Challenges and opportunities for improved tropical poultry productivity and resilience

Tadelle Dessie

CTLGH Annual Meeting

Edinburgh, 26-29 September 2017

Chicken production systems in SSA

- Village production system
- Small-scale production system
- Commercial production system

⇒ **Based on:**

- Objectives of the producer
- Type and number of animals
- Management system followed

Opportunity - Village production system

High potential for women's empowerment

Chicken leads the global meat trade with 40% of exports to Africa and the Middle East

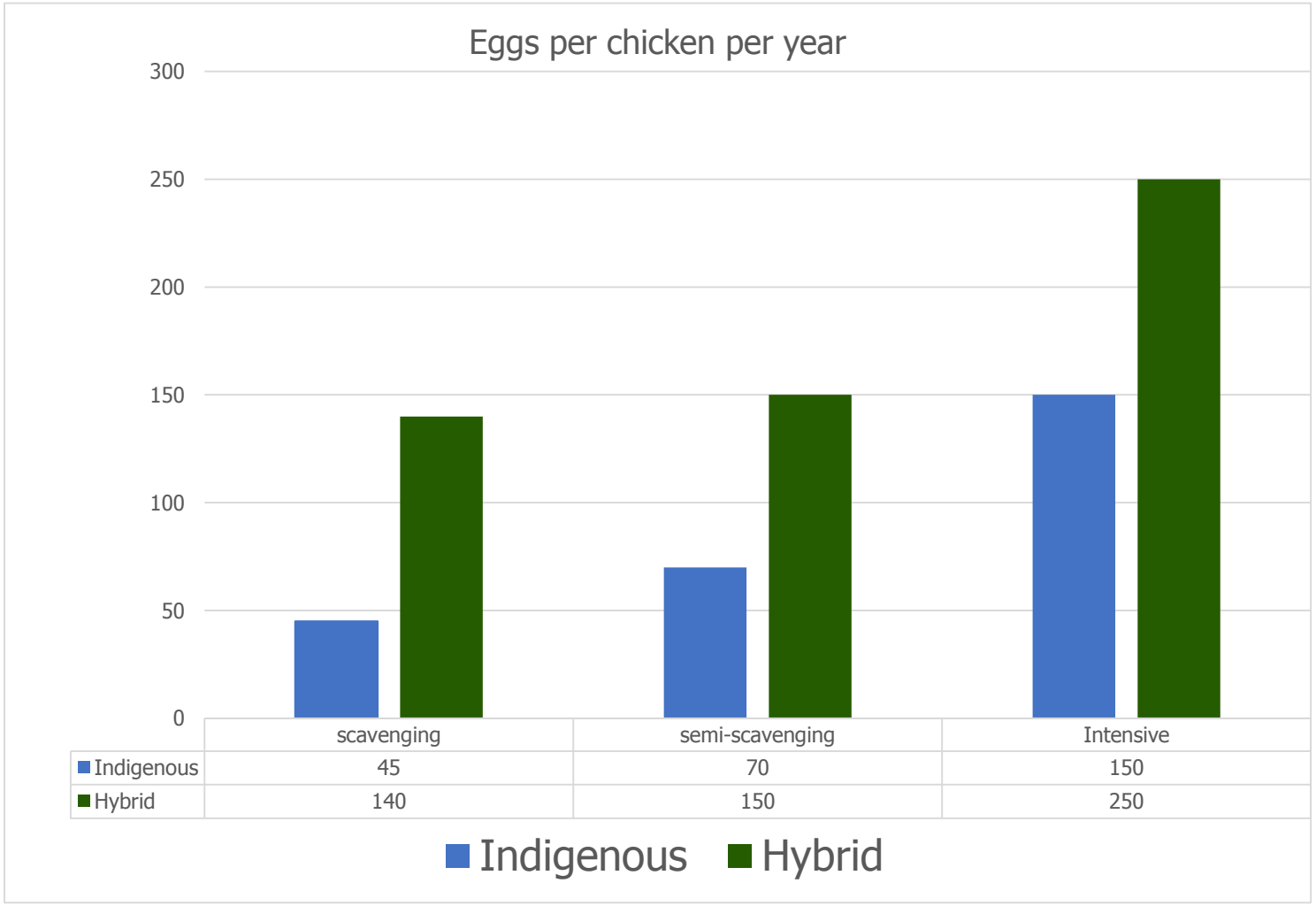
Egg and chicken meat are often the highest value agricultural product globally

High potential for contributing to dietary diversity globally

Low-productivity but high potential for growth across a range of systems

Income + Nutrition ***=Pathway out of Poverty***

Yield gaps in chicken production in Africa: the opportunity



Sources: *The data for the hybrid used here are from Kuroiler from an Indian environment (Ahuja et al., 2008); while for indigenous birds the data are from Hill and Modebe 1961; Oluyemi and Oyenuga,1971; Akinokun and Dettmers, 1976; Nwosu et al, 1979; Nwosu and Omeje, 1985; and Sonaiya, 1990. Dessie, 1995 etc*

Challenges: Village production system

African Chicken Genetic Gains

- High mortality -Farmers lost interest to invest
- Birds are slow growers and lay small size/number of eggs
  - Absence of tropically adapted and more productive breeds
    - No continuous supply of improved genetic material to small producers
      - major cause of failure of improvement projects
- Similar issue for feed and health service provision

-> **catalyze public-private partnerships for increasing smallholder chicken production and productivity growth**

-> Need to organize a supply chain of inputs tailored specifically to the needs of small-scale poultry producers

African Chicken Genetic Gains

A platform for testing, delivering, and continuously improving tropically-adapted chickens for productivity growth in sub-Saharan Africa

ACGG Vision

The vision of this program is to **catalyze public-private partnerships for increasing smallholder chicken production and productivity growth as a pathway out of poverty** in sub-Saharan Africa.

The ACGG project

- ILRI led BMGF funded project

The project has been testing in parallel multiple tropically adapted and more productive chicken strains under both on-station and on-farm management conditions, in different agro-ecologies

What are we doing differently?

ACGG Five Pillars of Change

1. High-producing genetics that is well-adapted to low-input production systems;
2. Farmer preferred breeds of chickens;
3. Public-private partnership for improvement, multiplication, and delivery;
4. Women at the center to ensure success; and
5. Innovation platforms for developing solutions across the value chain.

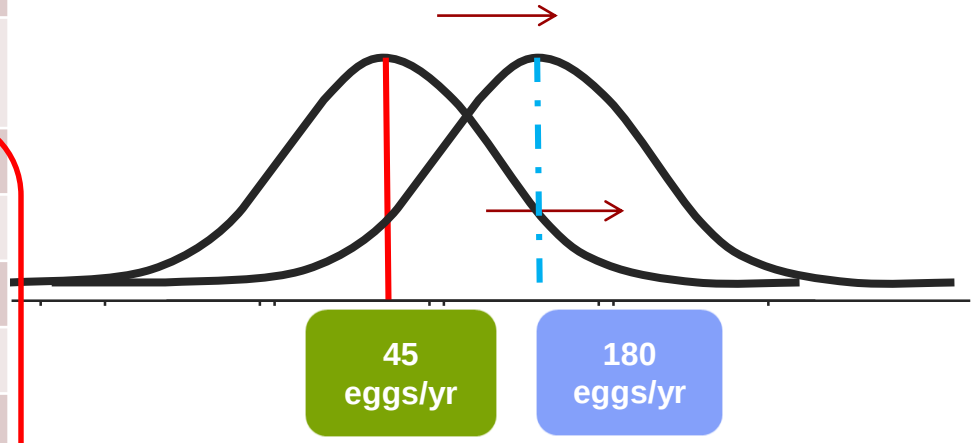
What must be different?

1. From "silver bullets" to ➔ researched options (informed by farmer experimentation)
2. From "we are here to offer you solutions" to "we are here to work with you to find solutions"
3. From pure focus on pushing 'promising strains' to recognition of importance of O x C
4. Innovation Platforms at national and community level as on-going processes for industry integration which outlive the current Project!

