Séminaire OIE
Ré-emergence de la fièvre de la vallée du Rift en Afrique Australe
Comment mieux prédire et réagir?
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Foyers et Contrôle de la fièvre de la vallée du Rift en Afrique de l'Ouest

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Foyers et Contrôle
de la fièvre de la vallée du Rift
en Afrique de l'Ouest

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- **Intrduction**

  - **La FVR est une arbovirose transmise par diverses espèces de moustiques et qui touche plusieurs espèces animales domestiques (ovins, caprins, bovins). Chez ces derniers, elle provoque des avortements de la presque totalité des femelles gravides et une mortalité très élevée chez les jeunes animaux.**

  - **La FVR est une zoonose majeure , particulièrement meurtrière au cours des dernières épidémies : En Egypte en 1977 et en 1993, en Mauritanie en 1987, et récemment au Kenya et au Soudan .**

  - **La FVR figure dans la liste des maladies à déclaration obligatoire de l'OIE.**

  - **Elle fait partie de 8 fièvres hémorragiques virales humaines qui font l'actualité dans le Monde (OMS)**

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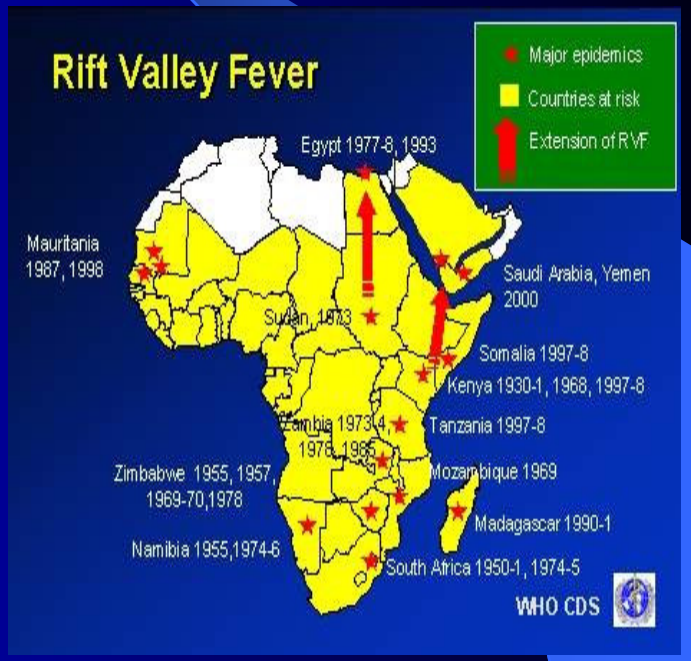
- **Répartition géographique**

  - **Vallée du Rift (Naivasha, Kenya) en 1912**
  - **Extension en Afrique australe et Est (Afrique du sud, Ouganda) en 1950**
  - **Premiers cas humains (Afrique du sud) en 1975 (7 décès)**
  - **Première grande épidémie (Egypte) en 1977 (600 décès)**
  - **Seconde grande épidémie (Mauritanie) en 1977 (300 décès)**
  - **Premier foyer hors d'Afrique (Arabie saoudite, Yémen) en 2000**



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- **Symptômes**

  - **La maladie se manifeste , après une période d'incubation de 12 heures à 15 jours, par des avortements associés à une mortalité chez les jeunes animaux ages de 1 à 10 jours.**

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Pétéchies, ecchymose, nécrose du foie chez les avortons et les nouveaux nés

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Hémorragies dans la zone péri anale sont les signes les plus visibles dans les élevages de petits ruminants en Afrique de l'Ouest.

