



A manual to guide collection of data using the ADGG ODK tools

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The Platform for African Dairy Genetic Gain (ADGG) is an International Livestock Research Institute (ILRI)-led investment by the Bill & Melinda Gates Foundation (BMGF) that has developed and is currently pilot-testing a multi-country genetic gains platform that uses on-farm performance information and basic genomic data to identify and promote wide use of appropriate superior purebred and cross-bred bulls for artificial insemination (AI) delivery and planned natural mating for smallholder farmers in Africa.

The ADGG project team at ILRI, with contributions from partners, has developed tools to collect data from smallholder farmers using the Open Data Kit (ODK: <https://opendatakit.org/>), which are customizable for countries that partner with ADGG.

This manual provides an overview on the tool's salient features, highlighting how data on the performance of dairy animals and the related farm-level socio-economic and infrastructural data is collected through the ODK. The manual is written with the assumption that readers or users are competent in installing, configuring and using ODK hence the installation steps and configuration of ODK are not described.

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1. Introduction

Open Data Kit (ODK) is a suite of tools to help users collect and aggregate data. ODK-Collect is a powerful phone-based replacement for paper forms that is built on the android platform. Data can be collected in a variety of formats including text, location, photographs, videos, audio, and barcodes. In using the ODK, users need to understand and adhere to basic principles of designing and implementing surveys and the collection of continuous monitoring data. Details on general installation and use of ODK collect are available at [Using ODK Collect](#).

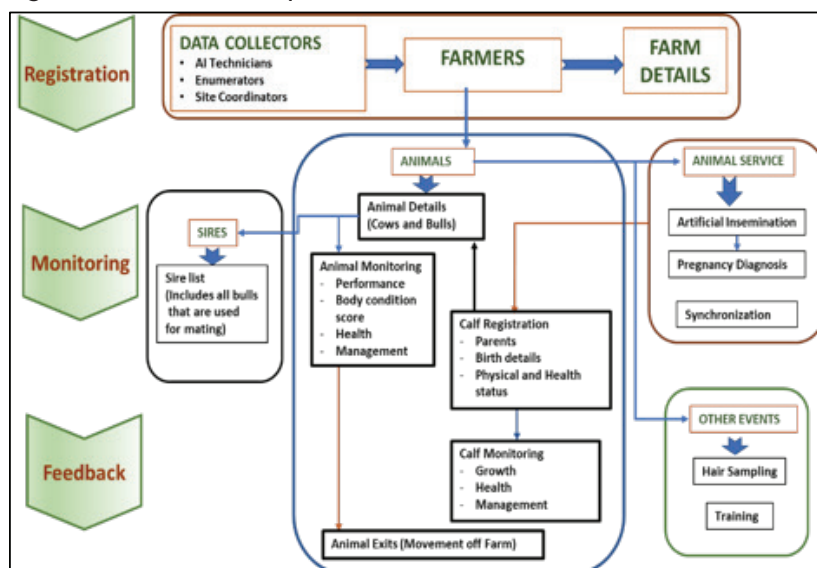
The ADGG ODK tools are designed to transmit data electronically directly to the main ADGG data Platform on which data from different types of farmers (smallholders, medium scale and large scale) is collated and stored. Data for each country participating in livestock data management is mirrored within a country database that is managed through a nationally designated Dairy Performance Recording Centre (DPRC).

Data collection in the ADGG project is carried out under supervision of designated coordinators in each county by trained Performance Recording Agents (PRA's). The data collected, is transmitted to the ADGG data platform and processed in real time where internet connectivity is available. The data collected can also be cued on the android device and transmitted automatically at the end of each's day data collection.

The ADGG ODK tool is packaged into modules to enable fast and accurate collection of interrelated information on animals in the targeted farming systems. Using a logical sequencing of events, related information is grouped for collection in a single cycle. With the diversity of information anticipated to be collected, guidance is provided on constraints, anticipated data ranges, and choices for a given variable.

The sequential logic used in grouping data collected through the ADGG ODK tool is illustrated in Figure 1.

Figure 1. Overview of sequence and information collected from farms using the ADGG data tool



The ADGG ODK data capture tool is currently available in English, Kiswahili and Amharic, and can be translated and availed in the official language used in any country that adopts the ADGG platform.

Instructions on accessing the ADGG data tools are available here: [Installing ODK for ADGG](#).

2. The ADGG ODK data capture tool

The ADGG data capture tool is packaged into modules designed to enable collection of information related to specific activities as follows:

1. Administration and user access
2. Registration
3. Cattle management/monitoring
4. Monitoring fodder production and milk utilization
5. Farm equipment and resources to support the dairy enterprise (general farm details)
6. Farmers/project groups

Note: Data can be captured on multiple activities during a single farm visit.

Details on the type of data that can be collected within each category listed are outlined in subsequent sections.

2.1 Administration and user access

Creation of administrative areas

Within each country the data and results from specific administrative areas/units such as Regions, Districts, Councils, Wards and Villages, are pre-coded and linked in the database. When using the ADGG ODK tool, administrative units are accessed through pull-down menus. This reduces errors in typing or spelling during data entry.

New administrative units can be added/edited by data managers as the expanse and numbers of farmers participating in the ADGG project increases.

User access for data collators

Data collators are users directly engaged in obtaining data from livestock keepers, monitoring data quality and availing information generated through the ADGG platform for decision making by different stakeholders. Two types of data collators are provided with user access in the ADGG ODK tools: data managers and data service providers.

Data managers are the ICT personnel engaged at the DPRC in the lead institution that hosts the national livestock database server.

Data service providers comprise site coordinators, performance recording agents (PRA's) and artificial insemination technicians (AI-Techs) engaged in each country. These users must be registered on the ADGG platform by the data managers. At registration, each user determines their log-in credentials and is given rights to the specific activities they will carry out.

Note: Only registered users can log in and use the data collection tool.

At registration, data service providers provide information presented in Figure 2.

Figure 2. Details captured during the registration of Data service providers

Staff General Details > 1

*** User / Staff Full Name**

*** User ID to be used by this Staff**

*** Password to be used by this Staff**
Password is case sensitive

*** User Staff Gender**

☐ Male

☐ Female

*** Phone Number**

*** Age group**

☐ Teenage (15 - 17 Years)

☐ Youth (18 - 29 Years)

*** Education level**

☐ NONE

☐ Primary Education

☐ Secondary Education

☐ Technical Education

☐ Diploma

☐ Bachelors Degree

☐ Post Graduate degree

☐ Other (Write it in the text below)

*** Do you have an email address?**

☐ Yes

☐ No

*** Staff Type**

☐ Data Manager

☐ Field Co-Ordinator

☐ Enumerator

2.2 Registration

The process of registering the sources of data to be captured in the ADGG database is grouped into four categories:

- Registration of farmers
- Household demographic information
- Cattle registration
- Adoption of technologies by farmer

Registration of farmers

Farmers willing to participate in the ADGG project are required to provide their consent through signing a document outlining their understanding of the project activities and the anticipated use of the information collected on their farms (see Appendix 1 of this document).