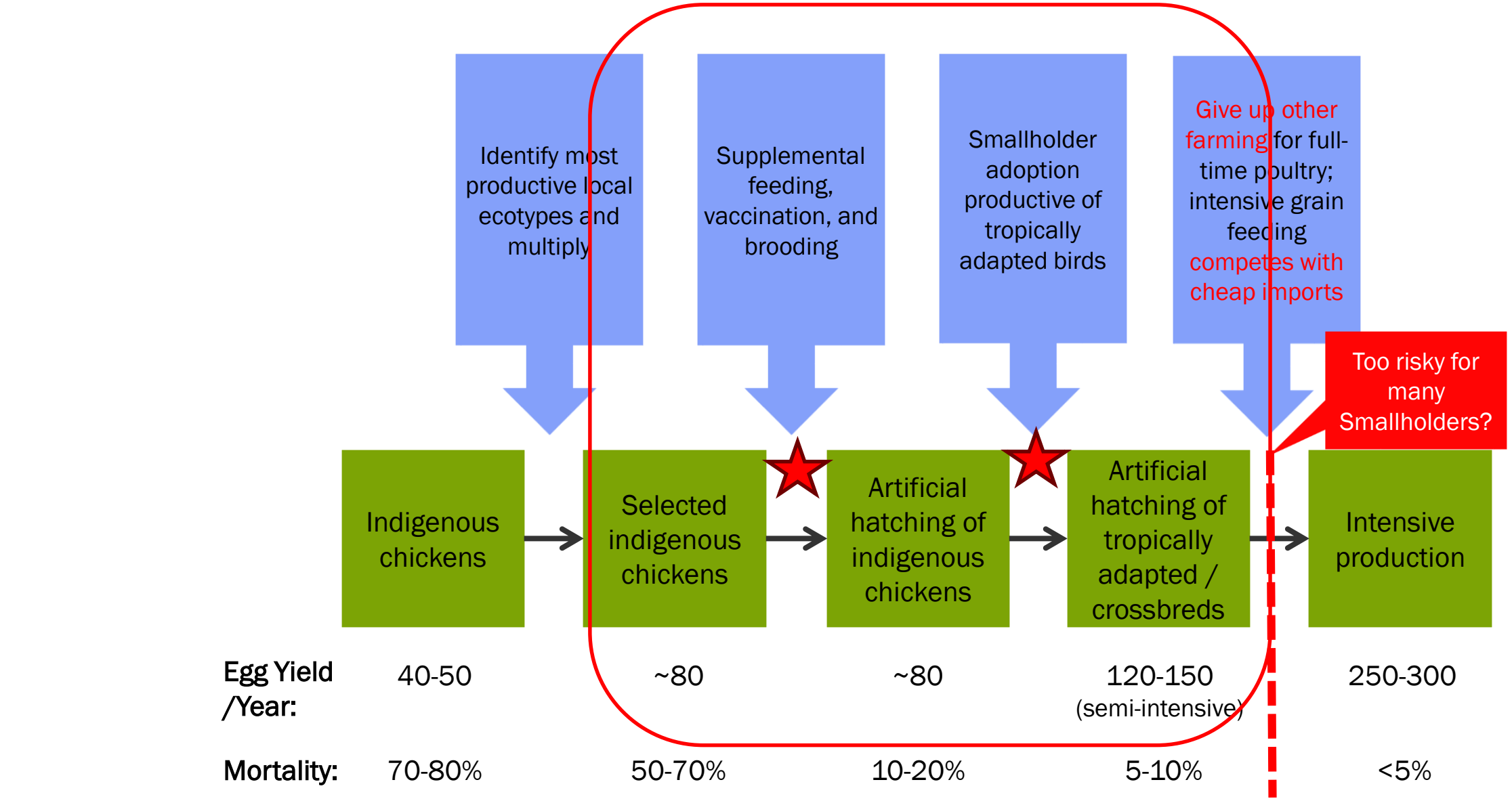
What is the science?

Geography / Conditions	Breed	Average eggs/ year
West Africa scavenging (sub)-humid	Indigenous	33
East Africa scavenging (sub)-humid	Indigenous	58
Egypt	Fayoumi	146
South Africa	Koekoek	204
Ghana (intensive feeding)	Naked Neck	288
Ghana (intensive feeding)	Frizzle Feather	287
Uganda	Kuroiler	180
India	Rainbow Star	160-180
India	CARI lines	198-220
Developed world	"Exotic"	300+

From indigenous to TAPBs



Source: Mwacharo et al 2008; Dessie et al 2011


Identify most productive local ecotypes and multiply
Supplemental feeding, vaccination, and brooding
Smallholder adoption productive of tropically adapted birds
Give up other farming for full-time poultry; intensive grain feeding competes with cheap imports
Too risky for many Smallholders?
Indigenous chickens
Selected indigenous chickens
Artificial hatching of indigenous chickens
Artificial hatching of tropically adapted / crossbreds
Intensive production
Egg Yield /Year:
40-50
~80
~80
120-150
(semi-intensive)
250-300
Mortality:
70-80%
50-70%
10-20%
5-10%
<5%


IFPRI

SCIENCE

TECHNOLOG

GENOMICS

ODK

FEED MIX app

INNOVATION

FAO POULTRY SECTORS 1 2 3 4

SMALLHOLDERS

Improved tropically adapted breeds, deployed specifically for smallholder chicken production system

INDUSTRY

BREEDING COMP

HATCHERIES

FEED MILLS

MICROFINANCE

MARKETING

DEVELOPMENT

POVERTY ALLEVIATION

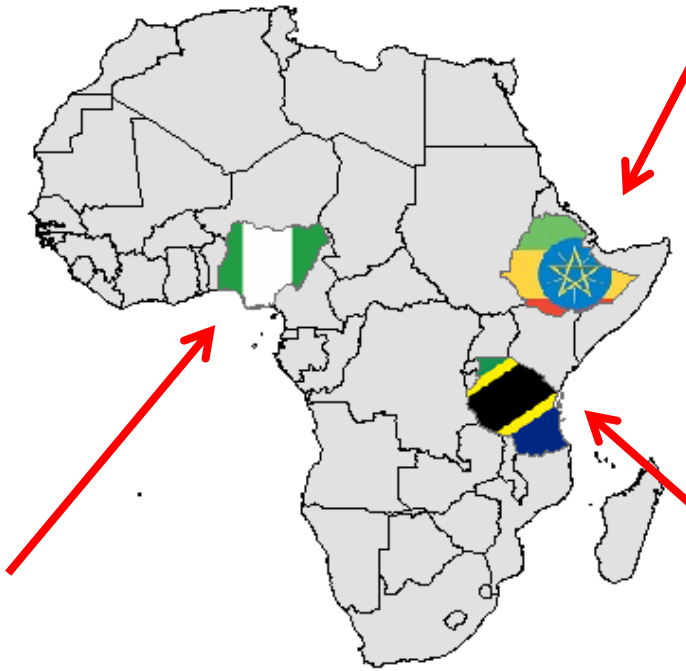
women children youth

food security

African Chicken Genetic Gains

Chicken strains being tested

- Kuroiler
- Koekoek
- Sasso (RIR X Sasso)
- Sasso
- Horro + XX ecotypes in the sites



- Kuroiler
- Sasso
- Shika Brwn
- FUNAB Alpha
- Fulani +
- XX ecotypes in the sites

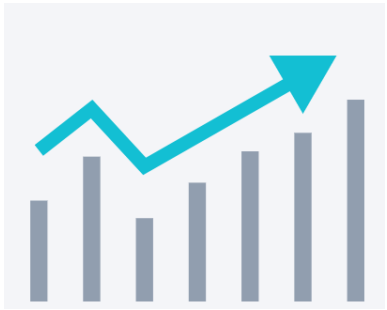
- Kuroiler
- Sasso
- Black Australorp
- XX ecotypes in the sites

ACGG data:

Data driven understanding of the breeds and specific traits that poor smallholder farmers, especially women, **prefer** across the various countries and agro-ecologies –**Main outcome of ACGG**

- Major points of data collection for ACGG are:
  - Baseline and cross sectional survey
  - Longitudinal survey

DB



Validate

Major outcomes- Baseline and cross sectional survey

- Baseline Data cleaned and analyzed Specific production characteristics identified
- **Outputs of the baseline information used as an input to design on-farm testing**

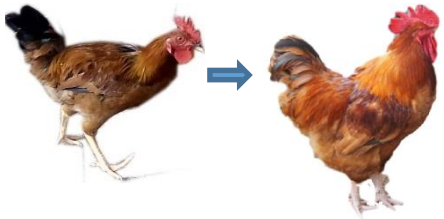
What are the desires of SHC Farmers?

