Rinderpest eradication in Africa

After its introduction into Africa in the 1880s, rinderpest became the most feared and most devastating disease to afflict the continent’s cattle and wildlife herds. Outbreaks of the classical disease in cattle caused mortality rates of 10 to 90 percent. So devastating was this “cattle plague” that many countries worldwide made concerted efforts to stamp it out and, having once eliminated it, prevent its re-emergence. The disease was a serious threat to the livelihoods of millions of people in Africa. The presence or suspected presence in a country served as a major barrier to livestock trade, and many countries of the world, particularly in Africa, were denied access to valuable external livestock markets. This devastating blow to trade impoverished the pastoral peoples of Africa and dealt considerable blows to the economies of their countries.

The present-day African Union3 Inter-African Bureau for Animal Resources (AU-IBAR)4 was established in 1951 with responsibility for eliminating rinderpest from Egypt and sub-Saharan Africa, where continual east-west cattle movements prevented effective control by individual countries. Since then, with the European Union (EU) as the main donor, AU-IBAR has coordinated the eradication of rinderpest from Africa through five main projects: Joint Project 15 (JP15), 1962 to 1976; the Pan African Rinderpest Campaign (PARC), 1986 to 1998; the Pan African Programme for the Control of Epizootics (PACE), 1999 to 2007; the African Wildlife Veterinary Project (AWVP), 2002 to 2003; and the Somali Ecosystem Rinderpest Eradication Coordination Unit (SERECU) project, 2006 to 2010. In tandem with rinderpest eradication, the need to strengthen veterinary services was addressed.

From JP15 to SERECU, the main objective was the eradication of rinderpest from Africa. Alongside this main objective were other complementary and synergistic objectives. Under PARC, these were controlling contagious bovine pleuropneumonia (CBPP) through mass vaccination programmes; strengthening the capacity of national veterinary services to undertake vaccination campaigns; and supporting livestock policy reforms in participating countries, to ensure a better financial foundation for and greater sustainability of veterinary services. PACE had the complementary objective of strengthening national and regional capability to assess the technical and economic impacts of animal diseases and to generate appropriate programmes for controlling diseases. All five projects conducted enabling research.

The need for a concerted effort for rinderpest control and eradication was recognized during the 1950s, and in 1961 the heads of veterinary services in Africa launched the multi-national JP15, coordinated by the Organization of African Unity (OAU), to-
day’s AU. JP15 aimed to vaccinate all cattle of all ages every year for three successive years, using live attenuated vaccines to confer durable immunity. The project was implemented in six phases from 1962 to 1976, in 22 countries in West, Central and East Africa, with co-funding from national governments, the European Development Fund (EDF), the United States Agency for International Development (USAID) and the Governments of Canada, Germany and the United Kingdom. The EDF funding was largely bilateral and did not directly involve AU-IBAR. Implementation was undertaken by national veterinary services and coordinated by AU-IBAR, which was essential for the smooth running of the campaign. AU-IBAR was also instrumental in transferring information to OIE and in keeping FAO abreast of progress.

Unfortunately, the phased implementation of JP15 left long gaps between actions; for instance, vaccinations in the Niger were completed two years apart. This led to the survival of residual foci of undetected rinderpest, which were instrumental in the resurgence of rinderpest epidemics in western Africa in the 1980s. JP15 did not develop an exit strategy beyond having national veterinary services eliminate the last vestiges of infection, which most of them did. Failure to resolve or even officially to recognize – the three or four persistent reservoirs of rinderpest infection in western and eastern Africa led to the undoing of most benefits. OIE was the only body in a position to understand that the virus had not been totally eliminated, on the basis of voluntary reports that it received from member countries, but the reporting process was inefficient at the time. The inadequacy of surveillance systems, the limited epidemiological knowledge concerning virus persistence and an excessive reliance on institutionalized mass vaccination therefore led to the resurgence of rinderpest at the end of JP15.