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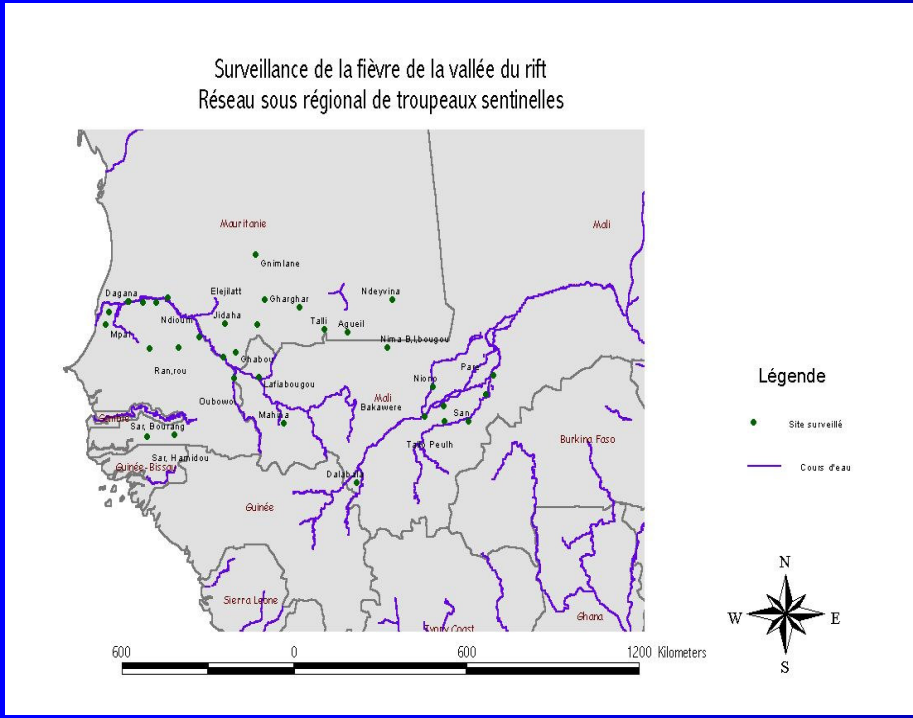
- **West African RVF Surveillance Network**



- There was a first and deadly epizootic of RVF in the Senegal River basin in the period of October to December 1987 (300 humans deaths).
- Post epizootic survey amongst domestic ruminants showed that up 80% of the ruminants of the walo riverine area had experienced FVR infections.
- The 1987 epizootic was thought to have been precipitated by the ecological changes brought about the building of the salt water barrier dam at Diama in the Delta and an another dam on the upper basin of Senegal river basin at Manantali in Mali.

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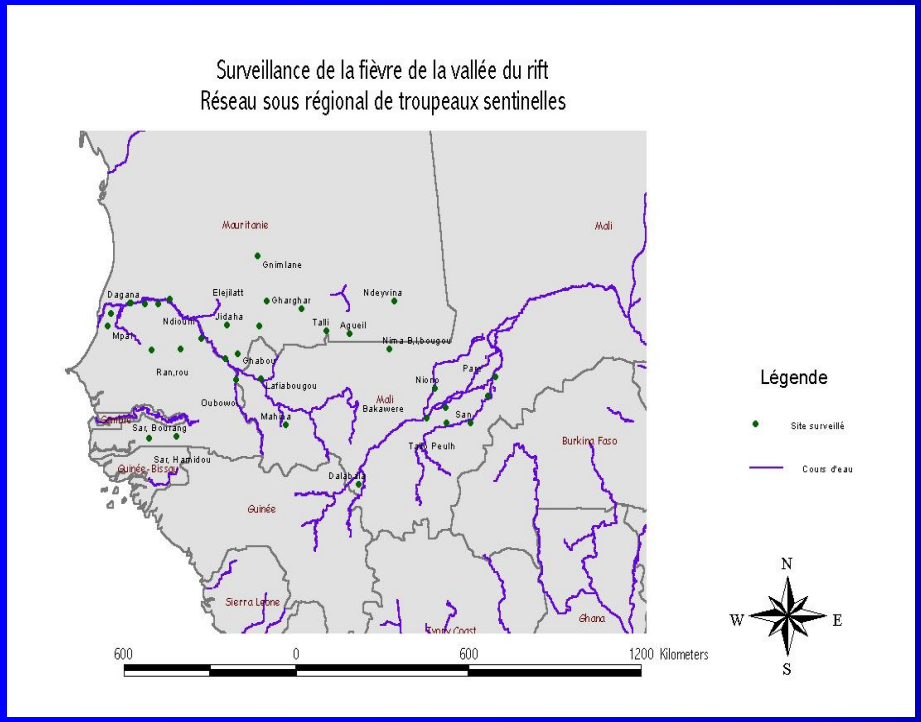
West African context