To have birds that

Have high survival rate

Lay more eggs

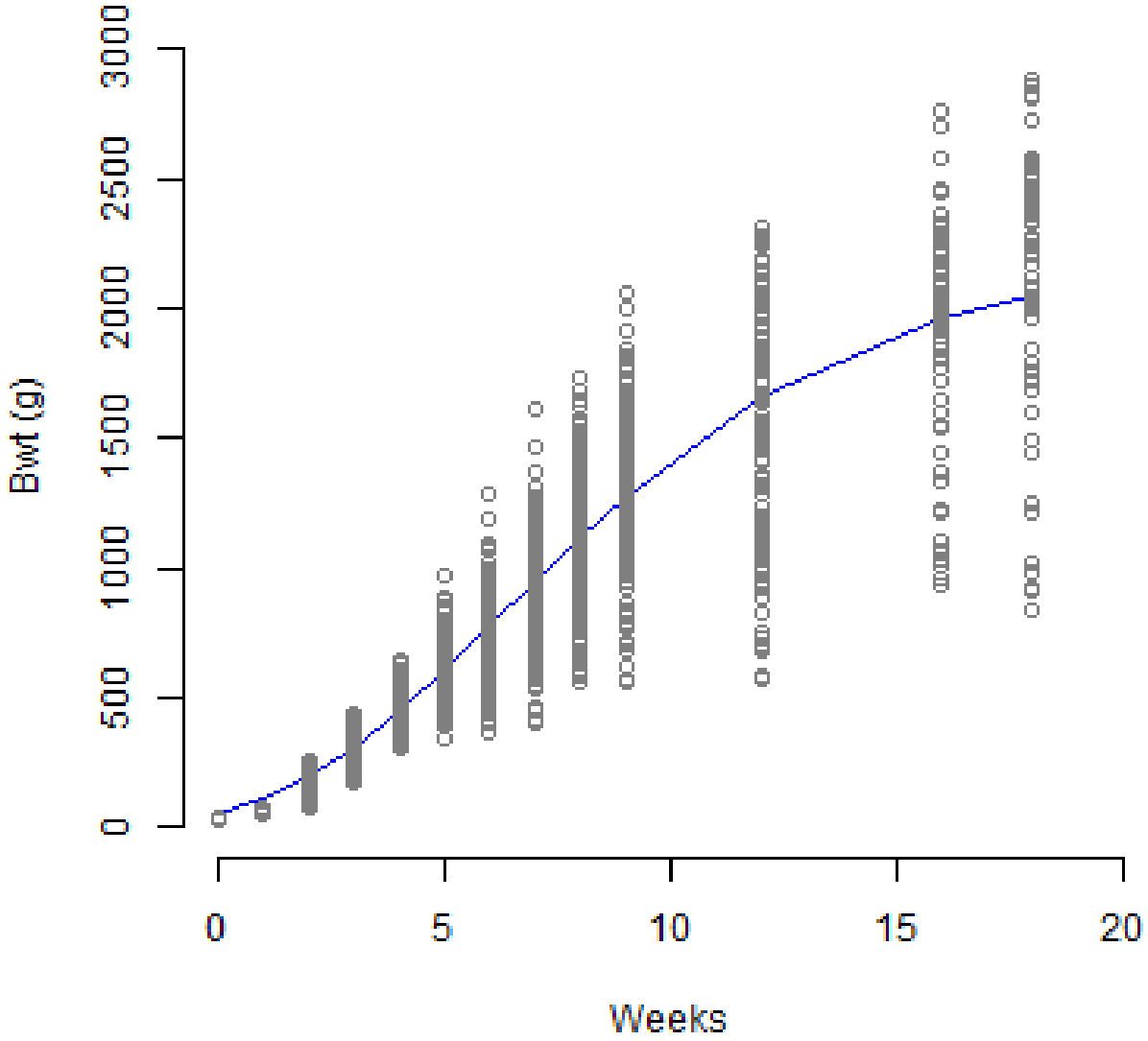
Grow bigger & faster



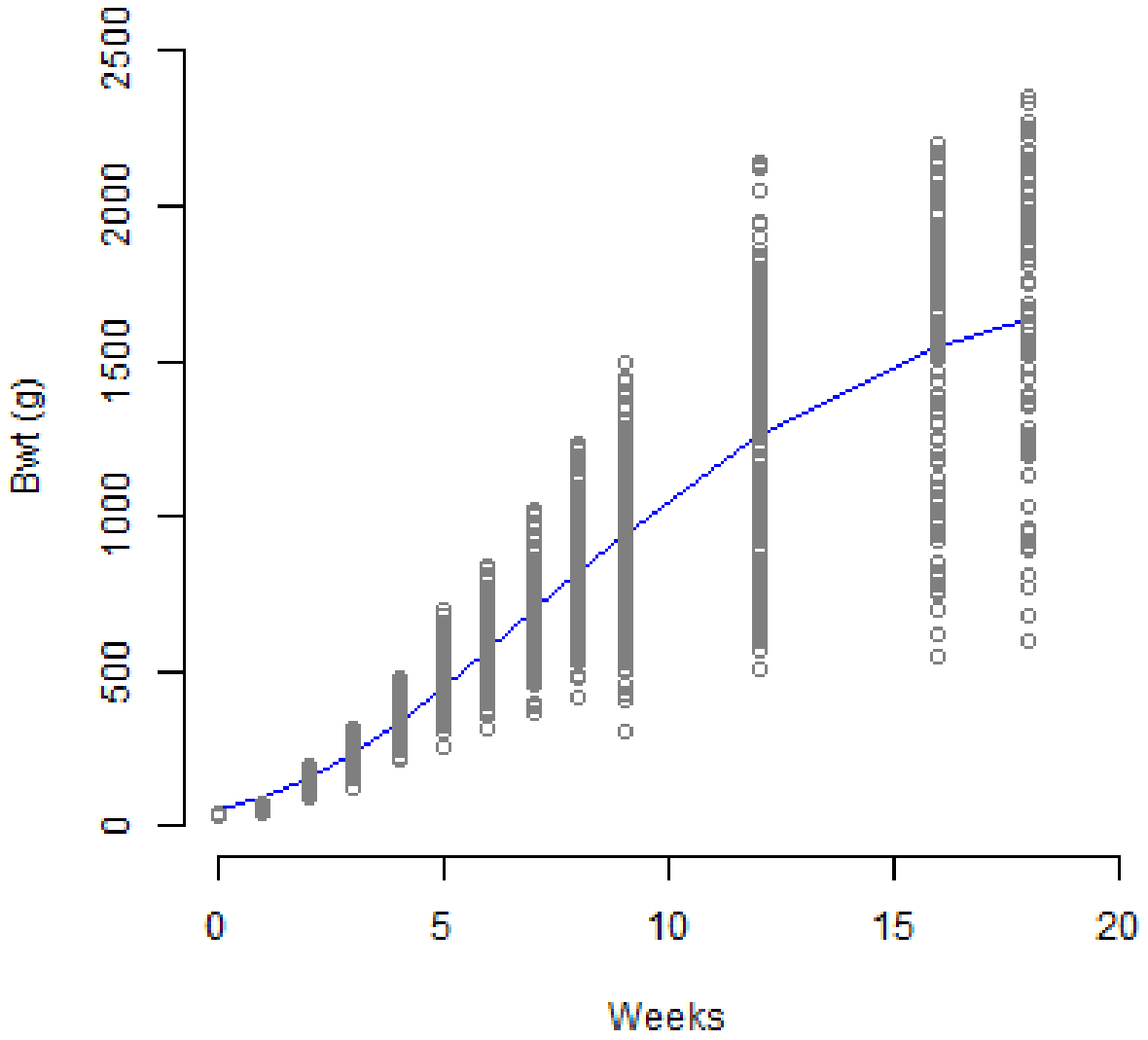
ACGG Longitudinal data – interim analysis results