PARC was a more comprehensive programme that built on the achievements and lessons learned from JP15. The project was a two-pronged effort combining regional activities through a coordination unit and national projects in 35 participating countries, between 1986 and 1998. The EU provided the bulk of the funding (EUR 115 million from EDF 6 and 7), with supplementary funding coming from bilateral donors: the United Kingdom, Italy, France, Nigeria and Japan. PARC was also implemented in phases, and funds allocated to each country were made available when an implementing protocol between the country and the local EU delegation was signed. Unlike JP15, PARC focused on strengthening veterinary services and implementing mass vaccination, with a parallel programme aimed at improving the delivery of veterinary services by creating revolving funds, promoting the privatization of veterinary services, and forming herders’ associations. These latter components were regarded as part of a broader structural adjustment programme. In addition to vaccination against rinderpest, activities included communication campaigns, programme monitoring and technical assistance. Towards the end of PARC, it became apparent that mass vaccination was masking signs of clinical outbreaks and interfering with the use of sero-surveillance as a tool for detecting the presence, or confirming the absence, of rinderpest. This led to the progressive replacement of mass vaccination with increased surveillance and targeted vaccination.
The evaluation of PARC in 1996 recommended a continuation to consolidate the gains made and facilitate the eradication of rinderpest from the remaining foci. PARC was succeeded by PACE (1999 to 2006), which was a regional programme designed to meet country needs and global priorities related to the eradication of rinderpest and the control of other major epidemic diseases of livestock. In particular, PACE was to build on the successes of PARC and continue the campaign for the verifiable eradication of rinderpest. The EU provided EUR 77 million for implementation of PACE from 2000 to 2006 (Agrisystems Consortium, 2006).

In contrast to PARC, PACE was managed and coordinated by AU-IBAR, with 32 participating countries each allocated a portion of the total budget. Within its budgetary limits, each country prepared a five-year global work plan of procurement, training and other inputs. PACE’s objectives were to strengthen the technical capacity of disease surveillance and animal health information systems, continue rinderpest eradication, and strengthen the control of other major epidemic diseases. A further objective was to increase livestock farmers’ awareness of the benefits of animal health services, including through strengthened linkages between central institutions and farmers.

Following the outbreak of rinderpest in wildlife in the Tsavo National Park in Kenya in 1994, the coordination and integration of disease surveillance in susceptible wildlife were increased during the last phase of PARC and throughout PACE. In 2000, a wildlife surveillance component was established in the PACE Epidemiology Unit, which implemented AWVP in nine priority countries from 2002 to 2003. The Centre de Coopération Internationale en Recherche Agronomique pour Development (CIRAD) in France was the contract holder, with a subcontract to the Zoological Society of London. AWVP carried out disease investigation and retrospective serosurveillance in susceptible wildlife species.

Despite the successes of PACE, there were concerns that residual foci of rinderpest may have remained in the Somali ecosystem, an area comprising southeastern Ethiopia, northeastern Kenya and Somalia. This was the last place where rinderpest had been diagnosed, in 2001. To address these concerns, SERECU was established to ensure that the three Somali ecosystem countries – Ethiopia, Kenya and Somalia – attained rinderpest freedom, and international recognition of it. The project applied an epidemiologically driven strategy and an ecosystem approach, with enhanced coordination and harmonization among the veterinary services of the three countries. The first phase of SERECU was funded through PACE, from January 2006 to February 2007. FAO-GREP and AU-IBAR supported a bridging phase from 2007 to April 2008, and the second phase was funded by the EU for implementation from May 2008 to December 2010 (Massarelli and Hoogendijk, 2010). Implementation of the various rinderpest eradication projects faced several problems: sporadic civil strife and insecurity, notably in southern parts of the Sudan, the Afar Region of Ethiopia, and Somalia, Liberia and Sierra Leone; national veterinary authorities’ failure to contain the second
great African pandemic of the early 1980s, owing to limited financial and physical resources; insufficient understanding of the role of wildlife in the maintenance and transmission of rinderpest; the presence of mild strains of rinderpest virus at risk of reverting to virulence; and the institutionalization of mass vaccination, with countries’ unwillingness to transit from mass vaccination to surveillance as part of the OIE Pathway for verification of rinderpest freedom.

