200 ouguiya per kg) which perturbs the meat market. The CoDep does not meet regularly; they re-evaluate the official meat price when there is increasing pressure from the Commission for the consumers. Meat price is generally increasing from within the country until Nouakchott where prices are the highest.

Milk production:
Semi-intensive farmers are grouped in dairy cooperatives which organize the milk collection from farms to the milk collection centers. The cooperatives also provide feed to farmers during the dry season in order to maintain a certain milk production level, although the feed supply is not guaranteed. In general the milk production significantly drops during the dry season. Milk is sold on average for 500 ouguiya per liter in Nouakchott and 160 - 200 ouguiya per liter is paid to the farmer.

- Animal movements and trade

Although no exact figures were available, it seems Mauritania is massively exporting live ruminants to Mali and Senegal. This impression is also plausible when comparing the estimated livestock population size (1.6 million cattle and 14.5 million small ruminants) with the human population size (3.89 million).These animals originate from the whole of Mauritania and are sold for export at the level of intermediate and weekly markets (see Annex 3). It was reported that many animals cross the border walking and then are put on trucks where they travel further to Mali, Senegal and sometimes even until Cote d'Ivoire or Niger. There is no official control of animals crossing the borders walking, as official controls mostly target trucks transporting live animals (for which sanitary certificates are required).

Very little live animals are imported into Mauritania, with the exception of a limited number of breeding animals (e.g. Bali bali sheep originating from Mali).

However, transhumance is very common between Mauritania, Mali and Senegal. Indeed, dry and humid seasons are slightly time-shifted between those three countries, or sometimes more favorable in one country or the other, leading to massive movements of herds in search for better pastures and water sources. Again, no official control is targeting transhumant herds and they can move freely across borders.

Finally, inside the country, live animals movements are mostly towards Nouakchott where there is massive demand and higher prices.

2.4 Risk analysis

Group work focused on the initial development of risk pathways for FMD entry into Mauritania and for FMD spread between herds, both in the extensive and semi-intensive livestock production systems.

Major pathways identified for FMD entry into Mauritania were the following:

- Transhumant animals originating or returning from Mali and Senegal where they got infected via direct contact (on pastures or at water holes)
- Contaminated returning trucks
- Contaminated returning people (e.g. traders, shepherds)

- Warthogs originating from Senegal although their relative importance for FMD introduction in Mauritania was discussed among the participants. Important to note is that there appears to be no, or very little, scientific data about the role of warthogs in FMD epidemiology.

Major pathways identified for FMD spread between herds in the Mauritanian extensive production systems were the following:

- Direct contact with infected animals on pastures, at water holes
- Indirect contact via personnel, fomites (material, transport vehicles)
- Livestock markets
- Transhumant herds (meeting other herds on their way)
- Wind, on short distance and mostly during the humid season (when desiccation is less of a problem)

Major pathways identified for FMD spread between herds in the Mauritanian semi-intensive production systems were the following:

- Introduction of infected animals in the herd (purchase or loan of animals)
- Indirect contact via personnel, fomites (material, vehicles transporting milk, feed)
- Wind during humid conditions

Workshop 1 only provided an initial approach to FMD risk assessment in Mauritania and it was not intended to further precise of finalize the pathways prepared by the participants. This task will be completed in the workshop 3.

2.5 Main gaps and possible corrective measures

Participants were asked to identify and then prioritize major gaps and most promising solutions for FMD control in Mauritania (see Annex 6 and 7).

The three principal gaps preventing effective FMD control that were identified were the following: i) insufficient supervision and care of herds by veterinarians due to lack of resources for the veterinary services, ii) low prioritization of FMD control by livestock owners due to a lack of knowledge and awareness of the socio-economic impact of FMD in Mauritania and iii) lack of regulation of animal movements at the border.

The three most promising control measures for the short to medium future were: i) strengthening sanitary controls at border to prevent introduction of FMD, ii) increase awareness and training about FMD to achieve a better early detection and iii) reactivate and train REMEMA staff to improve implementation of early response and control measures.

Vaccination was not identified as an important control measure at this stage, because of lack of data on the epidemiological situation of FMD in the country (i.e. which species and where to vaccinate), and because of lack of knowledge of the FMD circulating strains (i.e. selection of the appropriate vaccine strains).