African Chicken Genetic Gains

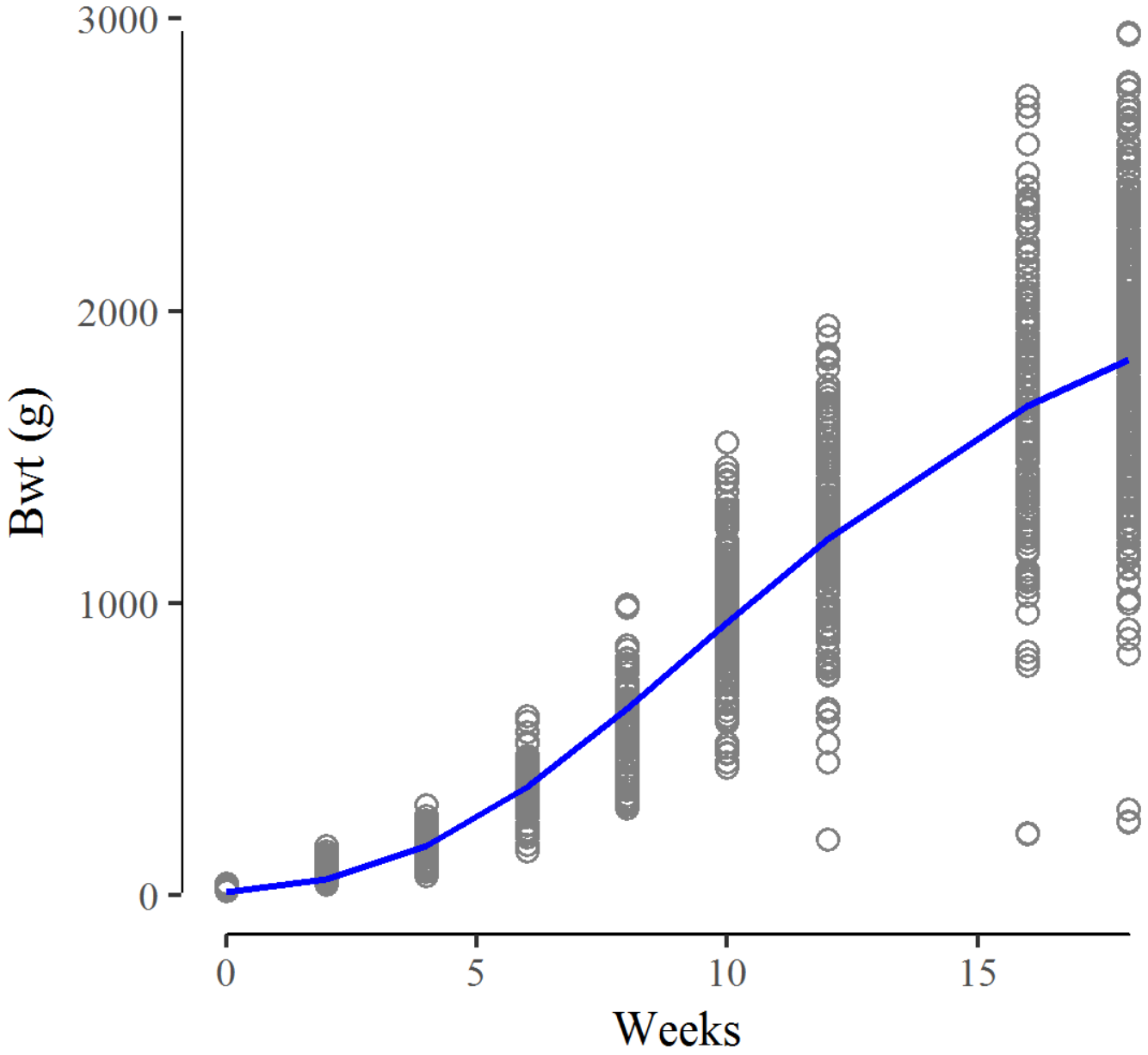
Fitted growth curve (growth data from day old to 18 weeks of age) using the non-linear models (Gompertz equation) for estimating growth curves to describe the relationship between live body weight and age of Kuroiler breed at DZARC, Ethiopia



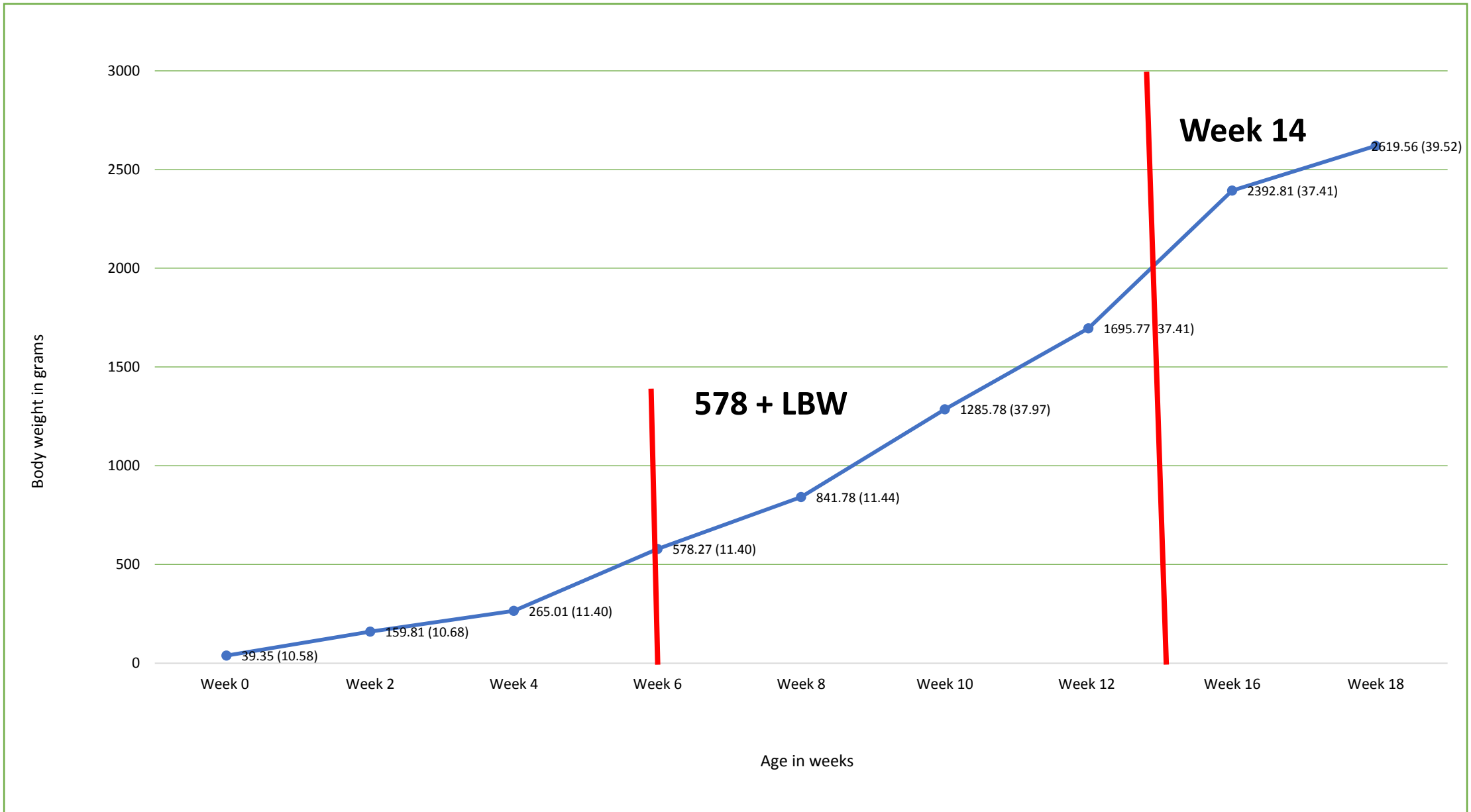
Fitted growth curve (growth data from day old to 18 weeks of age) using the non-linear models (Gompertz equation) for estimating growth curves to describe the relationship between live body weight and age of Sasso breed at DZARC, Ethiopia



Fitted growth curve (growth data from day old to 18 weeks of age) using the non-linear models (Gompertz equation) for estimating growth curves to describe the relationship between live body weight and age of FUNAB Alpha breed at FUNAAB, Nigeria