At registration, farms provide information as illustrated in Figure 3.

Figure 3. Details captured during registration of farmers

<p>* Type of Farm</p> <p><input checked="" type="radio"/> Small-Scale Farm</p> <p><input type="radio"/> Medium-Scale Farm</p> <p><input type="radio"/> Large-Scale Farm</p>	<p>* Mobile number of the Farm or Farmer</p> <p>_____</p>
<p>* Farm or Farmer First Name</p> <p>_____</p>	<p>* Gender of the farmer</p> <p><input type="radio"/> Male</p> <p><input type="radio"/> Female</p>
<p>* Farm or Farmer Other Names</p> <p>_____</p>	<p>* Age group of the Farmer</p> <p><input type="radio"/> Teenage (15 - 17 Years)</p> <p><input type="radio"/> Youth (18 - 29 Years)</p> <p><input type="radio"/> Middle age adult (30 - 45 Years)</p> <p><input type="radio"/> Elder (>45 Years)</p>
<p>Unique ID of Farm or Farmer for Identification</p> <p>ID to use in uniquely identifying the Farm or Household of the farmer. Enter the farmer telephone number if there is no other unique id.</p> <p>_____</p>	<p>* Is the farmer the household head?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>

Note:

- i. The registration of a farmer is done only once and cannot be repeated.
- ii. A farmer has to be registered before their animals can be registered.

Identification of people to receive feedback based on the data submitted

Information is captured on individuals on a farm who will receive information and feedback based on data collected from the farm. The people to receive feedback indicate their name, relationship to the head of the household, contact details, gender, age and level of education, and indicate the preferred language to be used for receiving feedback.

Individuals receiving feedback serve as a key contact point for networking, communication and introducing interventions to help improve the dairy enterprise.

Household demographic information

Once a farmer is registered, details are obtained about their household. The household demographic information includes details related to members within the household. Individuals who are resident in a household for less than three months are not considered to be household members.

There are two options for collecting household demographic information in the tool:

- a. Households not willing to provide demographics

A farmer can opt not to give details on the members of his/her household. In this instance, the farmer is requested to provide a general indication of the total number of household members of each gender, grouped into pre-defined age categories.

b. Households willing to provide details on their demographics

In this case, information is collected on each household member providing details on their gender, age, level of education achieved and their relationship to the household head.

Cattle registration

Animals belonging to registered farmers can be added into the database. It is desirable to have all the animals that the farmer owns registered. However, this remains a decision of the livestock owner.

Each animal must be uniquely identified as per the country's identification/registration policy. Animal identification could be using an electronically bar coded or conventional alfa-numerically labeled pastic ear tag, or a radio frequency identification (RFID) microchip. Details on animal registration, recording and the use of animal records at farm level are outlined in a subsequent manual.

Note:

1. Each individual animal is only registered once in its lifetime.
2. If ownership of an animal is changed, the animal retains its original identification and related information in the database.
3. Information collated on all animals will enable the farmer to receive better feedback to help guide decisions on the management of the whole dairy enterprice.

At registration, the following information is captured on an animal: its breed-type, sex, date of birth and information on its parents (sire and dam) see Figure 4.

Figure 4. Details captured during registration of cattle

<p>* Select Cattle type to register for Animal 1</p> <p><input type="radio"/> Heifer (A female that has never calved down)</p> <p><input checked="" type="radio"/> Cow (A female that has calved down at least once)</p> <p><input type="radio"/> Male Calf</p> <p><input type="radio"/> Female Calf</p> <p><input type="radio"/> Bull</p>	<p>* MAIN breed of Animal 1 (ADGG)</p> <p><input type="radio"/> Ankole</p> <p><input type="radio"/> Arsi</p> <p><input type="radio"/> Ayrshire</p> <p><input type="radio"/> Begait</p> <p><input type="radio"/> Boran</p> <p><input type="radio"/> Brown Swiss</p> <p><input type="radio"/> Fogera</p> <p><input type="radio"/> Guernsey</p> <p><input type="radio"/> Holstein Friesian</p> <p><input type="radio"/> Iringa Red</p> <p><input type="radio"/> Jersey</p> <p><input type="radio"/> Masaai</p> <p><input type="radio"/> Mbulu</p> <p><input type="radio"/> Mpwapwa</p>	<p>* Animal 1 (ADGG) main breed composition</p> <p><input type="radio"/> Pure bred</p> <p><input type="radio"/> >75%</p> <p><input type="radio"/> 50%</p> <p><input type="radio"/> 25%</p> <p><input type="radio"/> Don't know</p>
<p>* Name of Animal 1</p> <p>Should be name allocated by Farmer for the animal</p> <p>ADGG</p>		<p>Secondary breed of Animal 1 (ADGG)</p> <p><input type="checkbox"/> Ankole</p> <p><input type="checkbox"/> Arsi</p> <p><input type="checkbox"/> Ayrshire</p> <p><input type="checkbox"/> Begait</p> <p><input type="checkbox"/> Boran</p> <p><input type="checkbox"/> Brown Swiss</p> <p><input type="checkbox"/> Fogera</p> <p><input type="checkbox"/> Guernsey</p>
<p>* Animal 1 (ADGG) Color</p> <p>Color is required</p> <p><input type="checkbox"/> Black</p> <p><input checked="" type="checkbox"/> Brown</p> <p><input type="checkbox"/> Grey</p> <p><input checked="" type="checkbox"/> White</p>		

In the ADGG ODK tool, the registration of animals is categorized to enable collection of details that are unique to animal types:

- a. Mature female animals (cows and heifers)
- b. Sires (bulls and artificial insemination)
- c. Calves (male and female)

Depending on the category, specific information is captured, for example:

Mature female animals: additional information is captured related to the udder conformation and the number of previous calvings the animal has had.

Sires: additional information is collected on the origin and the international herd book number.

Calves: additional information is captured on its growth (weight for age) and any deformities.

Adoption of technology by farmers

Through this section information is obtained on the farm resource base and adoption of different technologies supporting the dairy enterprise. This includes the total number of animals a farmer has, adoption of feeding and animal health practices, the land that the farmer owns.

2.3 Cattle management or monitoring

Once an animal is registered, information on various events in its life are recorded either on a monthly basis or when it occurs. Measurements and dates of occurrence are noted.

Reproduction is critical for any dairy enterprise. Management interventions and dates for key events (Synchronization, Insemination, Pregnancy Diagnosis, Calving) to enable animals produce healthy calves are stored in the database.

Synchronization

Synchronization entails the multiple administration of specific hormones to a group of cows/heifers (from 20–100) on the same day to induce estrus (An individual animal on a farm could also be given hormones to enable timely calving). The synchronized cows/heifers come on heat at almost the same time and are inseminated by a qualified inseminator.