2.6 Next steps and homework in preparation of the workshop 2

It was discussed which data would be required in order to conduct a complete value chain analysis. As well, it was identified from which sources these data could be obtained. These were then split among workshop participants as homework (see Annex 8) to be completed before workshop 2. The results of the data collection should be presented during the next workshop. Dr Ahemd Salem El Arbi (Deputy CVO), has been chosen as a coordinator to follow up with the data collection from the participants.

3. Conclusions

The majority of the workshop participants, representing public and private veterinarians at central and regional levels appear to support the development of a Risk-Based Strategic Plan for FMD control in Mauritania. The workshop however highlighted a number of challenges that still require further discussion between EuFMD and the national authorities.

Mauritania is classified as a Least Developed Country, which means that its financial resources for animal disease prevention and control are extremely limited. Implementation of simple actions, such as conducting a small serological survey to better assess prevalence and geographical distribution of FMD, already faces significant hurdles due to a lack of financial resources. Without provision of financial incentives to veterinarians and veterinary auxiliaries, their willingness to participate in sample collection – or any other data collection activities – is significantly reduced. Also the capacity of the country to start implementation of FMD control measures during later stages of the PCP will be affected by its lack of financial, technical and human resources.

On a political level, allocation of available resources to and within the veterinary services is based on the prioritization of disease control. Currently, CBPP and PPR have received the highest priority due to the high mortality that these diseases cause, and vaccination campaigns for these 2 diseases have been established. Additionally, RVF is a main concern due to high mortality both in animals and in humans. Farmers themselves also give a higher priority to CBPP, PPR and RVF than to FMD due to higher mortality rates and hence more visible impact.

For EuFMD and the implementation of the PCP in Mauritania this context raises several issues:

- On a short- to medium term, EuFMD may consider to extent its support to Mauritania from technical to financial support to initiate and facilitate data collection necessary for the preparation of the Risk Based Strategic Plan. This could be in the form of a local consultant to conduct field work, or through provision of incentives to veterinarians and veterinary auxiliaries who participate in data collection. The second option is a more inclusive approach that will create a larger national awareness about FMD and FMD control and foster ownership among participating field staff. Such awareness and ownership among staff of the veterinary service is essential once first measures for FMD control will be initiated.
- On a medium term, the socio-economic study – scheduled as part of the preparation of the Risk Based Strategic Plan – will be required and essential to support policy dialogue and lobby for additional governmental resources for FMD control. Only by demonstrating that FMD has a significant impact on the livelihoods of farmers and the general economy despite the absence of obvious clinical signs and high mortality in animals it is possible to gain sufficient political support for reallocation of limited resources to achieve a sustainable and long-term investment in FMD control. It is therefore of utmost importance that this socio-economic study will be comprehensive and scientifically sound and it is recommended that EuFMD will provide sufficient technical and financial support to Mauritania to conduct this study.
- On a long-term, sustainable and effective FMD control in Mauritania can only be achieved through a significant strengthening of the veterinary services in general. This is an effort that goes beyond the mandate of EuFMD, however EuFMD can play an important role in advocating additional human, technical and financial resources for the Mauritanian veterinary services during discussions with high-level Mauritanian stakeholders, donors and implementing agencies.

In addition to political and resource constraints in Mauritania, it is important to realize that there are massive movements of livestock for trade and in particular for transhumance between Mauritania, Mali and Senegal. Therefore it is critical to consider Mauritanian FMD control in a regional context and sustainable gains can only be achieved when progress in FMD control is also made in Mali and Senegal. It is therefore recommended that EuFMD also considers the initiation of the PCP in those countries.