- The epizootic in Mauritania has created greater interest in the disease in West Africa.
- A surveillance network was established through sentinel herds after the 1987 epizootic in the Senegal river basin. The objective of the network was to detect RVF cases by regularly conducting serological surveys in sentinels herds and human populations. This sero-survey of RVF conducted in domestic ruminants in Senegal allows us to annually assess the risk for non immune populations.
- A second epizootic was noticed in Mauritania in 1998 with same consequences in livestock and humans, mainly in the South east in Mauritania (the surrounding countries less affected)

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- **West African RVF Surveillance Network**

- Following this second RVF epizootic in 1998, a regional disease surveillance system has been implemented in Mali, Mauritania and Senegal with the following objectives:
  - Early detection of the disease through a regional surveillance system based on sentinel herd sero-monitoring and disease reporting,
  - Information sharing at regional level by regular feedback to the partners,
  - Communication and training through tools like posters, videos and booklets on RVF
  - Use of safe attenuated vaccine in local sheep to prevent future RVF outbreaks

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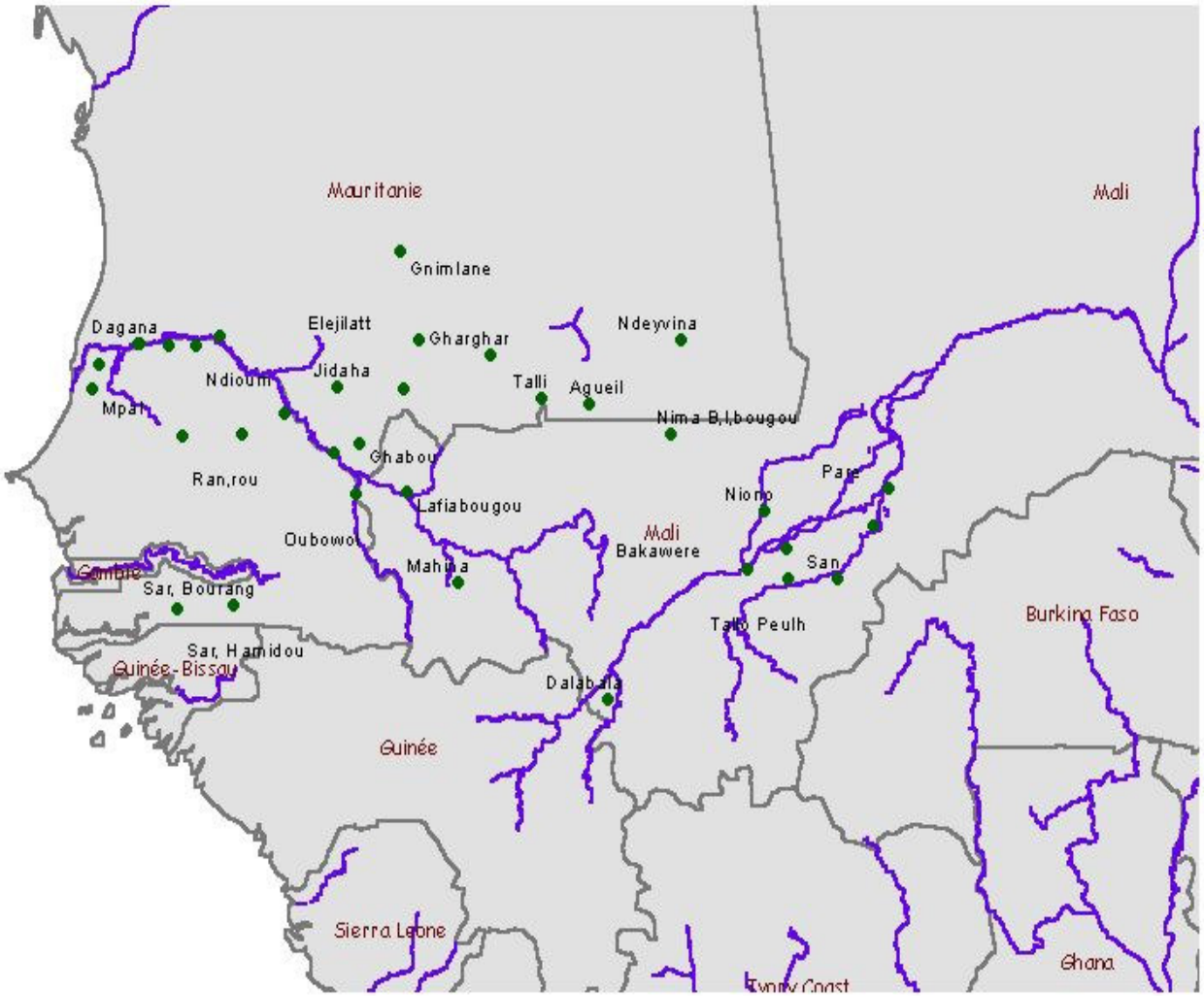
Activities adopted by the network (1)