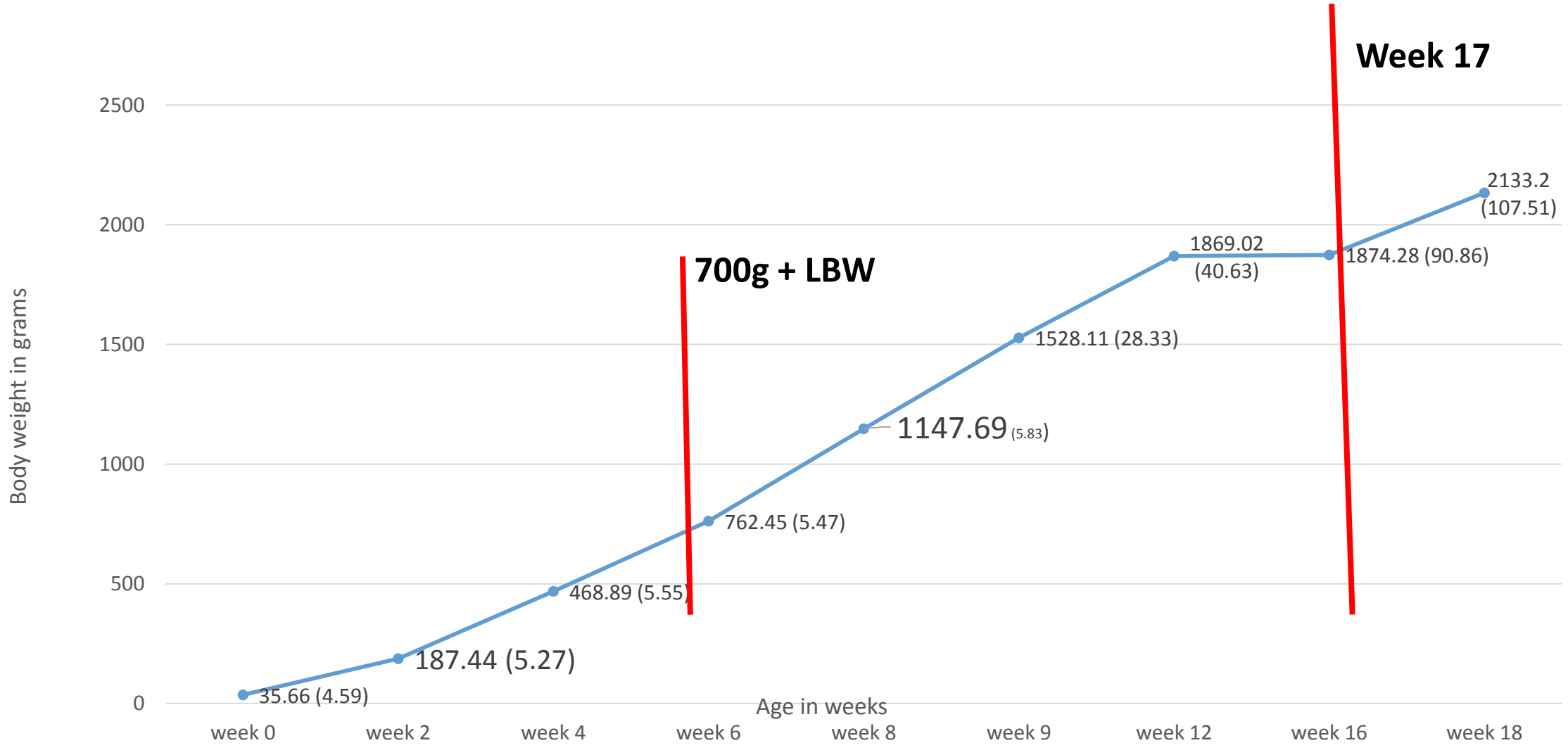


Live body weight (g) (0 to 18 wks), at six weeks and age when two kg live body weight of Kuroiler breed at FUNAAB, Nigeria

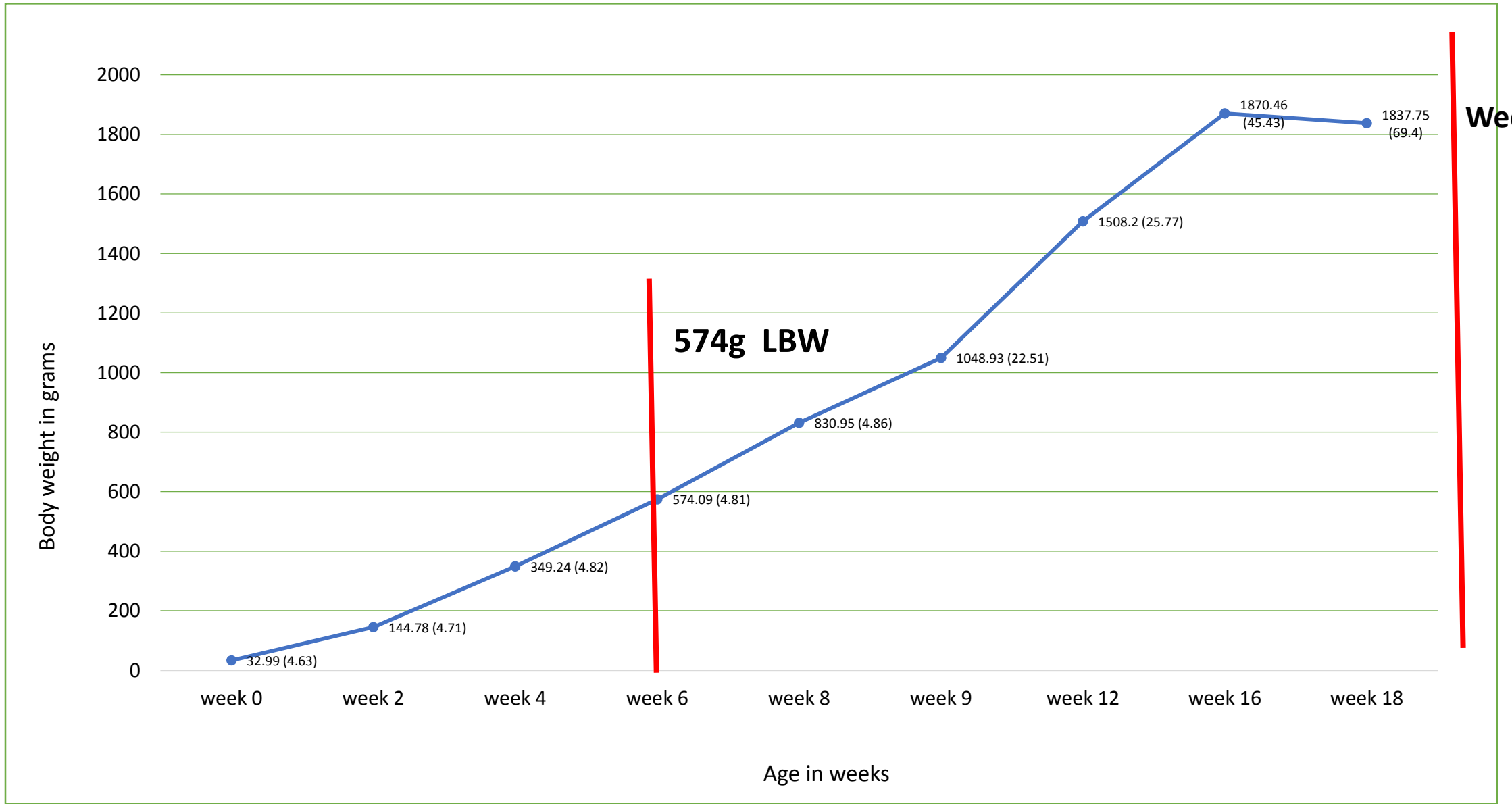


Live body weight (g) (0 to 18 wks), at six weeks and age when two kg live body weight of Sasso breed at FUNAAB, Nigeria