Annex 1: Workshop program

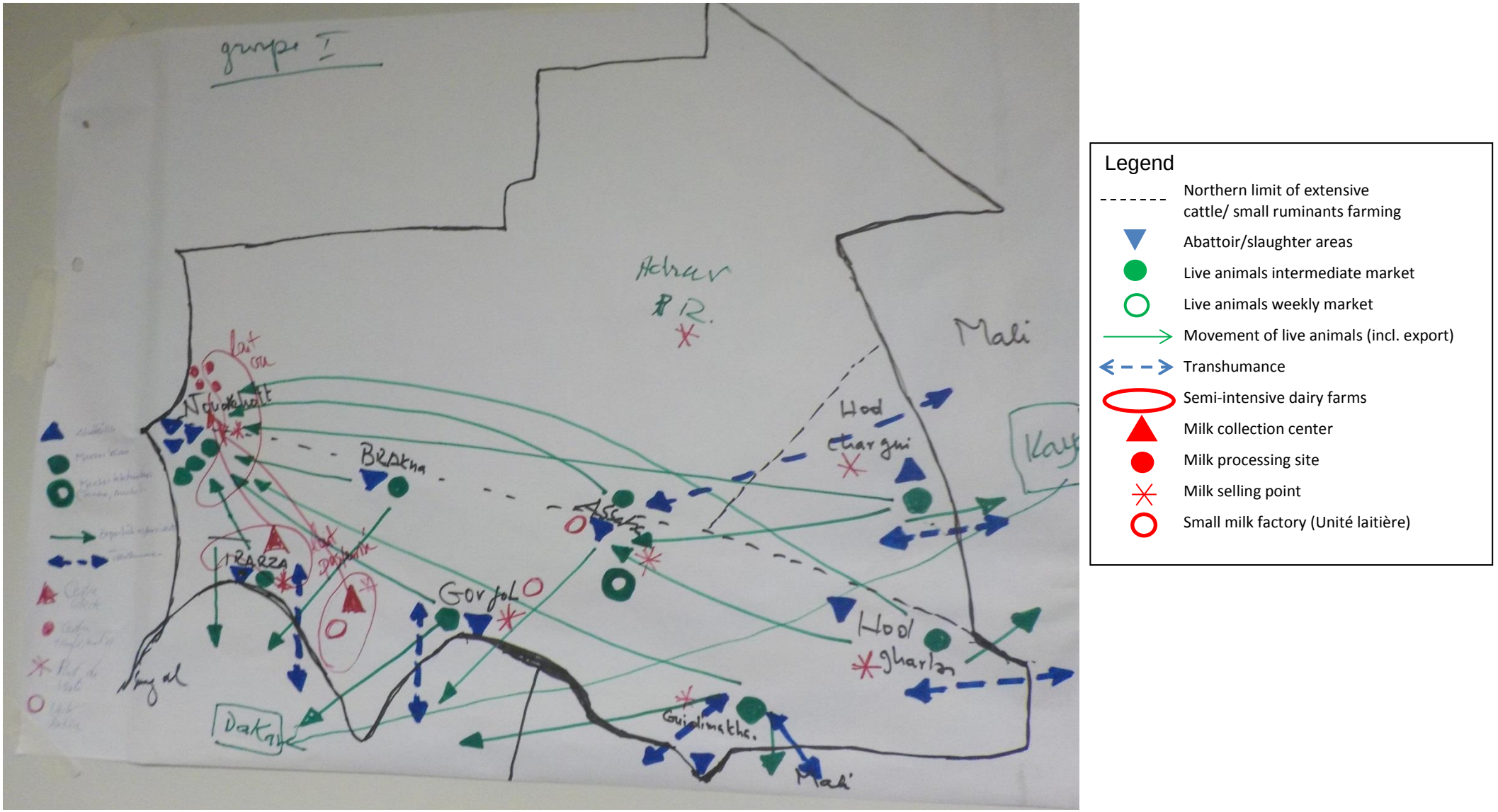
	Main topic	Specific activities	Format / Speaker
Monday Feb 23th			
9.00 to 9.30	Welcome Opening		CVO(?), EuFMD/FAO, SAFOSO
9.30 to 10.30	Refresher on FMD disease	Description of FMD susceptible species, transmission pathways, clinical signs, diagnostic, control (vaccination)	Presentation (SAFOSO)
Coffee break			
11.00 to 11.15	EuFMD presentation	Presentation of EuFMD activities and opportunities	Presentation (Ibrahim Eldaghayes)
11.15 to 11.45	PCP presentation	Presentation of the PCP framework: objectives, working steps, work in other countries	Presentation (SAFOSO)
11.45 to 12.30	Libya experience	Description of the Libya experience: initial situation, reasons to start with the PCP, progress	Presentation (Ibrahim Eldaghayes)
Lunch break			
13.30 to 14.00	Animal Health Structure in Mauritania	Description of the organization of the animal health system in Mauritania	CVO
14.00 to 15.00	FMD situation in Mauritania	Description of the current knowledge about FMD and FMD activities going on in Mauritania	Plenary discussion
Coffee break			
15.30 to 16.00	Value chain presentation	Description of the value chain analysis and its relevance for disease control	Presentation (SAFOSO)
16.00 to 17.00	Husbandry systems and livestock production	Identification of the Mauritanian livestock products and their geographic location (drawing maps)	Group work
Tuesday Feb 24th			
9.00 to 10.00	Feedback - Husbandry systems and livestock production	Feedback of the group work	Plenary discussion
10.00 to 10.30	Stakeholder + Livestock movement, trade and prices presentation	Introduction to stakeholder + Trade and prices analysis and relevance for value chain analysis and disease control	Presentation (SAFOSO)
Coffee break			
11.00 to 12.30	Stakeholders identification + Livestock movement, trade and prices	Identification and localization of stakeholders involved in livestock production and trade + Discussion on livestock prices to identify animals and products movements and trade	Group work
Lunch break			