- **Establish a regional surveillance system**

  - A network of sentinel herds (small ruminants) was established in the three countries (Mali, Mauritania and Senegal). Sentinel herds locations were chosen in potential high risk areas according to the proximity to rivers, swamps, dam, etc and the suitability of the place to harbour the mosquitoes (virus vectors). An average of 30 females per herd with individual tagging were clinically examined (abortions and still births recorded) and bleeded by field agents during the raining season. Collected sera were tested for IgM and IgG in order to detect recent and past infection.

  - A total of 31 sentinel herds were visited monthly during the raining season (from June to November).

Surveillance de la fièvre de la vallée du rift
Réseau sous régional de troupeaux sentinelles



Légende

- Site surveillé
- Cours d'eau

N
W
E
S

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Activities adopted by the network (2):

- **Improve the understanding of the epidemiology of the disease**
  - A regional database was established at the coordination unit in Dakar (Senegal) in order to record and analyse all the data related to the disease (sero-surveillances surveys, suspicion and outbreak notifications) generated by the activities.
  - Historical data and results of the past serological survey campaigns which started after the first 1987 RVF epizootic outbreak, 20 years ago, was computerized in order to highlight the long term disease trends.
  - Studies on mosquitoes vectors , potential hosts on wild life (rodents,.) and environmental factors involved in the enzootic or epizootic cycle of the disease,

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Activities adopted by the network (3)

• Establish a strategy control of the disease.

- Several prophylactic and control measures are recommended however , immunization of susceptible animals is considered the most effective mechanism to control the disease.
- The live veterinary vaccines have important disadvantages that limit their use. Most notably, the live attenuated vaccine virus vaccine may induce abortions, foetal anomalies, and neonatal death if inoculated onto pregnant ewes.
- An attenuated live strain of RVFV was established by institut Pasteur de Paris and tested successfully in mice laboratory. This strain that appeared to be a good candidate to be used in livestock vaccine campaigns needed to be tested in local sheep breed. The programme started the test of immunogenicity and innocuity in sheep in LNERV, Dakar-Hann, Senegal.

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Activities adopted by the network (4)

- **Increase public awareness of RVF**
  - Public awareness programme carried out in order to keep the public fully and accurately informed not only to reduce concern but also to assist in recognition of the disease cases.
  - Communication and training materials (a booklet, video and poster) produced by the project to raise local awareness of Rift valley fever consequences on livestock and human heath as well as to train field agents in disease recognition.

