

Start-up of small-scale Artificial Insemination and East Coast Fever Vaccination business: Guidelines on requirements

Artificial insemination (AI) of animals is a technical and involving process.

Benefits of AI for smallholder farming systems

- AI provides access to genetics from sires that have proven productivity potential in milk production and fertility traits.
- AI avails a choice among different sires that can complement and correct for characteristics in existing cows
- AI offers a lower cost in mating cows as there are no costs associated with rearing a bull



AI service providers

AI service providers need to offer options to enable livestock keepers make informed choices of sires that would result in better adapted and more productive heifers in their herds in addition to supporting the management of animals for better productivity.

1. Have an overall proposition for the type of services that will be offered

For example: Tag line	What to expect from AI services
'Providing access to productive and resilient dairy animals for farmers'	Reliable Accurate Informed (evidence based)

2. Be properly equipped with basic tools in order to provide AI services

Basic equipment required			
Function	Equipment	Estimated Cost (USD)	
1	Means of transport	Motorcycle	920
2	Storage and transport of AI semen	Liquid nitrogen container 3 litre	367
		Liquid nitrogen container 20 litre	900
		Liquid nitrogen	3/litre
3	Implementation of AI	Pistolet	Varies (35–43)
		Applicator	Varies (35–43)
4	Monitoring and providing feedback	Phone/tablet	281
5	Consumables	Gloves, spirit, soap, towels	30

*1 US dollar is equivalent to 2,313 Tanzania shillings (2021)

Things to remember

- Have several straws containing frozen semen of top AI sires (bulls), which you keep and transport in a special storage container. These must be kept at a low temperature using liquid nitrogen.
- Inseminating an animal is the final part of a process. This must be performed by a skilled AI service provider. It involves the following steps.
 - Select the straw containing semen from the bull to be used.
 - Thaw the straw containing frozen semen from the bull selected.
 - Place the semen straw in the insemination gun, which is then used to fertilize the cow which is in heat.



Determining the price of AI service

The following is a breakdown of basic costs to include when determining the price for AI service on a farm

Item	Estimated cost USD	% of total costs	Number of animals served Example of costing based on number of animals served (USD)		
			10	50	100
Bull semen	1.3	43	13	65	130
Arm service	1.12	37	11.2	56	112
Transport	0.39	13	3.9	19.5	39
Lubricant	0.09	3	0.9	4.5	9
Other equipment	0.09	3	0.9	4.5	9
- Gloves					
- LN					
- Sheath					
Depreciation	0.03	1	0.3	1.5	3
Total	3.02		30.2	151	302

Note: The key cost drivers for an AI service are bull semen, arm service and transport.

Scale of AI service

Numbers matter: Income depends on the number of AI services provided.

Before providing AI services, ensure you are clear on the following:

- How many dairy animals are available within the area targeted?
- What is the minimum number of services you need to provide in a month in order to make profit?
- What is the distance for accessing the different animals?
- What will influence the success of the AI service you provide? The condition of the animal is critical. Ensure you understand the animals you are serving. Be able to give an **objective body condition score**.

Think of either a village or a group of villages as the enterprise you are serving. How many farmers with dairy animals are in the area you are going to cover with your services?

Support the farmer to document details on the productivity of their animals—notably information related to reproduction:

- At what age should the animal be served for the first time? What is the optimal age of first service?
- Which type of bull should be used on a heifer? Select semen from a bull with a good fertility score.
- How soon after calving should a cow be inseminated? Have a good sense of a breeding calendar (If possible, leave a chart to guide the farmer).
- For how many breeding cycles should a cow be retained by a farmer before disposing/replacing it with another? Note, milk production by a good dairy cow increases with each lactation up to the fifth lactation, then plateaus or begins to decline.

The farmer who has invested in improved breeds will normally not hesitate to invest in monitoring the animal's performance and using records to guide decisions on the management of the investment.