13.30-15.00	Feedback Stakeholders identification + Livestock movement, trade and prices	Feedback of the group work	Plenary discussion
Coffee break			
15.30 to 16.15	Missing data for completing the value chain analysis	Based on 3 working groups, (1. Husbandry systems and livestock production, 2. Stakeholders identification, 3. Livestock movement and trade, prices), identification of missing data for completing the value chain analysis and possible data sources to inform them	Group work
16.15 to 17.00	Feedback- Missing data for completing the value chain analysis	Feedback of the group work	Plenary discussion
Wednesday Feb 25th			
9.00 to 10.00	Risk analysis presentation	Introduction to risk analysis with focus on risk pathways	Presentation (SAFOSO)
Coffee break			
10.30 to 11.30	Identification of risk pathways	Drawing risk pathways for FMD introduction and spread in Mauritania	Group work
11.30 to 12.30	Feedback - Identification of risk pathways	Feedback of the group work	Plenary discussion
Lunch break			
13.30 to 15.00	Key risks and important gaps regarding FMD control	Identification of key risks and important gaps for future control of FMD in Mauritania	Group work
Coffee break			
15.30 to 16.30	Feedback- Key risks and important gaps regarding FMD control	Feedback of the group work	Plenary discussion
16.30 to 17.00	Next steps planning	Identification of 3-5 active participants + best time for the workshop 2	Plenary discussion
Thursday Feb 26th			
9.00 to 12.30 am	Activities required to further develop the value chain analysis	Planning of upcoming activities within a smaller group of participants in order to finalize the value chain analysis before the next workshop	Group discussion with 5 selected participants
End of the Workshop			

Annex 2: Workshop participants

Trainers			
Manon Schuppers and Lucie Collineau (SAFOSO) Ibrahim Eldaghayes and Isabel Gutiérrez Boada (EuFMD)			
Participants	**Institution**	**Email**	**Phone**
Dr Ahmed Salem El arbi	Deputy of the Veterinary services Director	Salem3tr@yahoo.fr	22245560
Dr El Yedaly Mohameden Hamed	Chief of the Animal health services	yedalihamed@yahoo.fr	22435583
Dr Boubacar Ould Babah	Direction of Veterinary services	boulbabah@yahoo.fr	22245561
Dr Ahmed Bezeid Mamy	Chief of Department Chef PI CNERV (laboratory)	bezeid07@yahoo.fr	22245552
Dr Mohamed Ould salek	Regional Deleguee	Meitty71@yahoo.fr	22011004
Ekaterina Isselmou	Chief of division. CNERV	k_isselmou@yahoo.fr	36319666
Dr Teslem Mint Cheikh Ould Bourweiss	Ministry of Livestock farming	Tchb_2@yahoo.fr	22245562
Dr Lehbib O Abdelaziz	Doctor of Veterinary Medicine	lehbib.abdelaziz@yahoo.com	22113012
Hamady Abdul Sall	Livestock farming inspector	-	36691561
Dr Mohamed Mahmoud	Trarja	navisavi@yahoo.fr	22111602
Sidi Moussa Ndiaye	Assistant of Dr Samsa Tall	Sidindiaya2009@yahoo.fr	46557524
Dr Marega Mamadu Yahya	Kaedi Gorgol	Mmarega11@yahoo.fr	36535778
Dr Mahfoudh Ould Mohamed Salem	Wi Tagant	drmahfoudh@gmail.com	22317607
Dr Dia Mamadou Lamine	ENFVA	mldsb@hotmail.com	47641929
Jennifer Fearon	Consultant FAO		
Dr Oumar Dembarou sylla	Regional Deleguee	Barousylla.2014@gmail.com	22407896
Dr Naya Med Mahmoud			
Ahmed Gueye			