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Results obtained by the Network

- Establishment of a regional database linked a Geographic Information System (GIS) at Dakar, Senegal,
- Establishment of a regional surveillance system of RVF through sentinel herds survey in Mali, Mauritania and Senegal
- Élaboration of Posters, periodic bulletins, videos and CDs on RVF,
- Vaccine trial in local sheep in Dakar, Senegal

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Results obtained (2)

- **A regional network of sentinel herds (small ruminants) was established in the three countries.**
  - **An average of 30 animals per herd (31 herds in total) were clinically sampled by the field agents. These samples were analysed by the Central Veterinary Laboratories (LCV/Bamako, CNERV/Nouakchott, LNERV/Dakar) for IgM and IgG RVF antibodies to detect recent viral circulation.**
  - **Each herd has been visited 3 times during the raining season from June to November.**
  - **A total number of 31 herds were visited and around 3000 samples were analysed in 2000 and 2001, and 2000 samples during the following years**

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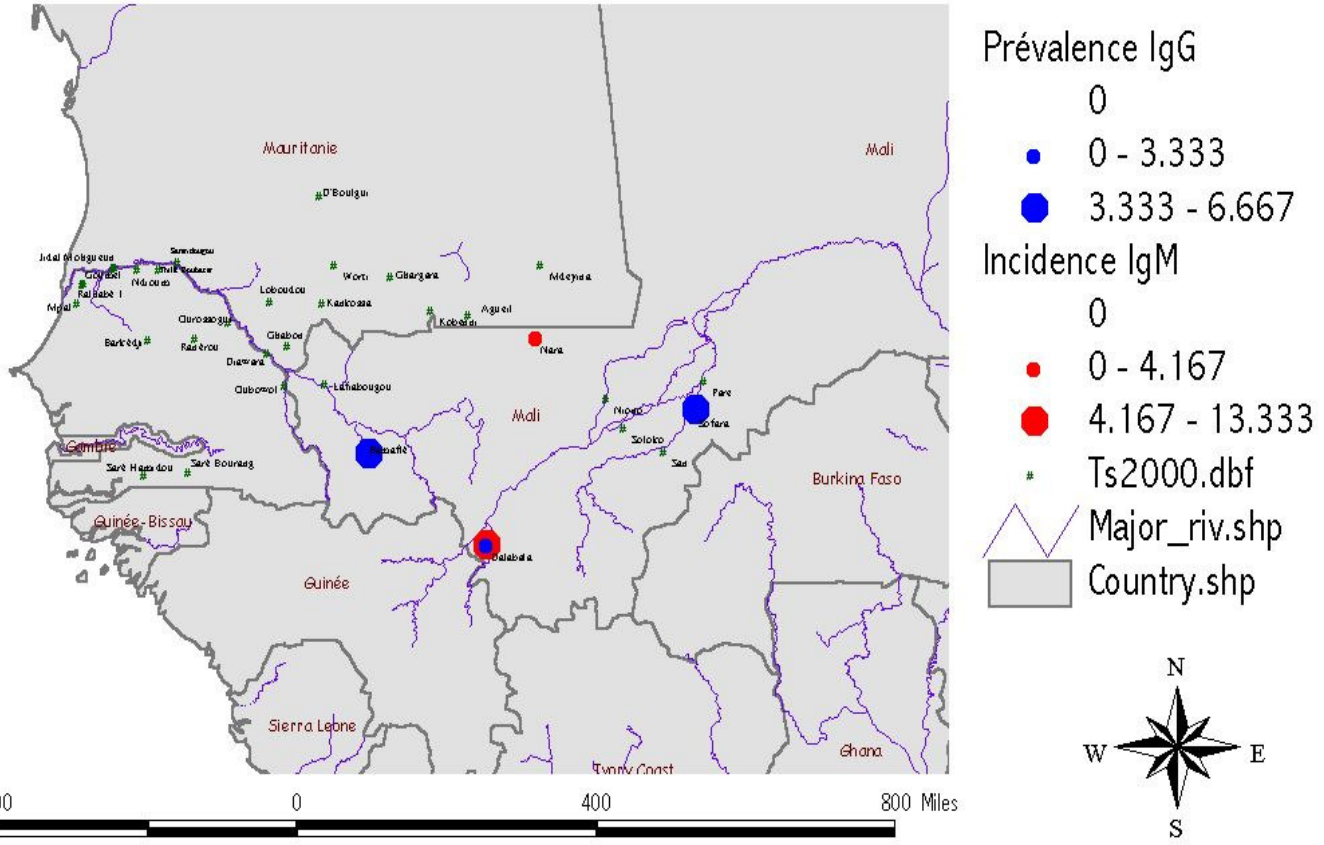
Réseau de troupeaux sentinelles
(Prévalence en IgG et IgM en juillet 2000 au Mali)



