CASE STUDY 1: Breeding for trypanosomosis resistance, The Gambia

African tsetse fly-transmitted trypanosomosis (ATT), sometimes referred to as ‘sleeping sickness,’ is estimated to cost more than US$4 billion in losses each year in agricultural income, kills 3 million livestock and infects up to 75,000 people. Symptoms of the infection include anaemia, weight loss, lymph node complications, infertility, and abortion. There is no vaccine for ATT and treatment drugs are expensive and may become ineffective as drug-resistance develops. Despite a century of research, ATT remains one of the world’s most serious livestock diseases.

An alternative method of control is being explored through marker-aided selection (MAS) and embryo transfer to breed trypanosomiasis tolerant cattle. A small number of indigenous African ruminant breeds are already considered to be ‘trypano-tolerant,’ in that when infected, the consequences are relatively minor. The most ‘trypano-tolerant’ cattle breed is the West African N’Dama (Bos Taurus) otherwise known for their resistance to many tick-borne infections, adaptability to humid and dry climates, low milk production and flavoursome low-fat meat.

In 1983 with the assistance of the International Trypanotolerance Center (ITC) (since renamed the West African Livestock Innovation Centre WALIC) based in Banjul, The Gambia, embryos were collected from N’Dama cows and transferred into Kenya Boran cows by using multiple ovulation and embryo transfer. The Center was able to breed 177 offspring that were genotyped and used in mapping for MAS. The results suggest it is possible to produce hybrids that are more tolerant of trypanosomiasis than either parent. WALIC continues to employ a variety of breeding strategies and technologies to improve resistance to ATT as well as improve milk production in local breeds.

CASE STUDY 2: Ol Pejeta Conservancy, Kenya

The Ol Pejeta Conservancy is a non-profit organization located in Kenya’s Laikipia County. In addition to boasting East Africa’s largest black rhino sanctuary, Ol Pejeta holds the largest single herd of Boran cattle in the world. With a herd size of 2,000 top quality Boran breeding cows, Ol Pejeta is at the forefront of breeding for improved beef production. As a member of the Boran Cattle Breeders’ Society, Ol Pejeta has embraced breeding technologies such as artificial insemination (AI) and embryo transfer (ET).

Although Ol Pejeta has not used ET for its own breeding programmes, but it has exported 1,600 embryos from around 100 cows to South Africa. To comply with export regulations, Ol Pejeta relied on expertise from South Africa.
which cost more than US$1,000 per calf born. This proved to be the most costly aspect of the embryo transfer process given that a team of 1 vet and 3 technicians are able to flush 20 cows and freeze all their embryos in the span of just 1 day.

Although ET has a number of benefits, such as mitigating the transmission of viral diseases such as Foot and Mouth Disease which are endemic across Africa. Local ET vets are also growing in numbers who can provide services to smallholder farmers, but drugs and other equipment necessary for ET remain high and the results have thus far been poor. Whist ET will be important to large scale dairy farmers, to multiply their top performing breeds, AI remains the most affordable and accessible option for smallholders for improving milk production. Ol Pejeta also provides improved breeds and semen at subsidized rates in addition to training for local communities through their ‘Linking Livestock Markets with Wildlife Conservation’ programme.

CASE STUDY 3: East Africa Semen and Embryo Transfer Association

Kenya has one of the largest dairy industries in sub-Saharan Africa, with an estimated 3.8 million dairy cattle. Nearly 85% of all milk in Kenya is produced by smallholders, for whom dairy production is a major source of income. The industry however suffers from low quality cows with poor milk yielding capacity. ET technology – the process of impregnating a cow with an embryo of superior breeds – offers the possibility for farmers to produce up to 10 calves per year or get a milking cow in 2 years compared to the current 15 year waiting time in some cases.

Supported by the World Bank East African Agricultural Productivity Project, interested farmers can receive advice on the procedures involved in using ET along with a tailor-made programme and financing options from the East Africa Embryo and Semen Transfer Association. The cost however still remains prohibitive for most farmers. A minimum package that includes harvesting embryos from 3 donors and transferring them to at least 5 surrogates costs Ksh200,000 (nearly US$2,000). The Association is encouraging farmers to partner or work with cooperatives to meet the financial requirements which hopefully will pay off in the long run since a calf of superior quality can be sold at Ksh150,000 (nearly US$1,500).5