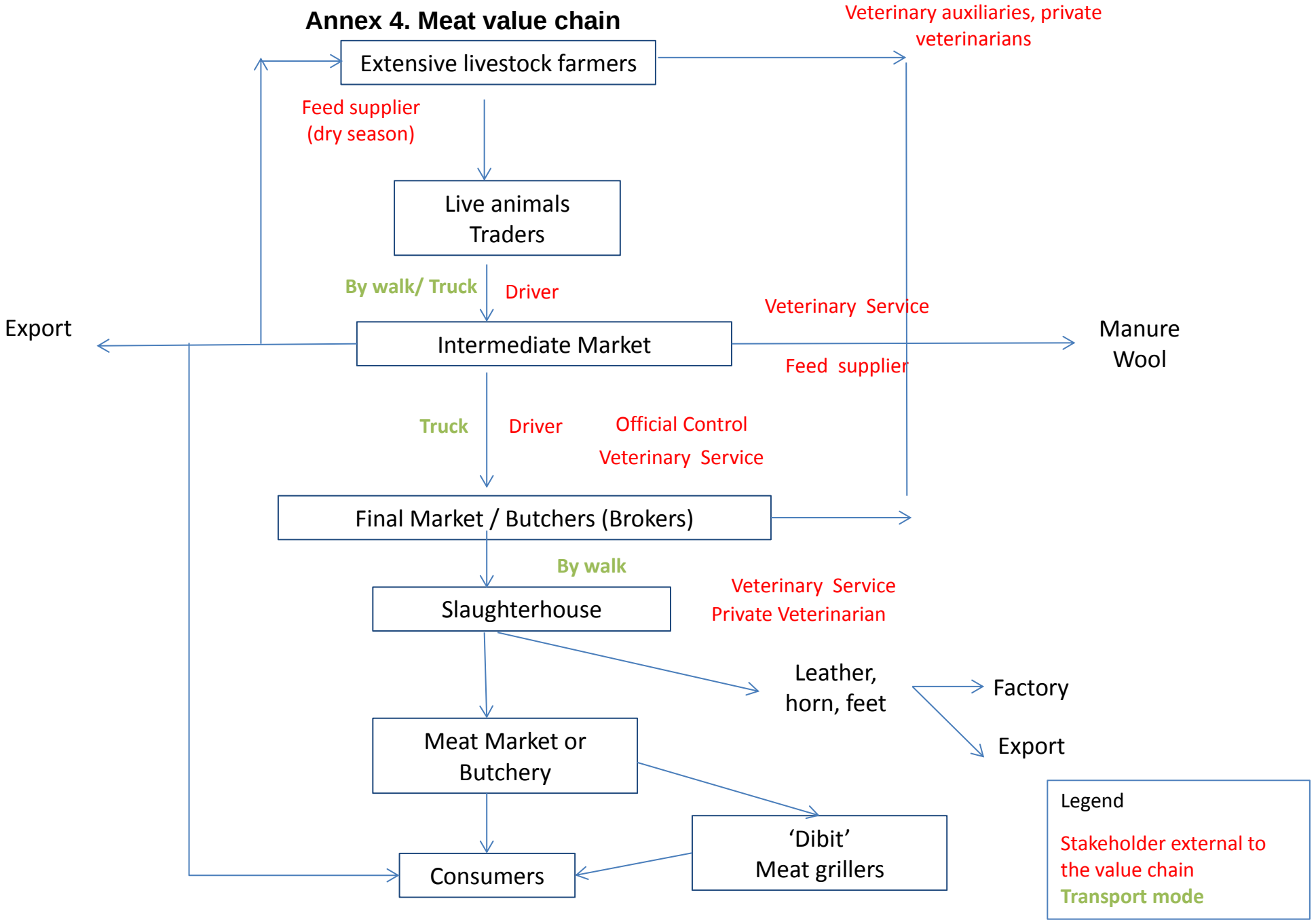
Annex 3: Mapping of Mauritanian cattle and small ruminants productions