During synchronization, the following details are recorded (illustrated in Figure 5):

1. type of hormones used and supplier of the hormones
2. date and time of insemination
3. body condition score of the cow/heifer
4. bull details: ID, breed, semen batch number
5. Person administering the synchronization and the inseminator

Insemination

Cows/heifers that show signs of heat (oestrus) are inseminated either through natural mating by bulls, or through AI. AI should only be done by a qualified AI technician.

During insemination (natural mating or AI) of a cow/heifer, the details of the procedure should be documented. These include: date of service, body condition of the cow/heifer, type of insemination (synchronized or not), source of semen, details of the straw used and the sire ID (Figure 6).

Figure 5. Details captured during synchronization

<p>* Which synchronization are you performing</p> <p><input type="radio"/> First Hormone</p> <p><input type="radio"/> Second Hormone</p> <p><input type="radio"/> Third Hormone</p>	<p>* Supplier of hormones</p> <p><input type="radio"/> NAIC</p> <p><input type="radio"/> ABS</p> <p><input type="radio"/> WWS</p> <p><input type="radio"/> ALPIS</p> <p><input type="radio"/> Regional AI Center</p> <p><input type="radio"/> County Government</p> <p><input type="radio"/> KAGRC</p> <p><input type="radio"/> ADC Kitale</p> <p><input type="radio"/> Other</p>
<p>* Animal Parity (The number of times a cow has given birth including stillbirth)</p> <p>Enter zero if heifer. -99 if Unknown</p>	
<p>* Synchronization Service Date</p> <p>If you don't know the exact date then use an approximation</p> <p>Select date</p> <p>No date selected</p> <p>Time of synchronization</p> <p>(hh:mm 24h format)</p> <p>Select time</p>	<p>* Choose the payment modes for the Synchronization</p> <p><input type="checkbox"/> Cash</p> <p><input type="checkbox"/> Voucher</p> <p><input type="checkbox"/> No Charge</p>

Figure 6. Details captured during artificial insemination

<p>* Insemination Service Date</p> <p>Select date</p> <p>No date selected</p>	<p>* Straw / Semen type</p> <p><input type="radio"/> Sexed</p> <p><input type="radio"/> Non-sexed/Conventional</p>	<p>* Breed composition of bull</p> <p><input type="radio"/> Pure bred</p> <p><input type="radio"/> >75%</p> <p><input type="radio"/> 50%</p> <p><input type="radio"/> 25%</p> <p><input type="radio"/> Don't know</p>
<p>* Insemination service number</p> <p><input type="radio"/> First Insemination</p> <p><input type="radio"/> Second Insemination (Repeat 1)</p> <p><input type="radio"/> Third Insemination (Repeat 2)</p>	<p>* Straw ID / Scan / Sire code</p> <p>Indicate</p>	<p>* Semen batch</p>
<p>* Body condition score of animal</p> <p>Scale 1 to 5</p> <p>1= very poor, 5= very good</p>	<p>* Country of Sire / Bull origin</p> <p>Indicate</p>	<p>* Choose the payment modes for Insemination Service</p> <p><input type="checkbox"/> Cash</p> <p><input type="checkbox"/> Voucher</p> <p><input type="checkbox"/> No Charge</p>
<p>* Type of AI</p> <p><input type="radio"/> Normal AI</p> <p><input type="radio"/> Synchronized AI</p>	<p>* Breed of the bull</p> <p><input type="radio"/> Ankole</p> <p><input type="radio"/> Arsi</p> <p><input type="radio"/> Ayrshire</p> <p><input type="radio"/> Begait</p> <p><input type="radio"/> Boran</p> <p><input type="radio"/> Brown Swiss</p> <p><input type="radio"/> Fogera</p>	<p>* NOTE</p> <p>Please tape the AI straw to the receipt issued farmer and take a photo for identification</p> <p>Take Picture</p> <p>Choose Image</p>
<p>* Source of semen</p> <p><input type="radio"/> NAIC</p> <p><input type="radio"/> ABS</p> <p><input type="radio"/> WWS</p>		

Pregnancy diagnosis (PD)

Following insemination, it is anticipated that the cow/heifer will conceive. Verification of conception is carried out through a pregnancy diagnosis (PD) at least 40 days after the insemination.

PD should only be implemented by a qualified veterinarian or technician. At this time, information should be noted as illustrated in Figure 7.

Figure 7. Details captured during pregnancy diagnosis

<p>* Is this animal service date known</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>* Time animal examined (hh:mm 24h format)</p> <p>Select time</p> <p>No time selected</p>
<p>* Service date for this pregnancy If you don't know the exact date then use an approximation</p> <p>Select date</p> <p>No date selected</p>	<p>* Method of pregnancy diagnosis</p> <p><input type="radio"/> Unknown</p> <p><input checked="" type="radio"/> Rectal</p> <p><input type="radio"/> Progesterone test</p> <p><input type="radio"/> Ultrasound</p>
<p>* Pregnancy diagnosis result Determine if a cow or heifer is pregnant.</p> <p><input checked="" type="radio"/> Positive (Pregnant)</p> <p><input type="radio"/> Negative (Not Pregnant)</p>	<p>* Body condition score of animal Scale 1 to 5 1= very poor, 5= very good</p>
<p>* Date animal examined If you don't know the exact date then use an approximation</p> <p>Select date</p> <p>No date selected</p>	<p>* Choose the payment modes for Pregnancy Diagnosis</p> <p><input type="checkbox"/> Cash</p> <p><input type="checkbox"/> Voucher</p>

Calving

Gestation/pregnancy in cattle normally lasts from 279–287 days. Details on managing animals during the calving process are available in a separate manual.

At calving, details should be noted as follows: the date of calving, whether or not the calving was normal, a still birth and/or an abortion (see Figure 8).

This information is critical for good management of the reproductive performance of cows.

Figure 8. Details captured on stillbirths and abortion

<p>COW STILL BIRTH / ABORTION REGISTRATION</p> <p>Select below Newly Registered Cows for Still Birth / Abortion Recording</p> <p>Animals Registered in current instance</p> <hr/> <p>Select below Previously Registered Cows for Still Birth / Abortion Recording</p> <p>Animals Registered before today</p> <hr/> <p>Tag Id : TZN000192809456</p> <p><input checked="" type="checkbox"/> Name : None</p> <p>Mature Female (Cow); Brown</p>	<p>* Was the Calving a Still Birth, Abortion or Calf Died</p> <p><input checked="" type="radio"/> Still birth</p> <p><input type="radio"/> Abortion</p> <p><input type="radio"/> Dead before being registered</p> <p>* Date of death If you don't know the exact date then use an approximation</p> <p>Select date</p> <p>Mar 11, 2020</p> <p>* What was the cause of Still birth, Abortion or Death of Calf</p> <p><input checked="" type="checkbox"/> Disease</p> <p><input type="checkbox"/> Starvation</p>
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Performance of registered animals is monitored on a monthly basis by the PRA. To facilitate monitoring, it is advisable for the PRA to have a notebook, a measuring tape and a portable weighing scale.