Several factors contributed to the ultimate success of the whole eradication process, including the PARC initiative of withdrawing vaccination and replacing it with surveillance, which culminated in OIE convening an expert group on rinderpest surveillance systems, in Paris (France) in 1989. The resulting Recommended Standards for Epidemiological Systems for Rinderpest were adopted by OIE as part of Chapter 8.12 of the Animal Health Code, and later became the OIE Pathway.

Other critical elements for success were:

- the political support of governments of AU member countries;
- the availability of effective and safe vaccines and reliable diagnostic and surveillance tools, through enzyme linked immunosorbent assay (ELISA) technology for both sero-monitoring and sero-surveillance;
- the decision made during PACE to eradicate all mild rinderpest virus strains, as it was perceived that these could revert to a more virulent form;
- innovative approaches to animal health services delivery, including the use of community animal health workers (CAHWs) and participatory epidemiology techniques, which facilitated access to and elimination of the disease from remote areas affected by political instability, civil strife and insecurity;
- introduction of a thermo-stable rinderpest vaccine, which significantly reduced dependency on a cold chain system and allowed CAHWs to deliver the vaccine to the field and carry out vaccination easily and efficiently;
- capacity building of national veterinary services in Africa, particularly in epidemiology and laboratory diagnosis, including the creation of epidemiological and laboratory networks;
- enabling research, in clarifying that wildlife were not reservoirs for rinderpest virus.

The eradication of rinderpest from Africa and the whole world marks the first time that an animal disease has been wiped off the face of the earth through human intervention. Other achievements from the programme include strengthened capacity of national veterinary services, particularly regarding national and regional capabilities to assess the technical and economic impact of animal diseases and to generate appropriate programmes to control them; creation of a framework for promoting goodwill among governments (especially veterinary departments and research institutes), the private sector, civil society and donors, which is being used for the control of other diseases; strengthened African Union Commission (AUC) institutions – AU-IBAR and the AU Pan African Veterinary Vaccine Centre (AU-PANVAC) – and capacities; positive socio-economic benefits from investments in rinderpest.
eradication (Tambi et al., 1999; Omiti and Irungu, 2010); improved access to markets and increased regional and international trade in livestock; and improved wildlife conservancy, leading to positive impacts on tourism.

Although rinderpest is now eradicated from Africa, other transboundary animal diseases continue to erode the continent’s access to lucrative livestock export markets. Strategies and programmes for the progressive control of these diseases, and continued vigilance for rinderpest re-emergence are necessary. Rinderpest eradication mobilized many organizations and institutions behind a single goal, and could be a key to success for other initiatives. Such collaboration promotes coherent structural changes across various stakeholder groups. The international consensus achieved over the past three years on the prevention of and response to risks at the interfaces among animals, humans and their various environments (the One Health approach) is a natural and logical development of the policy evolution that started with rinderpest control and eradication. The socio-economic benefits of rinderpest eradication have only been partially documented. Despite the cost of such an exercise, it is necessary to document these benefits in full, to provide justification for investing in the control and eradication of other transboundary animal diseases.

The following are among the main lessons learned from AU-IBAR’s experience of the rinderpest eradication programme

- Eradication of a disease such as rinderpest is a long-term process (with disease impact diminishing over time). Keeping local and international actors and development partners constantly mobilized against rinderpest was a major challenge for AU-IBAR for more than half a century.
- It is important to maintain donor focus and commitment over the long term. Aid effectiveness is a challenge for programmes with wide geographical coverage and long time frames, such as those for transboundary animal disease control, particularly regarding ownership, alignment, harmonization and coordination.
- Focused strategic vaccination (immuno-sterilization) based on rigorous epidemiological surveillance not only reduced wastage of scarce public funds but also accelerated the eradication of rinderpest.
- Mild strains of rinderpest had to be dealt with, to ensure total elimination of the disease.
- The ecosystem approach, with enhanced coordination and harmonization among the veterinary services of neighbouring countries, proved critical for the eradication of rinderpest.

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