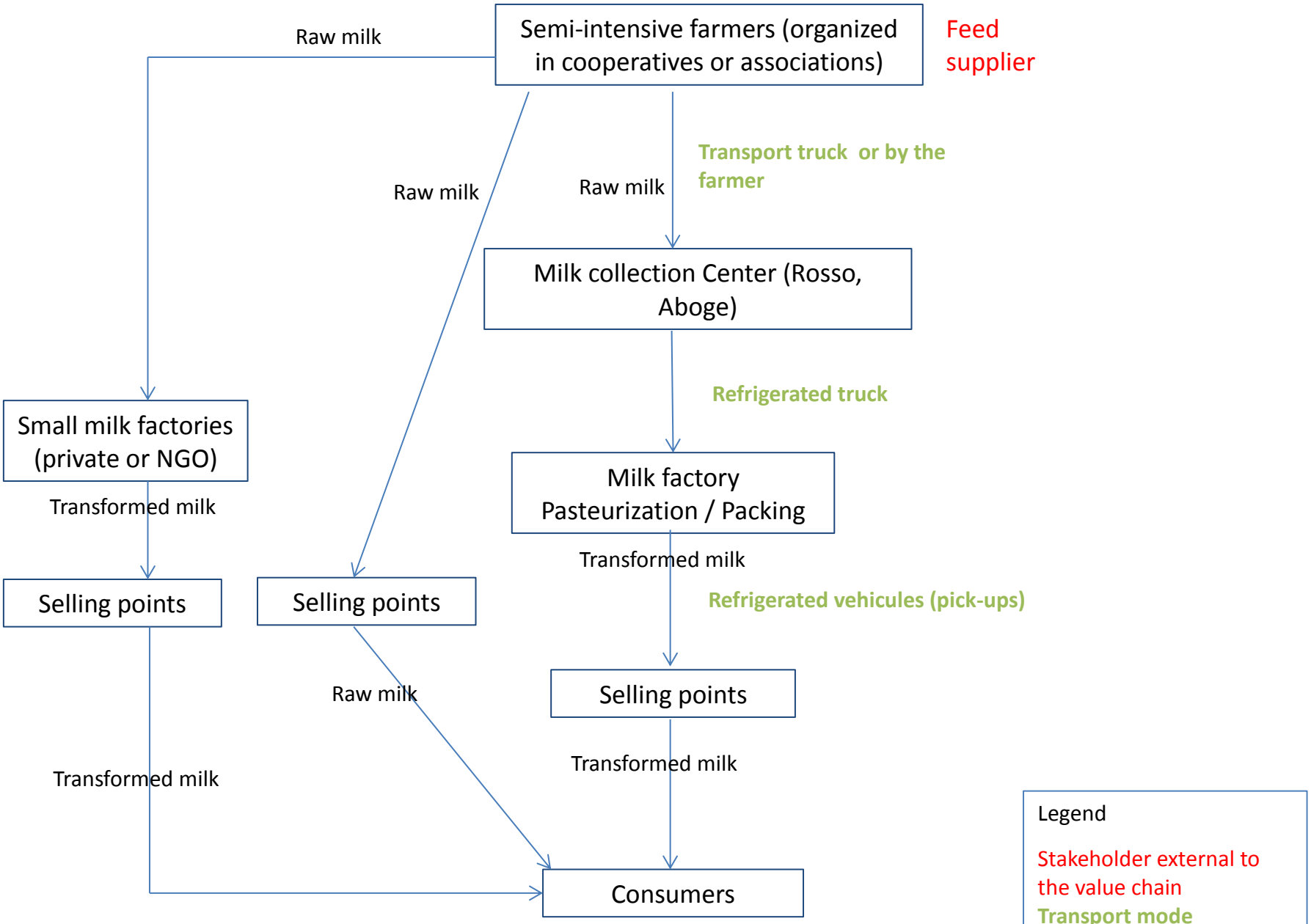
Legend

- Northern limit of extensive cattle/ small ruminants farming
- Abattoir/slaughter areas
- Live animals intermediate market
- Live animals weekly market
- Movement of live animals (incl. export)
- Transhumance
- Semi-intensive dairy farms
- Milk collection center
- Milk processing site
- Milk selling point
- Small milk factory (Unité laitière)