Monitoring performance of calves

The growth and health of a calf once it is registered is monitored each month. During each visit, the PRA should assess the calf and keep a record of different measurements on the calf. Accurate measurements should be noted on its body weight, heart girth and body condition.

Details should also be noted on the main feeds provided for the calf and any treatment the calf may have been given in the past month as illustrated in Figure 9.

Figure 9. Information captured when monitoring performance of calves

CALF MONITORING

Select below Newly Registered Calves you are going to monitor
Animals Registered in current instance

Select below Previously Registered Calves you are going to monitor
Calves Registered before today

Tag Id : TZN000192809650
☒ Name : John
 Male Calf; Black and white

* Weight (12 - 140 kgs)
Kgs.
40

* Heart girth (45- 130 cms)
Circumference of the thoracic cavity immediately behind the forelimbs and behind the shoulders of the animals. Two measurements (one at the start and one at the end of survey) should be averaged to obtain girth length.
120

* Body condition score
Scale 1 to 5
0= very poor, 5= very good
3

* What was the MAIN feed given to the calf the previous day?
☐ Concentrates
☒ Milk
☐ 50% Concentrates and 50% Milk
☐ Fodder/Pasture
☐ Crop residues
☐ Other
 Quantity of feed (kgs)

* How was water given to the calf the previous day?
☐ No water given

* How was water given to the calf the previous day?
☐ No water given
☐ Once in a day
☒ Two times in a day
☐ Three times in a day
☐ Throughout the day (ad libitum)

* Since the last visit, has the calf been provided with any mineral or other supplements
☒ Yes
☐ No

* Which mineral or other supplements have been provided

Note: When calves are 18 months old, the data system will automatically “graduate” them to be listed as mature animals. They will no longer appear in the drop-down list of calves in the tool.

Monitoring performance of mature female animals

Following calving, milk, the key output for the dairy enterprise is harvested from the cow. The quantity of milk produced by an animal reflects the value of that animal to the farmer. It is good practice for farmers to monitor and record milk produced each time the animal is milked. However, in farming systems where technology adoption is limited, farmers are advised to keep a written record of the milk produced by each animal on at least one day of each month that the cow is in milk.

Dairy animals enrolled in the ADGG data platform are monitored once a month. On the day of monitoring, the amount of milk produced by an animal within a 24-hour period is recorded as: the date of milking and the amount of milk produced in the morning of recording and in the evening of the previous day.

Note:

1. It is advisable for milk on a given farm to be recorded on the same day of each month, e.g. on the 10th day of each month, or on the 15th day of each month.
2. Consistency in the date of milk recording is important for more accurate prediction of production within the lactation.
3. A dairy cow is normally milked for 10 months (305 days), then is dried off in anticipation of another calving event. Details on the lactation cycle of dairy cattle is provided in the manual on “dairy cattle management”.

When monitoring milk production, the PRA assesses the animal’s condition and the production environment under which it is kept. Information noted on each animal is illustrated in Figure 10, and includes:

- Heart girth of animal
- Body condition score
- Feeding regime adopted by the farmer
- Any treatment given to the animal in the course of the month

Figure 10. Details captured during cow or heifer monitoring

* How many COWS / HEIFERS are you monitoring
1

Select below Newly Registered Cows / Heifers you are going to monitor
Animals Registered in current instance

Select below Previously Registered Cows / Heifers you are going to monitor
Animals Registered before today

Tag Id : TZN000192809456
☒ Name : None
Mature Female (Cow); Brown
Tag Id : TZN000192809457

* Is the cow currently being milked?
☒ Yes
☐ No - Is dry
☐ No - Heifer not yet calved
☐ No - Sick
☐ No - Other

* Enter the CALVING DATE (For the current lactation)
Select date
Apr 15, 2020

* Enter the MILK DATE
Select date

* MORNING milk production
Liters
12

MID-MORNING milk production
Liters
5

* EVENING milk production
Liters
10

* Has the milk produced been tested for quality
☒ Yes
☐ No

* Milk sample from which milking
☒ AM (Morning)
☐ PM (Afternoon)
☐ AM and PM (Combined milk)

* Milk Fat (1.5 - 9 %)
3

* Milk Protein (1.5 - 5%)
5

* Milk Urea (8 - 25 mg/dl)
15

* Milk Lactose (3 - 7 %)
5

Monitoring East Coast fever vaccination

East Coast fever (ECF) is an economically devastating tick-borne disease which affects cattle in central, eastern and southern Africa. The adoption and efficacy of a vaccine against ECF that has been developed in partnership with ILRI is being monitored through the ADGG platform. Details of each vaccination on an animal are recorded as illustrated in Figure 11.

Figure 11. Details captured on East Coast fever (ECF) vaccination

* ECF Vaccination Date	* Time Vaccine Dilution Completed (hh:mm 24h format)
No date selected	No time selected
* ECF Supervisor Veterinary Officer	* Time of FIRST Immunization (hh:mm 24h format)
* ECF Provider Name	No time selected
* ECF Provider Phone Number	* Time of LAST Immunization (hh:mm 24h format)
* ECF Vial Batch number	

Animal movement into and out of herds

The movement of animals into a herd through birth, purchase or as a gift, and the movement out the herd through deaths, sales or transfer to another farmer is also monitored.

Movement of animals out of herds (called animal exits), and the reasons for movement are of interest as this greatly affects the productivity on a farm. This information should be recorded as soon as it occurs as illustrated in Figure 12.

Figure 12. Details captured on animals leaving a herd

Animal exits Select below Previously Registered animals Animals Registered before today <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Tag Id : TZN000192809456 Name : None Mature Female (Cow); Brown <input type="checkbox"/> Tag Id : TZN000192809457 Name : None Mature Female (Cow); Black and white <input type="checkbox"/> Tag Id : TZN000192809458 Name : None Female Calf; Black and white <input type="checkbox"/> Tag Id : TZN000192809650 Name : John 	* Date of disposal If you don't know the exact date then use an approximation. In the case of stolen or lost indicate the date he/she came to know such event Select date Apr 01, 2020 * Main reason for disposal <ul style="list-style-type: none"> <input type="radio"/> Sold to slaughter house <input checked="" type="radio"/> Sold to another farmer or livestock breeding station <input type="radio"/> Died (due to sickness) <input type="radio"/> Given away for ceremony <input type="radio"/> Unwanted male calf
--	---

Collection of samples from animals for genotyping

Once in a while, in line with specifically outlined protocols, a sample is collected from targeted animals for DNA analysis to determine their genotype. At this time, the ADGG tools are used to note the code given for the sample collected from the animal. An electronic barcode is used to identify each sample. This barcode is read using a scanner and is stored in the data platform.