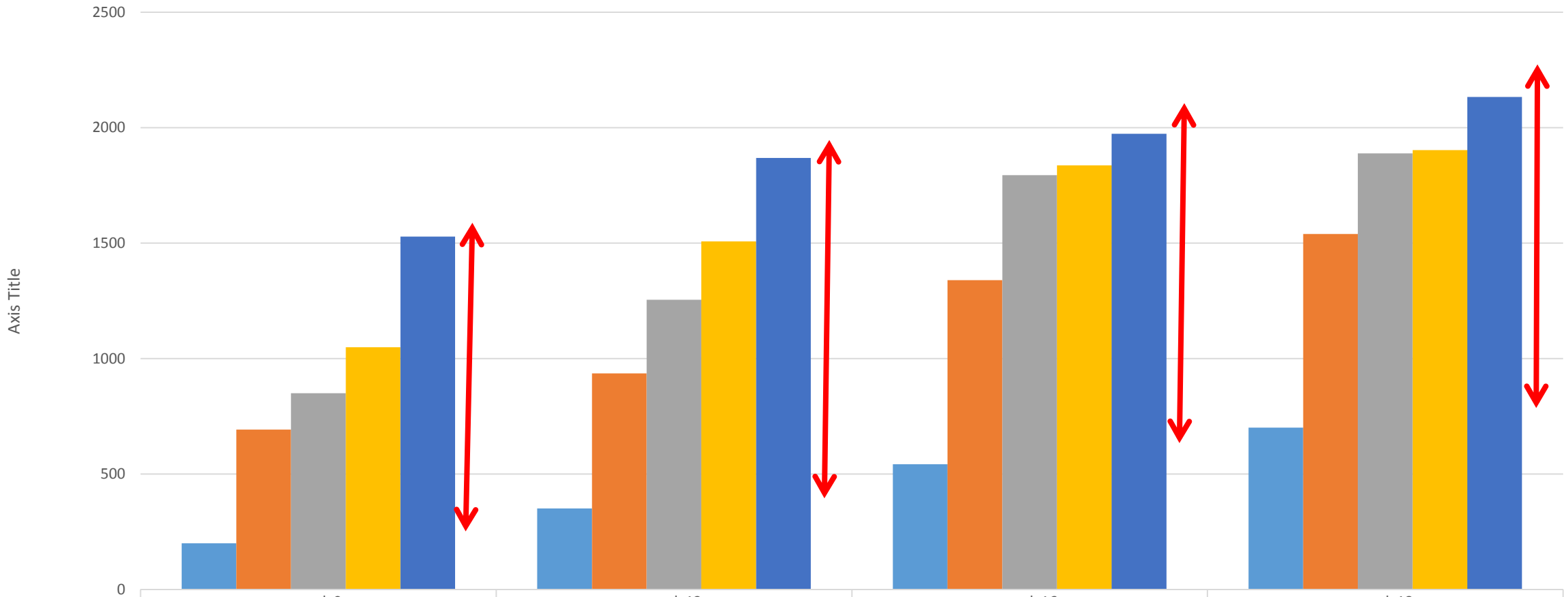
Live body weight (g) (0 to 18 wks), at six weeks and age when two kg live body weight of Kuroiler breed at DZARC, Ethiopia



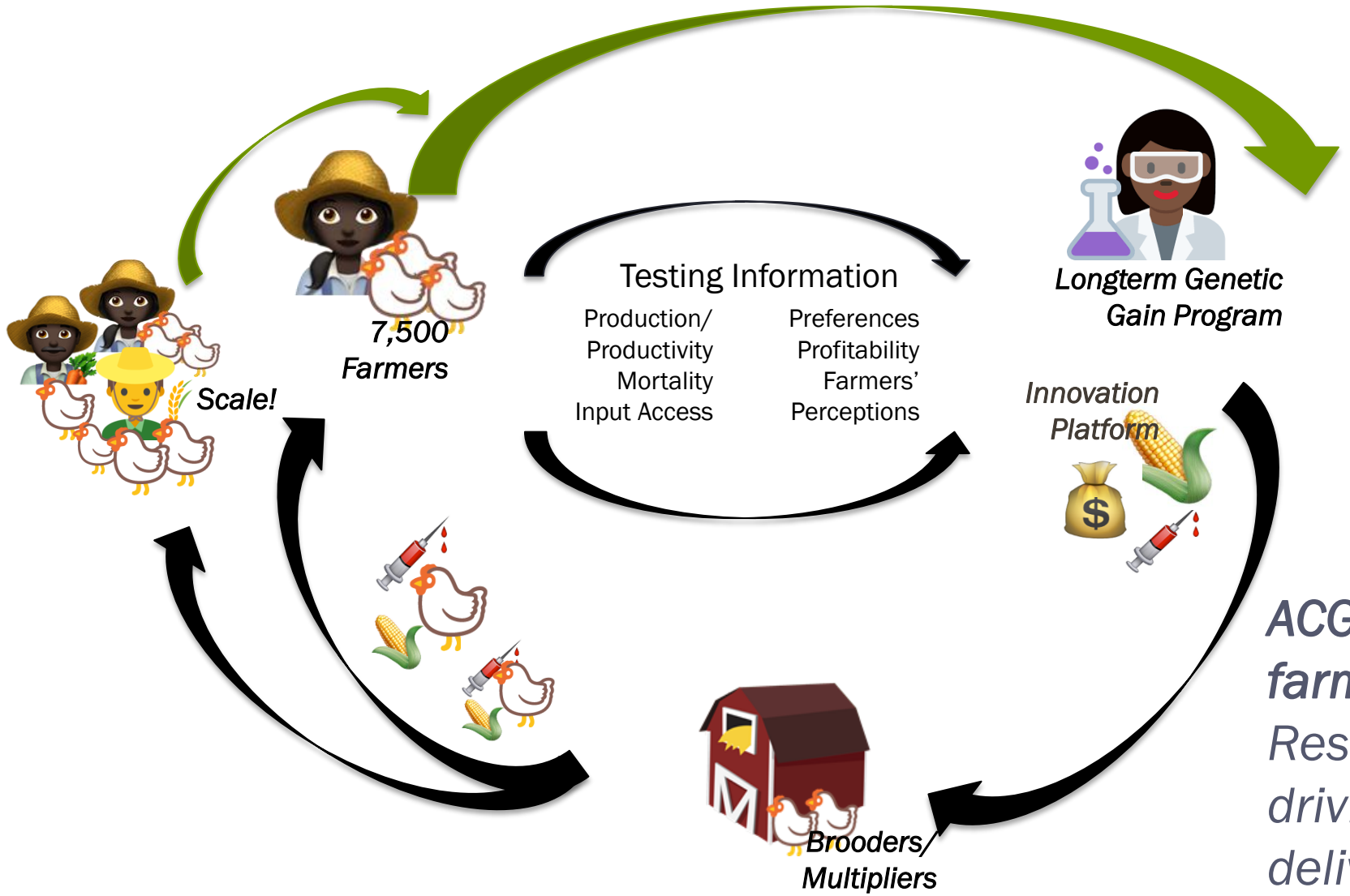
Live body weight (g) (0 to 18 wks), at six weeks and age when two kg live body weight of Sasso breed at DZARC, Ethiopia



Mean body weight (g) of different chicken strains tested at Debre Zeit, Ethiopia (9 to 18 weeks of age) -200 to 300 % increase from the indigenous chicken-ACGG on-station testing interim result



	week 9	week 12	week 16	week 18
Village Chicken	200	351	542	701
Improved Horro	692	936	1340	1540
Koekoek	850	1255	1794	1889
Sasso	1049	1508	1837	1903
Kuroiler	1528	1869	1974	2133



ACGG On-farm Testing- *Research driving delivery at scale*

ACGG

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CTLGH poultry Genomics program