Annex 4. Meat value chain

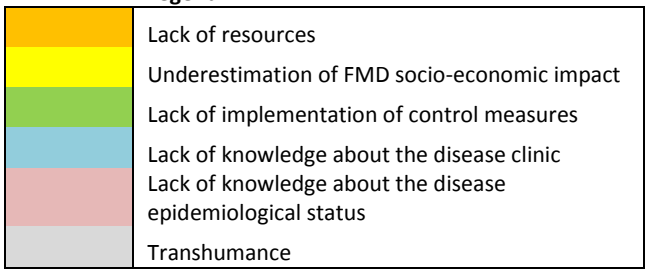


Annex 5. Milk value chain



Annex 6. Prioritization of gaps in FMD control in Mauritania

Gap ID	Major gaps in FMD control in Mauritania	Number of votes
20	Not enough veterinary supervision and care for the herds	5
1	Lack of knowledge of herders about impact of disease (socio-economic impact)	4
17	Lack of regulation for points of entry and exit of animals at the border	4
2	Underestimation of the disease	3
8	Lack of awareness about the disease	3
3	Underestimation of the risk of spread of FMD by herders	2
11	Insufficient financial resources	2
19	Unknown status	2
21	Lack of knowledge about which specific techniques to use for sample collection	2
22	Early diagnostics	2
4	Underestimation of the socio-economic impact of the disease by different actors	1
5	Lack of knowledge of herders about clinical signs of FMD	1
6	Measures to be taken	1
12	Lack of supervision by veterinary services	1
13	Weaknesses at the level of the veterinary services	1
14	Lack of human resources	1
15	Lack of adequate financial resources	1
16	Transhumance	1
18	Transport can contribute to the exportation of the disease	1
23	Knowledge about the epidemiological status of the disease	1
7	Lack of knowledge about specific clinical signs of the disease	0
9	Identification	0
10	No vaccination	0



Annex 7. Prioritization of solutions to improve FMD control in Mauritania

Solution ID	Most promising solutions to improve FMD control in Mauritania	Number of votes
17	Strengthen sanitary control points at the borders	5
3	Awareness and training	4
20	Reactivate and train staff of REMEMA	4
1	Communication and awareness of herders	3
8	Conduct a good awareness campaign to better understand the disease	2
11	Provide means	2
13	Strengthening of veterinary services	2
15	Provide financial means for surveillance and control	2
19	Epidemiological survey	2
23	Epidemiological survey	2
2	Demonstrate severity of the disease	1
4	Conduct a socio-economic study	1
5	Awareness of herders/training/radio/slides	1
6	Awareness	1
12	Supervise/support animal health workers	1
14	Recruitment of staff	1
18	Hygiene of trucks for animals before and after	1
21	Strengthening of capacities	1
22	Strengthening of laboratory capacities	1
9	Training	0
10	Vaccination	0
16	Introduction of new husbandry techniques	0
7	Awareness	0

Legend

- Implementation of control measures
- Awareness and training
- Providing additional resources
- Epidemiological surveys
- Demonstrating FMD socio-economic impact

Annex 8. Table of Necessary Data (Homework) (in French)

Etape/acteurs	Données nécessaires	Source (si disponible)	Comment renseigner (si pas disponible)	Qui ?	Quand ?
Eleveurs extensifs	Nombre d'éleveurs par région Composition des troupeaux Nombre d'animaux par éleveur Prix d'une vache Prix d'un petit ruminant Renouvellement d'animaux (achat) Proportion vendue ou auto-consommée Transhumance	- Statistique nationale - GNAP :Groupement national des associations pastorales (pour les éleveurs inscrits) - Association pastorale lait viande (APLV)- - Delegués régionaux et inspecteurs departementaux du Ministere de l'elevage (campagnes vaccinales d'une partie des animaux) - site internet : fews.net	Demander aux éleveurs (questionnaire/ enquête de terrain)	Dr Mohamed Salem Mr Sall Hamadi Dr Marega Dr Lehbib Dr Mohamed Saleck	40 jours
Negociants	Nombre de négociants Localisation, origine Couverture geographique, nombre de marchés Stabilité professionnelle Saisonnalité de son activité Logistique pour le transport		Interview	Dr Teslem	

Marchés intermédiaires	Localisation Nombre Fréquence Taille Espèces présentes Origine des animaux Destination des animaux (dont exportation)	Delegués régionaux et inspecteurs departementaux du Ministere de l'elevage		Dr Teslem	
Marché hebdomadaire	Localisation Nombre Fréquence Taille Espèces présentes Origine des animaux Destination des animaux (dont exportation)	Delegués régionaux et inspecteurs departementaux du Ministere de l'elevage (mieux renseignés)		Dr Teslem Dr Ahmed Salem	
Marché final	Localisation Nombre Fréquence Taille Espèces présentes Origine des animaux (etapes intermediaires) Destination des animaux (dont exportation)	certificats zoonsanitaires enregistrés au niveau des autorités régionales ou deprtementales	Interviews des chauffeurs	Dr Teslem Dr Ahmed Salem	
Courtiers	Nombre Organisation Localisation Nombre de clients Destination des animaux	Pas de donnée formelle Federation nationale des commercants de betail	Interview	Dr Teslem	40 jours