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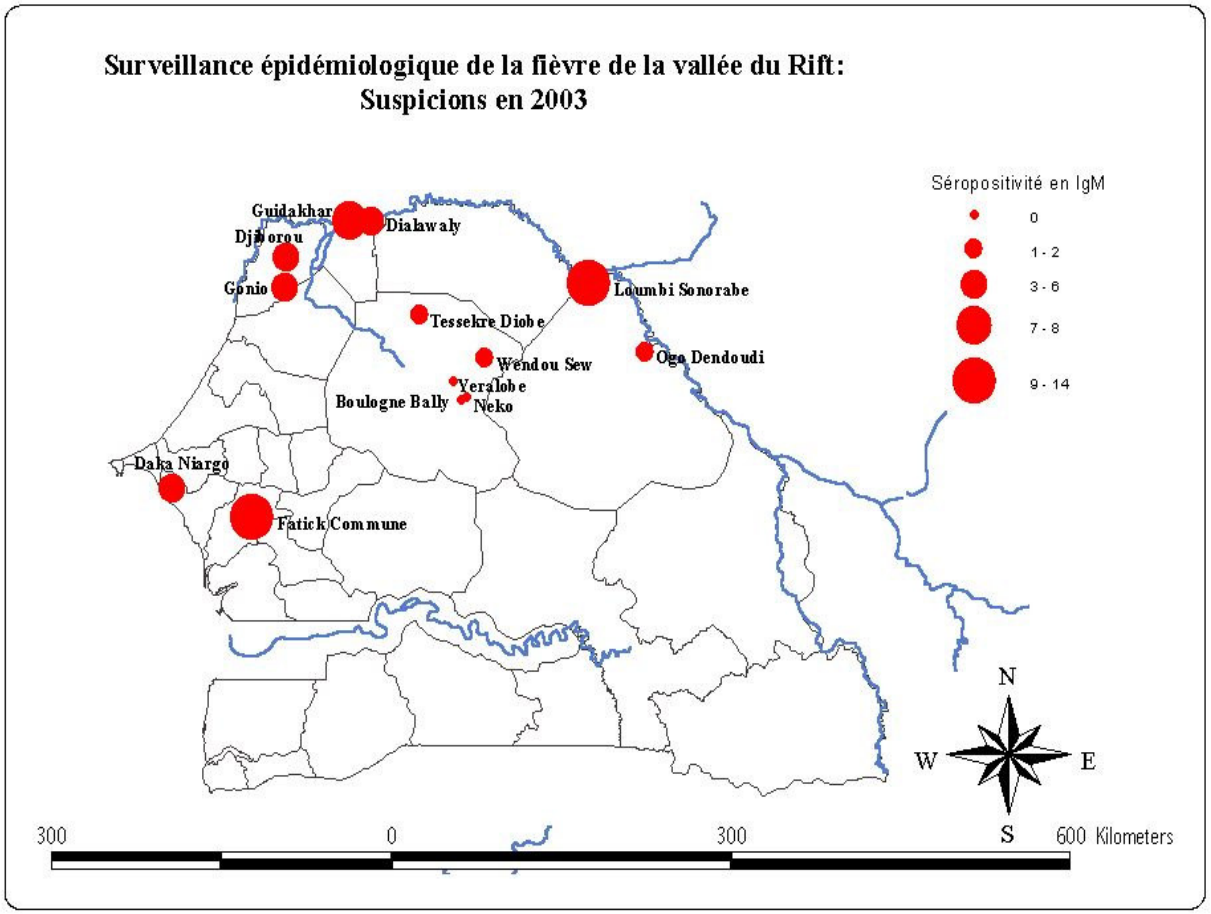