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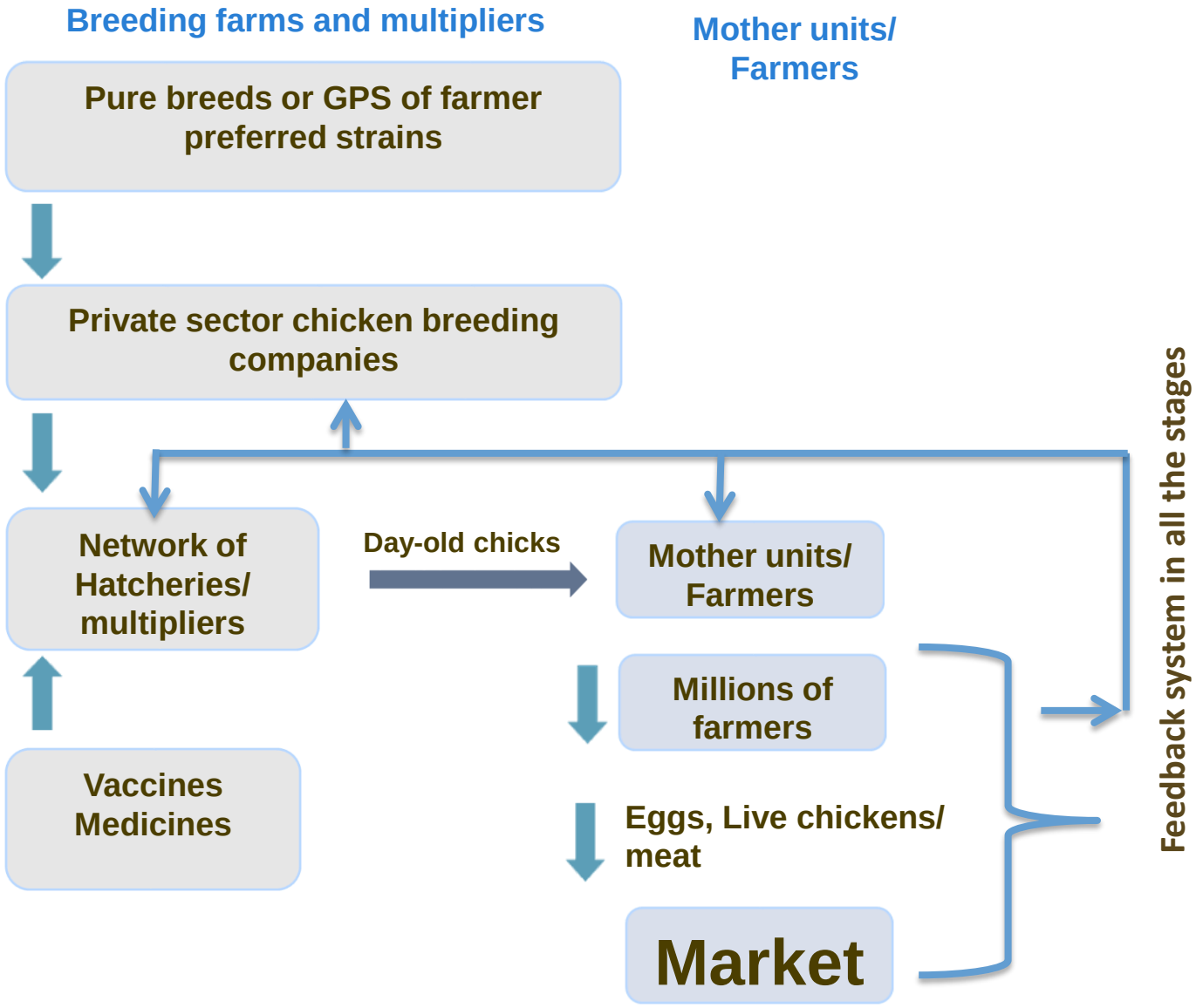
The Long Term Chicken Genetic Gains (LTGG) Program

A platform for developing a Long Term Genetic Gains program for tropically-adapted and farmer preferred chickens for sustainable productivity growth in sub-Saharan Africa

What is our vision for this "network"?

Key elements

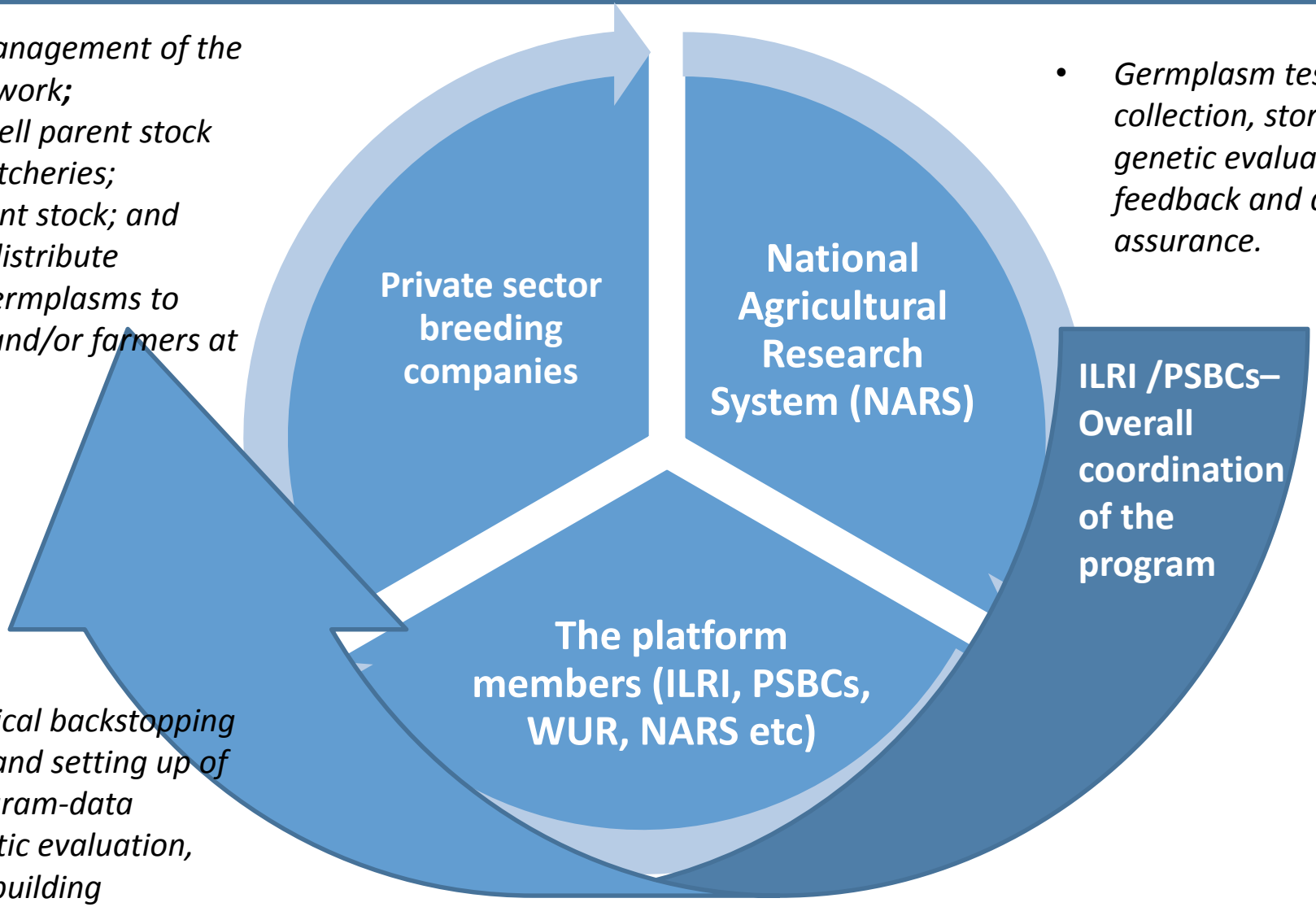
- **Set-up a long term genetic Gains program (Pure breeds or GPS) of farmer preferred strains - ACGG's longitudinal study, by private sector chicken breeding companies**
  - **potentially within-breed selection and crossbreeding**
  - **Base population 180 eggs/hen/Y – 2% GG annually**
- **Establish a supply of improved Parent stock with improved growth, egg production, feed conversion and adaptability traits**
- **Multiplier flocks established and scaled-up via a net work of hatcheries/multipliers**
- **When target scale is reached, hatcheries begin sale of day-old improved chicks to mother units/farmers**
- **Chicks vaccinated by hatcheries/multipliers and/or mother units**



Who are the partners of the Long Term Genetic Gains program network ?