Bouchers	Nombre Organisation Localisation Nombre de clients Adhésion à la fédération des bouchers (Age) Source de financement Volume d'activité Système de distribution, nombre de points de vente	Federations de bouchers (federation principale = federation nationale des bouchers) Societé des abattoirs de Nouakchott (SAN)		Dr Boubacar Dr Ahmed Salem	1 mois
Abattoir	Nombre Localisation Volume Origine des animaux Espèce Infrastructures, systèmes d'hygiène Clients (localisation) pour les différents types de produits et sous-produits	SAN Délégation régionale et départementale du Ministère de l'élevage Mairies	Interview	Dr Boubacar Dr Ahmed Salem	2 semaines
Marché à viande	Localisation Nombre Marché spécialisé ou non, point de vente, boucherie moderne Variabilité des prix	Marie Fédération des bouchers	Interview	Dr Boubacar	
Consommateurs	Quantité consommée par personne Espèce	Office national des statistiques Association pour la protection des consommateurs		Dr Boubacar	

Service veterinaire public et privé	Role, taches Nombre Couverture géographique Formation	Service vétérinaire Rapport PVS de l'OIE Ordre des vétérinaires Syndicat national des vétérinaires Association des professionnelles de l'élevage (infirmiers, assistants)		Dr Yedali Dr Mahfoud	
Eleveurs semi-extensifs	Nombre d'éleveurs Localisation Nombre d'animaux Volume de production laitiere semestriel Renouvellement Vente d'animaux Coopérative, organisation Destination du lait (vente de lait cru, au centre de collecte) Prix du lait et variabilité Transport du lait Race des animaux, programme d'amélioration Source d'alimentation, système de paturage Source de l'eau Suivi sanitaire, gestion de l'usage des médicaments (résidus) Vaccination	Coopérative, associations Vendeurs Industriels Service veterinaire Direction des filières animales - GNAP :Groupement national des associations pastorales (pour les éleveurs inscrits)	Interview avec éleveur, vendeur	Dr Marega Dr Mohamed Salem Dr Ahmed Salem Dr Lehbib Dr Mohamed Saleck	1 mois

Centre de collecte	Localisation Volume, capacité Nombre Nombre de fournisseurs Materiel Origine et destination du lait Circuit de collecte Transport du lait Source d'energie Source d'eau Organisation, ressources humaines Types de contrôle du lait Prix du lait et variabilité	Industriels Centres de collecte		Dr Lehbib Dr Marega Dr Mohamed Salem	3 semaines
Usine laitière	Volume Capacité Origine du lait Types de produits Transport Circuit commercial Organisation Localisation Système de contrôle et d'auto-controle Sources d'énergie et d'eau Prix du lait et variabilité Gestion du stock (périmés, non conformes)	Usine Service veterinaire Association des industriels Direction des filières animales Ministère de l'industrie		Dr Bezeid Dr Ahmed Salem Dr Navea Dr Boubacar	1 mois

Points de vente	Nombre Localisation Volume Origine des produits Prix du lait et variabilité Transport Organisation		Interview	Dr Boubacar Oumar Sylla	1 mois
Unités laitières	Nombre Localisation Capacité Nature des produits Origine et destination des produits Clients Sources de financement (ONG,privées) Prix du lait Couverture géographique des clients, zone d'écoulement Transport du lait Système de contrôle	Unités laitières Bailleurs Service vétérinaire Direction du développement des filières animales (niveau central)		Dr Mohamed Saleck Dr Lehbib	3 semaines
Consommateurs des produits laitiers	Quantité consommée par personne Localisation Espèce (lait de bovin ou camélidés ou chèvre)	Office national des statistiques Association pour la protection des consommateurs FAO stat		Dr DIA Mamadou Lamine Dr Teslem	1 mois

Service veterinaire public et privé	Role, taches Nombre Couverture géographique Formation	Service vétérinaire Rapport PVS de l'OIE Ordre des vétérinaires Syndicat national des vétérinaires Association des professionnelles de l'élevage (infirmiers, assistants)		Dr Yedali Katia Isselmou	1 mois