2.4 Monitoring milk utilization and fodder production

The ADGG tool is used to regularly monitor how the milk produced on a farm is utilized. Information is collected on general use of milk at household and farm level, and on quantities sold. This data is important for understanding the demand and consumption patterns for milk within smallholder dairy enterprises.

One of the greatest limitations to milk production under smallholder farming systems is the availability of adequate feed resources. The ADGG project is monitoring the adoption of practices to improve fodder production by different farmers. Data is recorded on the types of improved fodders planted, and the land resources availed for growing improved fodder.

Note:

Information on use of milk and fodder production provides a guide to developing targeted interventions to address gaps in the dairy value chain and in feed resources for smallholder dairy enterprises.



2.5 Farm resources and equipment to support the dairy enterprise

Once a farmer is registered on the ADGG platform and has a better understanding of what the project seeks to achieve, the farmer is requested to provide more detailed information around their dairy enterprise.

The farmer is requested to provide information on resources available and investments made on the farm to support dairy production. Information is grouped into categories outlined below.

Land ownership, water sources and their use

Data is obtained on the land owned by the farmer, the proportion allocated for dairy related activities, and water sources available as illustrated in Figure 13.

Figure 13. Details on land and water resources

<p>* What is the SIZE of plot 1 (Acres)</p> <input type="text"/>	<p>* Main water source for HOME use during the DRY Season</p> <p><input type="radio"/> Borehole</p> <p><input type="radio"/> Well</p> <p><input type="radio"/> River</p> <p><input type="radio"/> River diversion</p> <p><input type="radio"/> Springs</p> <p><input type="radio"/> Pond</p> <p><input type="radio"/> Tap water</p> <p><input type="radio"/> Other</p>	<p><input type="radio"/> Springs</p> <p><input type="radio"/> Pond</p> <p><input type="radio"/> Tap water</p> <p><input type="radio"/> Other</p>
<p>* Who owns plot of land 1 Tenure system</p> <p><input type="radio"/> Own land</p> <p><input type="radio"/> Rented in land</p> <p><input type="radio"/> Rented out</p> <p><input type="radio"/> Family land</p> <p><input type="radio"/> Shared/Communal land</p> <p><input type="radio"/> Free gift from others</p> <p><input type="radio"/> Other</p>	<p>* Distance to water point during DRY Season (Kilometers)</p> <input type="text"/>	<p>* Distance to water point during WET Season (Kilometers)</p> <input type="text"/>
<p>* Primary use of plot 1</p> <p><input type="radio"/> Livestock</p> <p><input type="radio"/> Staple crops</p> <p><input type="radio"/> Pastures/Forages</p> <p><input type="radio"/> Trees/Forests</p>	<p>* Time to water point during DRY Season (Minutes)</p> <input type="text"/>	<p>* Time to water point during WET Season (Minutes)</p> <input type="text"/>
	<p>* Main water source for HOME use during the WET Season</p> <p><input type="radio"/> Borehole</p> <p><input type="radio"/> Well</p> <p><input type="radio"/> River</p> <p><input type="radio"/> River diversion</p> <p><input type="radio"/> Springs</p> <p><input type="radio"/> Pond</p> <p><input type="radio"/> Tap water</p> <p><input type="radio"/> Other</p>	<p>* Do you pay for the water for HOME use?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
		<p>* Do you transport water for home use?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>

Note:

Water comprises at least 87% of milk. Without adequate water, no dairy animal will provide adequate milk.

Other species of livestock reared

Smallholder livestock keepers rarely keep just one species of animal. Information on the different species of livestock kept by the farmer in addition to cattle is noted (Figure 14). This provides a more wholistic picture on the allocation and use of resources on the farm, and on the different income streams related to livestock that support the farmer. The improved management practices learnt and adopted for cattle also have an impact on the other species of livestock reared.

Figure 14. Details captured on other livestock species owned by the farmer

<p>* Which livestock species does the household have</p> <p><input type="checkbox"/> Goats</p> <p><input type="checkbox"/> Sheep</p> <p><input type="checkbox"/> Poultry</p> <p><input type="checkbox"/> Pig</p> <p><input type="checkbox"/> Donkeys/Horses</p> <p><input type="checkbox"/> Rabbits</p> <p><input type="checkbox"/> Other Specify</p> <p><input type="checkbox"/> None</p>	<p>Current Household Livestock Details > 1 > Details for each livestock species > 1</p> <p>* Total number of Goats owned</p> <input type="text"/>
	<p>* Number of Goats owned by MALE</p> <input type="text"/>
	<p>* Number of Goats owned by FEMALE</p> <input type="text"/>
	<p>* Number of Goats owned JOINTLY</p> <input type="text"/>

Investments in cattle housing and structures

If the farmer keeps his/her cattle in a shed, its characteristics and details on other structures that are used for the dairy enterprise are noted as illustrated in Figure 16.

Cattle housing and structures built to provide feeds and water, in addition to controlling the movement of the animals directly influence the health and production environment of dairy cattle.

Figure 15. Details captured on cattle housing and structures

<p>* Do you keep cattle in a housing premise</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Structures in the cattle unit</p> <p><input type="checkbox"/> Water tank</p> <p><input type="checkbox"/> Water trough</p> <p><input type="checkbox"/> Feed trough</p> <p><input type="checkbox"/> Milking stall</p> <p><input type="checkbox"/> Other(specify)</p>
<p>* Type of unit</p> <p><input type="radio"/> Permanent</p> <p><input type="radio"/> Semi-permanent</p>	<p>* Please indicate other structures on the farm used for cattle besides the housing premise</p> <p><input type="checkbox"/> NONE</p> <p><input type="checkbox"/> Feed store</p> <p><input type="checkbox"/> Crush</p> <p><input type="checkbox"/> Calf pen</p> <p><input type="checkbox"/> Biogas Unit</p> <p><input type="checkbox"/> Other structures</p>
<p>* Size of unit (Square Meters)</p> <p>_____</p>	
<p>* Materials used for constructing the unit</p> <p><input type="checkbox"/> Wood</p> <p><input type="checkbox"/> Cement / Stone / Sand / Bricks</p> <p><input type="checkbox"/> Thatch / Makuti / Grass</p> <p><input type="checkbox"/> Iron Sheets</p> <p><input type="checkbox"/> Other(specify)</p>	
<p>* When was the unit built (year)</p> <p>_____</p>	

Cattle breeding practices adopted on the farm

Many farmers face challenges in the management of reproduction. At the start of the herd monitoring process, we seek to understand how the farmers propagate and breed their dairy animals. This section of the tool obtains information on the use of natural mating (live bulls) and the use of AI (Figure 16).