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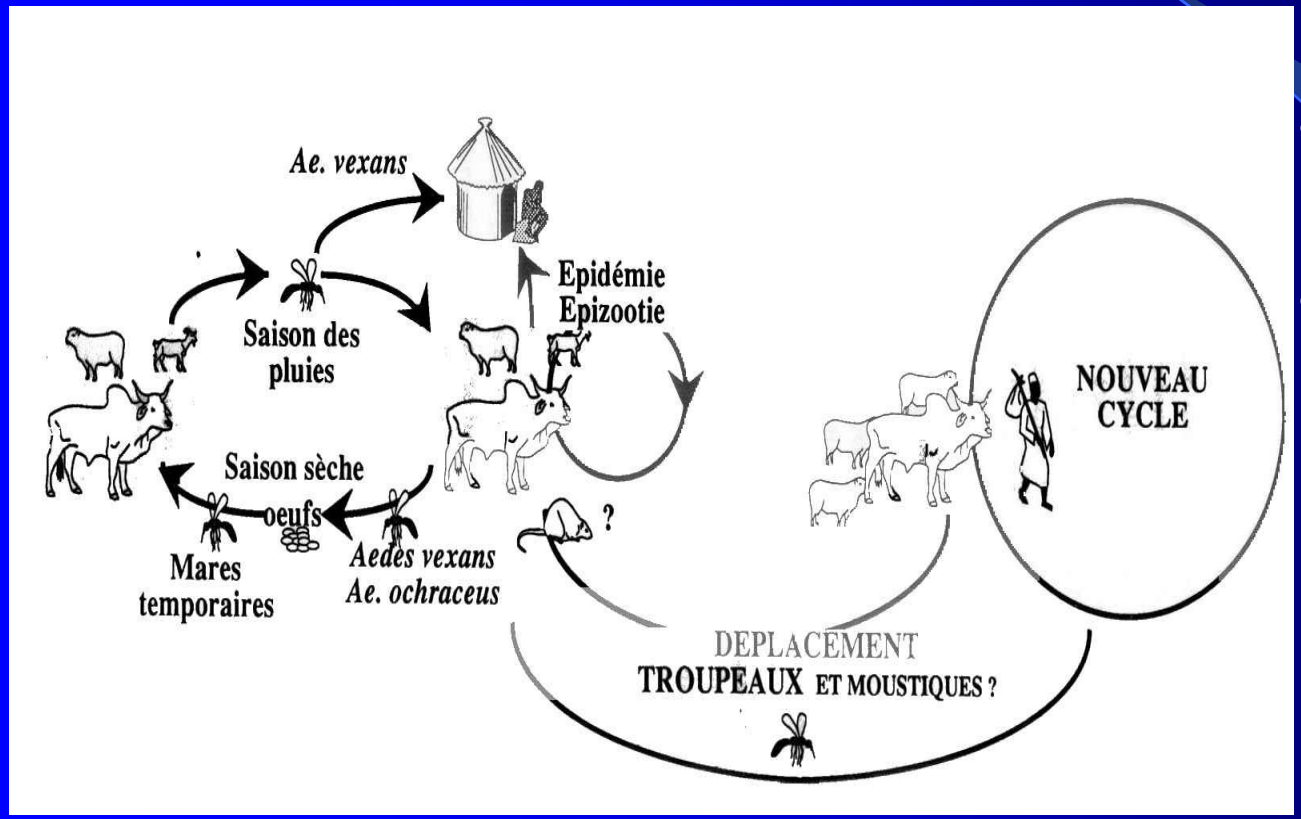