- *Day-to-day management of the genetic gains work;*
- *Multiply and sell parent stock and GPS to hatcheries;*
- *Maintain parent stock; and*
- *Multiply and distribute commercial germplasms to mother units and/or farmers at scale.*

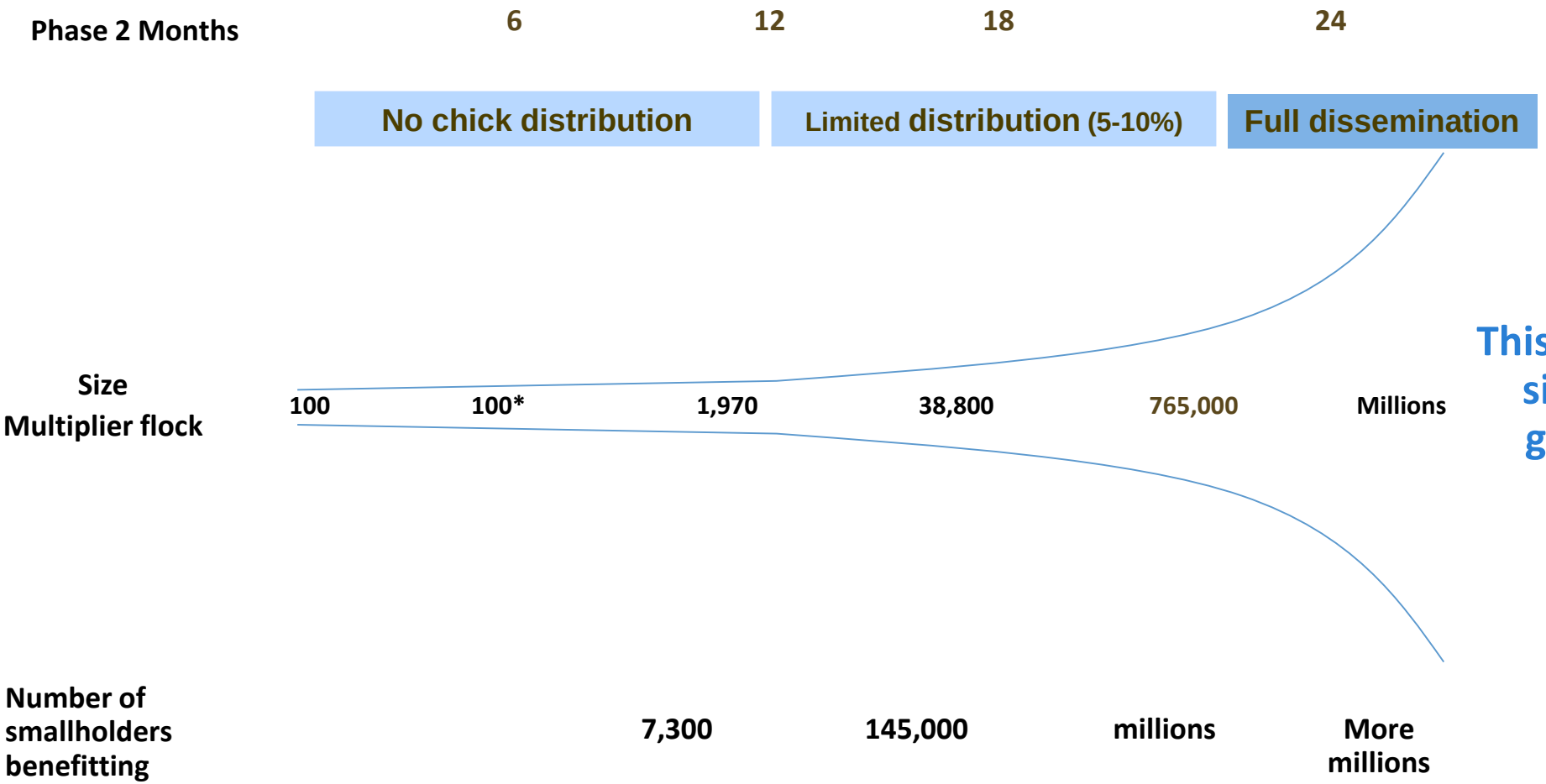
- *Germplasm testing, data collection, storage and genetic evaluation of lines, feedback and quality assurance.*



- *Negotiate the IP and access to the preferred strains;*
- *Design and coordination of the LTGG program;*
- *Capacity assessment/gap analysis in the private/public sector partners; and*
- *Develop and lead the implementation of context specific capacity building*

- *Provide technical backstopping in the design and setting up of the LTGG program-data capture, genetic evaluation, and capacity building*

Chicken's high rate of reproduction enables rapid scale
Distribution could begin after 12 months



This model can be implemented simultaneously in multiple geographies and countries.

The four cardinal aims of ACGG -outcomes

- Employment creation
- Wealth creation
- Poverty reduction
- Building the capacity of partners

ACGG Partnership - Mr Key

Partners now

African Chicken Genetic Gains

FANRPAN
Food, Agriculture and Natural Resources Policy Analysis Network

CCRP
cosmopolitan chicken research project

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR

BILL & MELINDA GATES foundation

CTLGH

ARARI

ethio chicken

LIVESTOCK FEEDS PLC
...quality feeds nationwide

Silverlands
Tanzania
Chakula Bora. Vifaranga Bora

TALIRI
TANZANIA LIVESTOCK RESEARCH INSTITUTE
UTAFITI KWA MAENDELEO

UNIVERSITY OF AGRICULTURE ABEOKUTA
KNOWLEDGE FOR DEVELOPMENT

SOKOINE UNIVERSITY OF AGRICULTURE
ARDHI NI HAZINA
1984

NATIONAL ANIMAL PRODUCTION RESEARCH INSTITUTE
A.B.U. SHIKA, ZARIA

WAGENINGEN UR
For quality of life

PICO-Eastern Africa
helping institutions work...

Koepon

AU-PANVAC

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Ethiopian Biodiversity Institute

HARAMAYA UNIVERSITY

Premier Feed Mills

ANIMAL CARE

Adellium Consult Limited

GTE

AGRO INVESTMENT LIMITED

Amo Farm
Sieberer Hatchery
...the source you can trust

Kind Palms Ventures

Oromia Agricultural Research Institute

Mainahawu Enterprises Nig. Ltd.

TASO
TANZANIA AGRICULTURAL SOCIETY

TANZANIA VETERINARY LABORATORY AGENCY

TPBA
TANZANIA POULTRY BREEDERS ASSOCIATION

COSTECH

TFDA
Tanzania Food & Drugs Authority

U.S. GRAINS COUNCIL

FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI
TECHNOLOGY FOR SERVICE

NASARAWA STATE UNIVERSITY
KNOWLEDGE FOR DEVELOPMENT

Olorun Osun Farms

Field Officers/enumerators -Nigeria

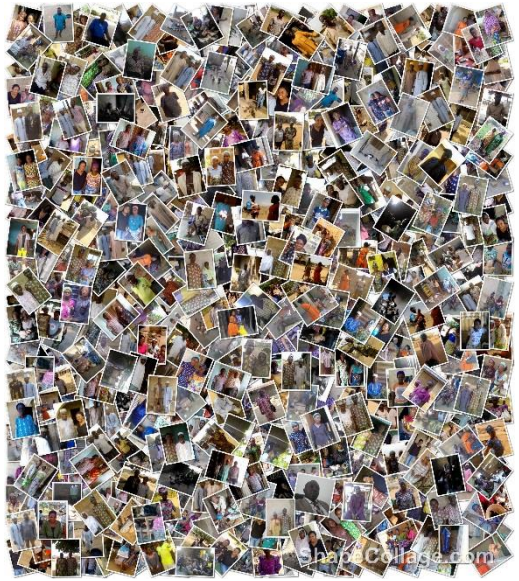
Female: 44%

Male: 56%

Photo credit: ACGG-NG FOs Database

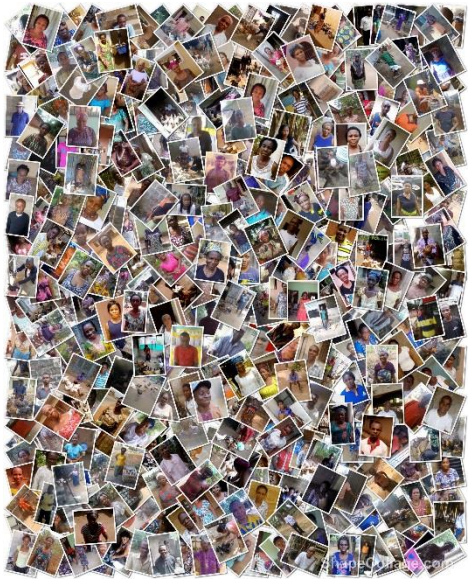
Project partner farmers/Beneficiaries…2100 in Nigeria

Kwara



Rivers

Imo



Nasarawa

Kebbi

420 Farmers per


Thank you for your attention