Figure 16. Details captured on methods of breeding dairy animals

<p>* Which breeding methods do you use? Select all that apply</p> <p><input checked="" type="checkbox"/> Own bull</p> <p><input type="checkbox"/> Bull from other farmer</p> <p><input type="checkbox"/> Bull from bull scheme</p> <p><input type="checkbox"/> Artificial Insemination (AI)</p>	<p>* Reason for the use of OWN BULL? Select all that apply</p> <p><input type="checkbox"/> I am using this service for the first time</p> <p><input type="checkbox"/> Is cheap</p> <p><input checked="" type="checkbox"/> Easily accessible (service provider can easily be reached)</p> <p><input type="checkbox"/> Readily available when cow is on heat</p> <p><input type="checkbox"/> Higher success rates (not too many repeats)</p> <p><input type="checkbox"/> Offers calf with desired traits</p> <p><input type="checkbox"/> Offers a wide variety of breeds</p> <p><input type="checkbox"/> Frequently provides female calves</p> <p><input type="checkbox"/> Offers access to sires with known history</p> <p><input type="checkbox"/> Helps avoid inbreeding</p> <p><input type="checkbox"/> Other specify</p>	<p>* Do you use your OWN BULL but you do not like it?</p> <p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>* What is the name of OWN BULL</p> <p>_____</p> <p>What is the Tag ID of OWN BULL</p> <p>_____</p>
<p>* Which is your preferred breeding method</p> <p><input checked="" type="radio"/> Own bull</p> <p><input type="radio"/> Bull from other farmer</p> <p><input type="radio"/> Bull from bull scheme</p> <p><input type="radio"/> Artificial Insemination (AI)</p>	<p>* Who made the decision to use an OWN BULL?</p> <p><input checked="" type="radio"/> Household male</p> <p><input type="radio"/> Household female</p> <p><input type="radio"/> Joint household (male and female) in HH</p> <p><input type="radio"/> Non household member</p> <p><input type="radio"/> Other specify</p>	<p>* What is the breed of OWN BULL</p> <p><input type="radio"/> Ankole</p> <p><input type="radio"/> Arsi</p> <p><input type="radio"/> Ayrshire</p> <p><input type="radio"/> Begait</p> <p><input type="radio"/> Boran</p> <p><input type="radio"/> Brown Swiss</p> <p><input type="radio"/> Fogera</p> <p><input type="radio"/> Guernsey</p>	
<p>* Do you keep written records on how you breed your animals (Use of own bull, off-farm bull, AI, etc)?</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>* How many OWN BULLS do you use for breeding?</p> <p>1</p>		

Animal health management practices and services used on the farm

Good dairy cattle management requires an understanding of the well-being of the animals. Poor animal conditions and diseases negatively impact dairy production. The availability of services to support the raising of healthy dairy animals is not uniform in different areas.

In this section, we obtain information on animal health services (deworming, vaccination and external parasitic infections) and an indication of the reliability and cost of each service depending on the service providers available (Figure 17).

Figure 17. Details captured on animal health services

<p>* Do you use ANTHELMINTICS (Deworming)</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>* What was your total expenditure in the last 6 months on dewormers (put 0 if none)</p> <p>1200</p>	<p>* When was the last intervention for Deworming? If you don't know the exact day use an approximation</p> <p>Select date</p> <p>Mar 22, 2020</p>
<p>* How many times have used Deworming service in last 12 months</p> <p>2</p>	<p>* Who made the decision to use the service/ service provider?</p> <p><input checked="" type="radio"/> Household male</p> <p><input type="radio"/> Household female</p> <p><input type="radio"/> Joint household (male and female) in HH</p> <p><input type="radio"/> Non-household member</p> <p><input type="radio"/> Other specify</p>	<p>* Name of deworming service provider (write persons' name)</p> <p>Guuuuu</p>
<p>* Who provided the deworming service? Select all that apply</p> <p><input checked="" type="checkbox"/> Self with professional advice</p> <p><input type="checkbox"/> Self without professional advice</p> <p><input type="checkbox"/> Neighbour with professional advice</p> <p><input type="checkbox"/> Neighbour without professional advice</p>	<p>* When was the last intervention for Deworming?</p>	<p>Do you know the mobile number of the service provider</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>

Feeding systems used for the dairy enterprise

Information on the type of feed (fodder, pasture, crop residue and concentrates) being used at the farm for different categories of animals, sources of the feeds and their costs is collected as illustrated in Figure 18.

Figure 18. Details captured on feed resources

<p>* What is your main system of feeding CALVES</p> <p><input checked="" type="radio"/> Only grazing (free-range or tethered)</p> <p><input type="radio"/> Mainly grazing with some stall feeding</p> <p><input type="radio"/> Mainly stall feeding with some grazing</p> <p><input type="radio"/> Only stall feeding (zero grazing)</p> <p><input type="radio"/> Do not have this group of cattle</p>	<p>* Do you grow improved fodder or pasture Examples: Napier Grass, Brachiaria, Rhodes grass, desmodium</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Total annual cost in growing improved fodder or pasture Local currency</p> <p>255</p>
<p>* What is your main system of feeding IMMATURE HEIFERS</p> <p><input checked="" type="radio"/> Only grazing (free-range or tethered)</p> <p><input type="radio"/> Mainly grazing with some stall</p>	<p>* Fodder and pasture species Select all that apply</p> <p><input type="checkbox"/> Pennisetum grasses eg. Napier grass</p> <p><input checked="" type="checkbox"/> Planted grasses eg. Brachiaria grasses, Rhodes grass, Panicum grasses</p> <p><input checked="" type="checkbox"/> Naturalized grasses eg. Jaragua, Asia</p> <p><input type="checkbox"/> Fodder maize</p>	<p>Where do you get information on fodder / pasture cultivation</p> <p><input checked="" type="checkbox"/> Extension agent</p> <p><input checked="" type="checkbox"/> Research / training institute</p> <p><input checked="" type="checkbox"/> Coop or group</p> <p><input type="checkbox"/> Private extension provider eg. Agro vet shop / company</p> <p><input type="checkbox"/> NGO / Project</p> <p><input type="checkbox"/> Other specify</p>

2.6 Membership and participation in community groups

Community groups provide a platform for learning and sharing thoughts and ideas. Farmer involvement in groups greatly influences the adoption of technologies and practices to enhance their livestock enterprises. We obtain information on groups within the farming community and an indication of participation by farmers enrolled in the ADGG platform as illustrated in Figure 19.