Cycle épidémiologique
de la FVR dans le Ferlo

- **Others Vectors involved**
  Culex poicilipes
- **Rodents, as possible hosts in the maintenance cycle of RVF in nature**
  Rattus ratttus
  Mastomys huberti
  Arvicanthis niloticus
  M erythroleucus

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Results obtained (1)

- **A regional database was set up at the coordination unit in Dakar, Senegal**
  - **All data related to the disease were recorded (serological survey from 1988 to 2008).**
  - **About 28 000 samples were analysed and computerized in this regional data base .**
  - **Productions obtained:**
    - Risk mapping (Clements et al, 2005)
    - Predicting models (Ceccato et al, 2008)
    - Asses the risk for no immune animal population

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Results obtained (1)

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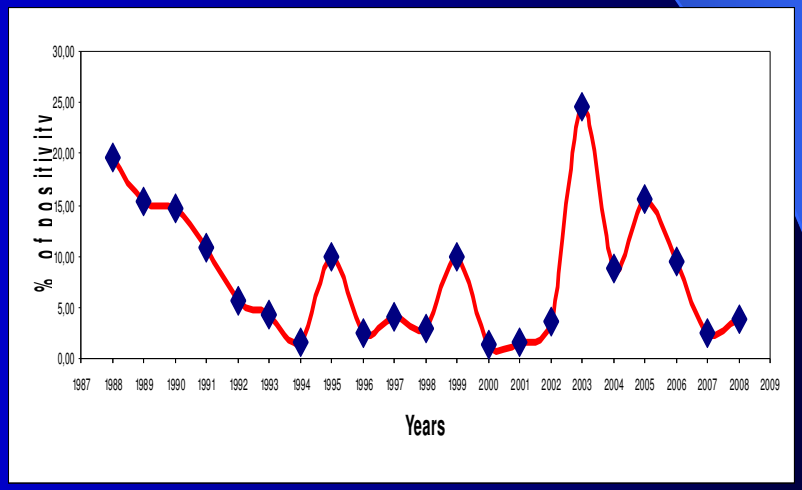

Evolution of the seroprevalence in domestic ruminants in Senegal from 1988 to 2008

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Results obtained (3)

- **Elaboration of Posters, information bulletins, Videos, CDs and booklets on RVF.**

  - 3 000 posters in French and national languages (Pulaar, Bambara),
  - 200 videos on RVF FVR (film translated in French)
  - 200 CDs On RVF
  - 400 Booklets on RVF
  - 10 Nos of information bulletins on RVF (in French) (2000-2008)
  - Acts of a regional meetings in Dakar, Senegal

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Poster on RVF consequences on livestock and human health to train field veterinarians and herdsmen in disease recognition (Poster in French and bambara, Mali)

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Results obtained (4)

- **Vaccine trial (attenuated RVFV strain R566) on local sheep in Dakar, Senegal.**
  - The minimal dose producing neutralizing antibodies is 10^4 u f p per animal ,
  - This dose is non pathogen in pregnant sheep (no abortion) at any stage of gestation.
  - It is needed to test the efficacy of the RVFV strain 566 (about challenge with pathogen strain) to evaluate the protective capacity against the disease.
  - The production and the use of that strain in a massive vaccination campaign against RVF in West Africa will be a great achievement of the programme.

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Conclusions

- Sentinel herds established system in areas at risk in Mali, Mauritania and Senegal. It was able to detect any RVFV activity even at very low.

- This system of RVF surveillance provoked a significant increase in disease awareness and was able to detect others transboundary diseases like Lumpy Skin disease, Peste des petits ruminants, Foot and Mouth disease, ect,.. and can contribute to better understanding of the epidemiology of the disease (vectors, reservoirs, prediction,).

- Thee R566 strain of RVFV appeared to be very attenuated and immunogenic in sahelian sheep and needed to be tested for efficacity with pathogen strain to evaluate the protection in sheep vaccinated.

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