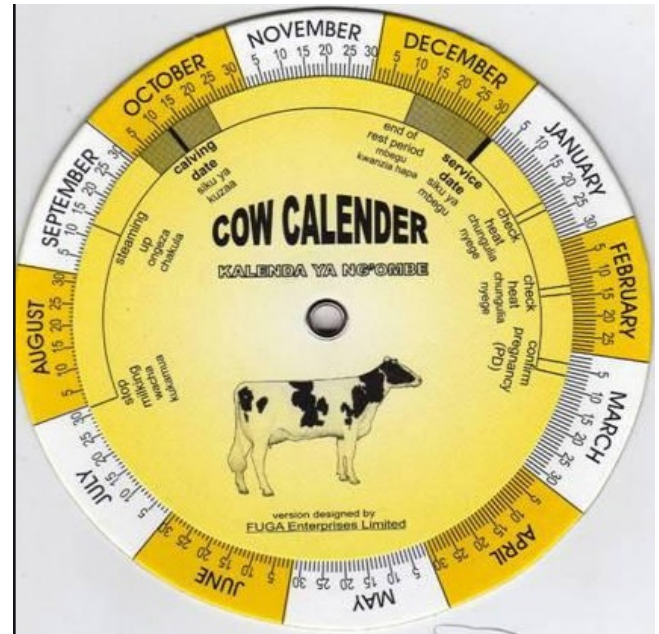
Tools to support services

1. The African Dairy Genetic Gains (ADGG) data platform is useful for animal data management <https://portal.adgg.ilri.org/>

2. Breeding calendar/reproductive cycle management for a dairy cow (Figure 1)

- Calving down should occur with minimum difficulty
 - Involution (shrinking) of uterus takes 21 days
 - Follicular development in a well-managed cow should commence 14–21 days after calving down
 - Heat periods occur every 18–24 days
- Inseminate the cow 50–80 days after calving
 - Days-open should not exceed 50 days
- Pregnancy takes 282 days
- Dry off the cow 50–60 days before calving
- Transition period to calving should be 14–21 days

Figure 1: Breeding calendar



Calendar courtesy of Fugo Enterprises limited, Nairobi, Kenya

Small-scale business opportunities with AI

As a business which needs to generate profit from providing AI services, you can do a combination of the following:

- Procure and resell AI semen of prized animals.
- Sell the required tools and instruments for providing AI.
- Provide associated consultation services for livestock keepers, and for AI service providers.
- Function as an agent for agro-dealer by providing training/extension services to farmers, generate demand for improved dairy inputs/technologies and bulk orders for the same to earn commission from sale of inputs.

Develop AI and animal health packages with cost options for a farmer to select:

It makes **best business and economic sense** to combine the provision of AI services with other services the farmer may require.

- Shared facilities can lower overhead costs and improve profitability

- Costs for each transaction will be lower
- Better use of cold chain facilities (liquid nitrogen to store semen + vaccines)

Services that support keeping animals in good health can be easily provided together with AI. These include:

- Deworming
- Clinical services
- Vaccinations
- Services associated with good management practices such as dehorning, castration, hoof trimming and ear tagging
- Animal health information

Combining the provision of AI with vaccination against East Coast fever (ECF) is particularly attractive. This is because the two services use similar equipment (liquid nitrogen tanks and liquid nitrogen).

ECF Vaccination is provided once in the lifetime of the animal

Requirements for ECF vaccination

	Function	Equipment	Estimated cost (USD)
1	Means of transport	Bicycle/motorcycle	200 (bicycle) 2000 (motorcycle)
2	Transport of ECF vaccine stabilate	Liquid nitrogen container 3-litre	600
		Liquid nitrogen	2–3/litre
	Storage of diluent	Fridge (-20oC)	500
3	Vaccine package1	Stabilate + diluent + antibiotic + ear tag	5
		Weigh band	10
		Cool box	20
4	Consumables	Syringes, needles	



The challenge in ECF vaccination is usually the need to mobilize 40 calves because a straw contains 40 doses. Each straw costs USD 174

AI bundled services

All 'AI service bundles' should come with supportive data capture mechanisms to enable the farmer to monitor their animal's performance

AI package 1 (Basic): Provide sire selection advice + arm service + manage until the point animal has conceived + animal health information.

AI and care package 2 (Economy): Provide corrective mating + arm service+ conception management + calving management+ animal health information

AI and care package 3 (Wholistic): Provide corrective mating + arm service+ conception management + calving management + calf management and routine vaccination+ animal health support services.

All AI packages should include

- Breeding calendar
- Guided mate selection for enabling corrective mating
- Pregnancy diagnosis three months after AI
- Critical guidance on animal management to calving
- Support at calving (e.g. using e-learning tools available at <https://m.learn.ink/ilri>)

Other costs to be considered in AI packaging services

Type of service	Product deal (USD)	
	Stand alone	Package
Pregnancy diagnosis	2.16	1.73
Transport	0.65	0.65
Monitoring visit	2.16	1.73
Transport	0.65	0.65
Calving support	8.65	6.49
Transport	0.65	0.65

- Learn basic financial management for your enterprise
- A key strength of an entrepreneur is the ability to sell a product



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