Figure 19. Details captured on group membership

<p>* Name of the group / cooperative</p> <input type="text"/>	<p><input type="checkbox"/> Provides ways to save money and get credit</p>
<p>* Type of group</p> <p><input type="radio"/> Social welfare and community development groups</p> <p><input type="radio"/> Savings and credit groups / Sacco</p> <p><input type="radio"/> Agricultural producer groups</p> <p><input type="radio"/> Livestock producer groups</p> <p><input type="radio"/> Agricultural marketing groups</p> <p><input type="radio"/> Livestock marketing groups</p> <p><input type="radio"/> Other specify</p>	<p><input type="checkbox"/> Social functions and networking</p> <p><input type="checkbox"/> Other specify</p>
<p>* Main function that this group performs for you</p> <p><input type="checkbox"/> Provides access to milk market</p> <p><input type="checkbox"/> Provides access to inputs and services for the dairy</p> <p><input type="checkbox"/> Provides training / advisory for dairy</p>	<p>* Does the group help with livestock marketing</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>* Does the group help with livestock production</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
	<p>* How many men in the HH belong to this group</p> <input type="text"/>
	<p>* How many women in the HH belong to this group</p> <input type="text"/>

3. Guide on use of different options and menu's in the tool

Choices

1. Select one: for some questions in the tool, the user is able to select only one option from a list of choices. In this instance, the choices are presented using a "round" button as illustrated in List 1.

Example: the gender of the farmer can either be male or female and not both, hence only one option can be selected.

List 1: Example list of choices that can be made using select one option

* Gender of the farmer	
<input type="radio"/>	Male
<input type="radio"/>	Female
* Age group of the Farmer	
<input type="radio"/>	Teenage (15 - 17 Years)
<input type="radio"/>	Youth (18 - 29 Years)
<input type="radio"/>	Middle age adult (30 - 45 Years)
<input type="radio"/>	Elder (>45 Years)
* Is the farmer the household head?	
<input type="radio"/>	Yes
<input type="radio"/>	No

2. Select multiple: in some questions, the user can select more than one option from a list of choices. In this case, the choices are presented using a "square" button as illustrated in List 2.

Example: the farmer may own goats, sheep and pigs. All three options can be selected when listed using the square button.

List 2: Example list of choices that can be made using select multiple option

*** Which livestock species does the household have**

<input type="checkbox"/>	Goats
<input type="checkbox"/>	Sheep
<input type="checkbox"/>	Poultry
<input type="checkbox"/>	Pig
<input type="checkbox"/>	Donkeys/Horses
<input type="checkbox"/>	Rabbits
<input type="checkbox"/>	Other Specify
<input type="checkbox"/>	None

3. Required information: when documenting information around specific activities, some information must be collected. The tool does not allow the user to proceed with data collection unless this information is documented. Questions that require an answer are denoted with a red asterix (*) as illustrated in List.

Example: when collecting milk production information on a given day, the date of the record, the milk produced that morning, and in the evening of the previous day must be recorded.

List 3: Example presentation of information that must be recorded when collecting data

*** Enter the MILK DATE**

Select date

Mar 05, 2020

The cow has been milking for 57 days

*** MORNING milk production**

Liters

5.5

MID-MORNING milk production

Liters

3.5

*** EVENING milk production**

Liters

2

4. Recording dates, time, images and GPS coordinates

Date and time: when collecting data, the date on which an activity or event occurred needs to be noted.

The tool enables the recording of date within a given time-line.

In order to record the date and/or time for an event, the options “select date” or “select time” are presented as illustrated in List 4. When the option is “select date”, a calendar is opened from which the user can select the date, month and year as required. For the option “select time”, the user is able to select the hour and minutes.

A warning message is given when a date is indicated that is beyond the boundaries set for a given activity.

For instance, it is not logical to indicate that the milk production being recorded in the year 2020 was produced by the animal in 2018.

List 4: Example options for selecting the date and time of an event

*** Date animal examined**

If you don't know the exact date then use an approximation

Select date

No date selected

*** Time animal examined**

(hh:mm 24h format)

Select time

No time selected

Images: when collecting data on a farm, it may be desirable to take a picture of an animal or of a written document. The photograph can be taken directly within the ODK tool or to take the picture using the camera on the device and later upload the photograph into the tool and send it to the database. The options available in the tool are illustrated in List 5.

List 5: Example options for taking and storing photographs in the tools

*** Take a photograph of the ear tag as close as possible so the code is legible**


Take Picture

Choose Image

Take a photograph of the the animal for the purpose of identification

Take Picture

Choose Image

GPS coordinates: evidence that data is collected on a specific farm is noted through recording the GPS coordinates of the location at which the information was generated as illustrated in List 6. *Enure the location setting on your android device is active.* 

List 6: Option for recording GPS coordinates

*** Collect the GPS coordinates of this household**

Make sure the precision is less than 10 meters

Start GeoPoint

Collecting similar information on different animals (repeats)

When collecting information on a farm, it may be necessary to collect the same information on many different animals. This is easily done using the option “Add Group”.

The “Add Group” option when selected enables the user to provide a similar cycle of responses on a different animal without going through the process of activating a new form for data collection. Information collected using “Add group” is stored alongside data of the individual identified within the new loop.

Constraints and boundaries for data parameters

To facilitate the collection of data around different measures/parameters on an animal, constraints/boundaries are provided for the scale within which each measure must fit. Boundaries within the data tool are based on biological parameters of dairy cattle.

For example, when registering or monitoring the growth of a calf prior to weaning at 9–12 weeks of age, its weight will range between 10 and 100 kg. In case the user records a value outside of this range, a message will be displayed indicating that the value is beyond the boundaries for the trait. A correct measure must be taken and recorded, otherwise the user will be unable to record additional information on the animal.

Hints


Some sections of the tool provide directions to the data collector on how to answer a particular question. Such information is presented in *italics* beneath the main question.

Addressing common errors

a. Challenge: names of farmers and/or animals that are registered fail to appear in list.

Solution: ensure you have access to the internet. Download an update of the form using the option “Get blank Form”. In order to ensure that you have the most up to date list of farmers and animals that have been registered, each user is advised to update the tools in use each morning prior to going out to collect data on farms. In case the problem persists, contact the country ICT administrator.

b. Challenge: obtaining GPS coordinates takes a very long time.

Solution: enure the location  setting on your android device is active. The device communicates with satellites that are positioned in the skies to record the GPS coordinates. Stand in an open area and face your android device towards the sky and allow it to register coordinates of the location within a 10 metre radius.

c. Challenge: failure to send data collected to the main database.

Note: this could be as a result of different factors such as:

- using old versions of data forms that have been deactivated: download updated forms.
- poor internet connection: wait until internet is available then allow the device to send the data.
- trying to send the same data twice: update the forms on your tool and check that data has not been previously submitted.
- trying to send incomplete data: check that you have completed all information in a form prior to sending it.

Quick guide to using ADGG ODK collect

Step 1: Ensure you are registered as a platform user by ICT personnel in country

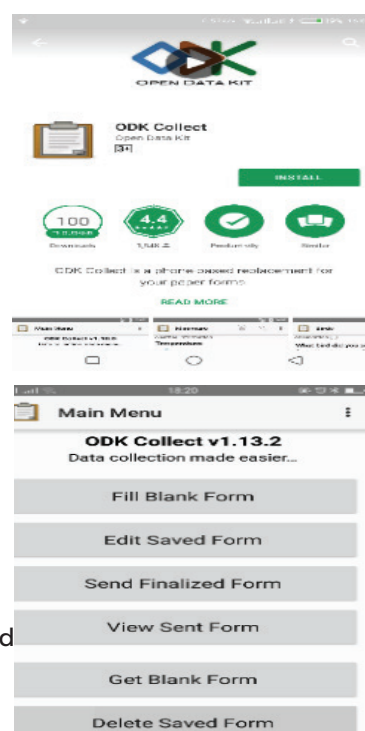
At registration, you will be provided with credentials to enable you access and use the ADGG data capture tools. Remember your credentials and DO NOT share them with other people.

Step 2: Install and configure ODK on your android device

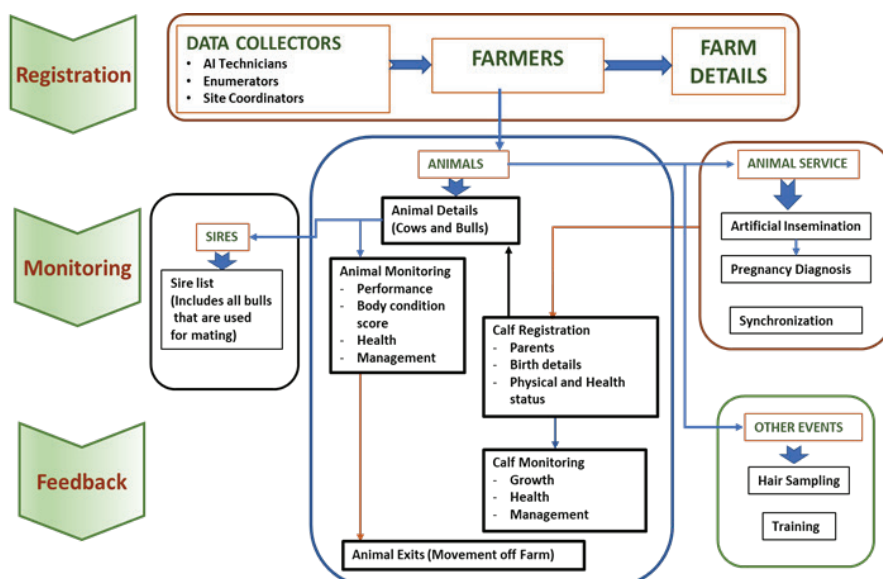
Download the ODK application through the play store on your android device. Configure your ODK application to the ADGG Platform using the details provided by your ICT department. An illustration of downloading and configuring your ODK is available at [Installing ODK for ADGG](#).

Step 3: Download the ADGG tool in the ODK application

Download the ADGG tool using the ODK Application you have installed and configured in step 2. This is done by selecting "Get Blank Form" from the ODK menu.



Step 4: Data collection



Overview of the ADGG data collection process

Step 5: Submit data to ADGG database

Once you have filled in details in the form, use the menu option “Send Finalized From” in the ODK application to submit the information collected to ADGG data platform.

Note:

- An internet connection is need for all steps except Step 4, i.e data collection.
- A Farmer needs to be registered before you can register his/her animals.
- Animal monitoring and services can only done for animals that have been registred.
- Information collected through the ADGG ODK tool needs to be updated regularly by selecting “Get Blank Form” from the ODK applicaiton. This ensures that you have the most recent information related to farmers and animals in the database.

Appendix 1. Consent form to be signed by farmers participating in ADGG Platform

My name is (*name of the interviewer*). I work for TALIRI (or NAIC, whichever is relevant). We are partnering with the International Livestock Research Institute (ILRI) in a project titled “Platform for African Dairy Genetic Gains” (ADGG) that seeks to improve dairy production in the country. Through the project, we will establish a national Dairy Performance Recording Center (DPRC) with digital data capture and farmer feedback systems. Through your participation in the the program we will generate critical data on dairy production in the country to inform development of the dairy industry.

If you decide to participate, then you will be requested to provide information on your dairy farming enterprise. We will request you to also have the animals in your dairy herd identified using nationally coded ear tags, registered onto the data platform and their performance recorded each month for the duration of the project. The project staff will visit you on a monthly basis to ask questions about your dairy animals and the requisite management practices, and to follow-up on recording their performance. Project staff may provide advice and guidance on issues related to management, feeding, breeding and marketing of the animals. However, you will undertake any decisions on the management of your animals.

Confidentiality

Any information that we collect about you as part of this project will be kept confidential. This means that we will not publish any data with your name, or give out this information to someone else. Only average data for your area, for example, average land size or herd size, will be reported without reference to your particular household. Your community will indirectly benefit from this work, as we will be able to better understand your situation and what needs to be done in relation to dairy cattle production. The findings from this project will be published in accessible databases and used by researchers and others both within and outside of Africa.

Participation in this project is entirely voluntary, and your refusal to participate will not result in a penalty or a loss of benefits. You may discontinue participation at any time. However, it is our hope that our findings will provide to improve the profitability of your dairy enterprise.

Risks

We do not anticipate any for you through participating in this program except for loss of your time during engagements with project team members. However, engagements should be no longer than one hour on one day of each month. In case you are not comfortable during an engagement, please do not hesitate to inform the project team member. The ADGG project activities have been reviewed by the relevant authorities in your country who have approved it.

Certificate of consent

I have read the foregoing information, or it has been read to me or translated to me. I have had the opportunity to ask questions about it and any questions that I have asked to have been answered to my satisfaction. I consent voluntarily to participate in this research.

Name of participant: _____

Date: _____

Signature/thumb print: _____

Identification document number: _____

Name of person obtaining consent: _____

Date: _____

Signature: _____

Contact

Name of main researcher: _____

Institution: _____

Telephone: _____

Email address: _____

ISBN: 92-9146-636-1



The Platform for African Dairy Genetic Gain (ADGG) is an International Livestock Research Institute (ILRI)-led investment by the Bill & Melinda Gates Foundation (BMGF) that has developed and is currently pilot-testing a multi-country genetic gains platform that uses on-farm performance information and basic genomic data to identify and promote wide use of appropriate superior purebred and cross-bred bulls for artificial insemination (AI) delivery and planned natural mating for smallholder farmers in Africa.



The International Livestock Research Institute (ILRI) works to improve food security and reduce poverty in developing countries through research for better and more sustainable use of livestock. ILRI is a CGIAR research centre. It works through a network of regional and country offices and projects in East, South and Southeast Asia, and Central, East, Southern and West Africa. ilri.org



CGIAR is a global agricultural research partnership for a food-secure future. Its research is carried out by 15 research centres in collaboration with hundreds of partner organizations. cgiar.org