*Better lives through livestock*

# Asian Chicken Genetic Gains (AsCGG):

# A platform for exploring, testing and delivering improved chickens for enhanced livelihood outcomes in South East Asia (SEA)

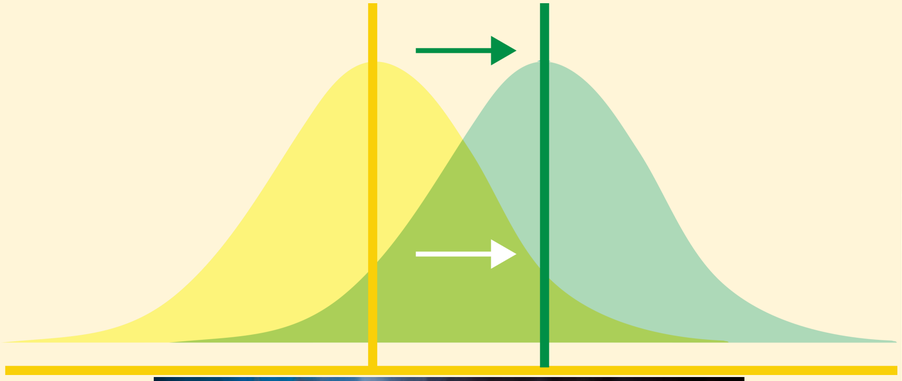
*Tadele Dessie, PI AsCGG*

*LiveGene Program, ILRI – Addis Ababa*

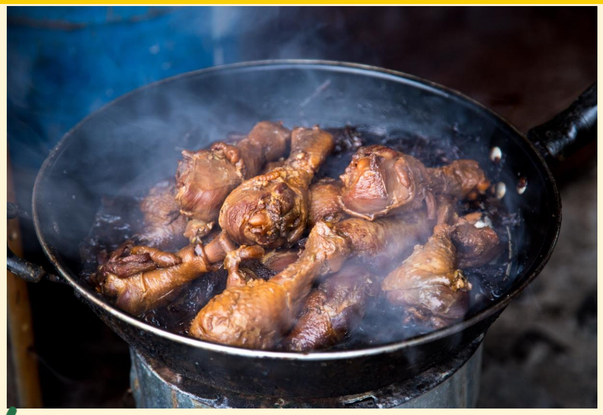
AsCGG Project Virtual Launch ,
May 24 and 25 2021

# Summary of the Findings from the ACGG Program

1 **Productivity Gain**



2 **Nutrition Gain**



3 **Economic Gain**

4 **Functional Innovation Platforms**

African Chicken Genetic Gains

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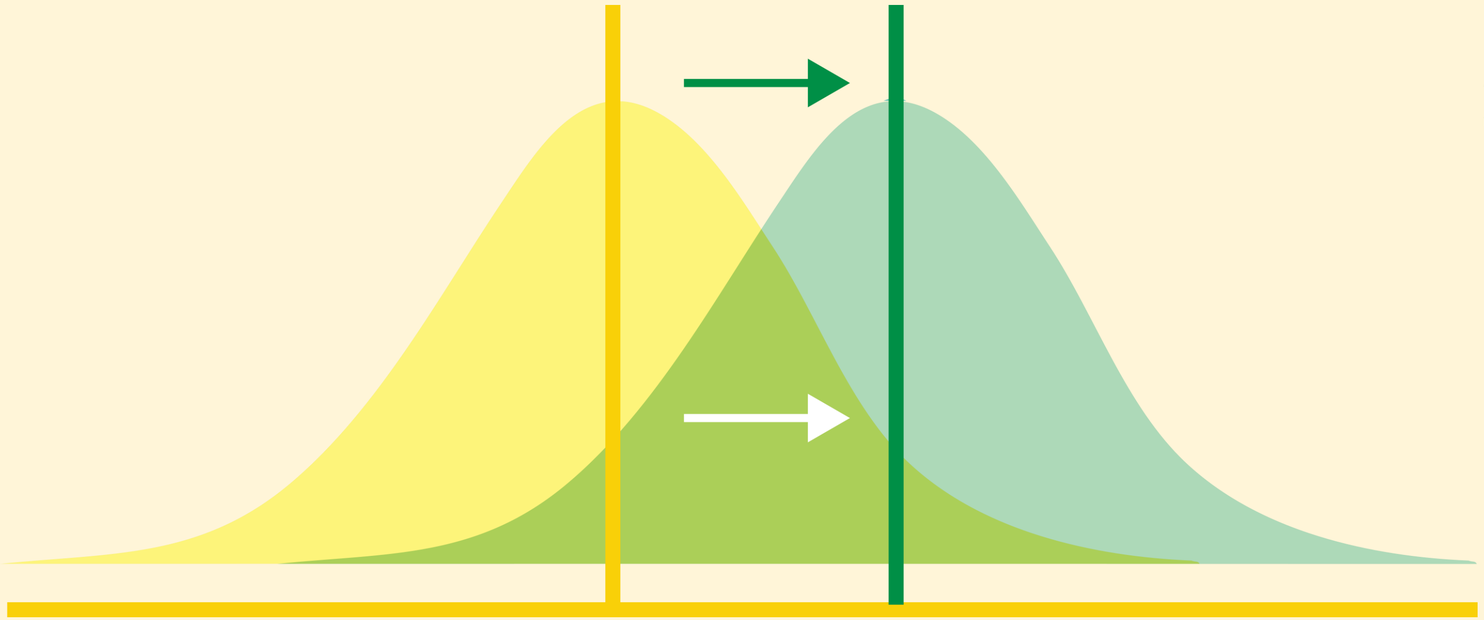
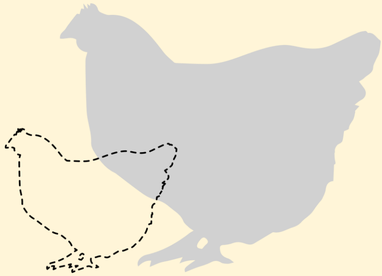
# Productivity Gain:

- ✓ Increase in production and productivity level from indigenous to tropically adapted and more productive chicken breeds



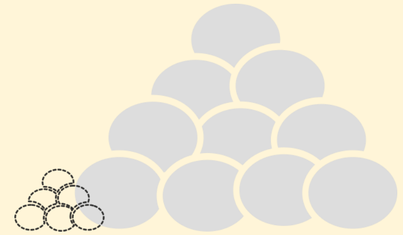
**200-300%**

in body weight



**100-160%**

in egg production



✓ SL Tanzania, AKM G Tanzania, Amo Farms in Nigeria and Ethiochicken in Ethiopia

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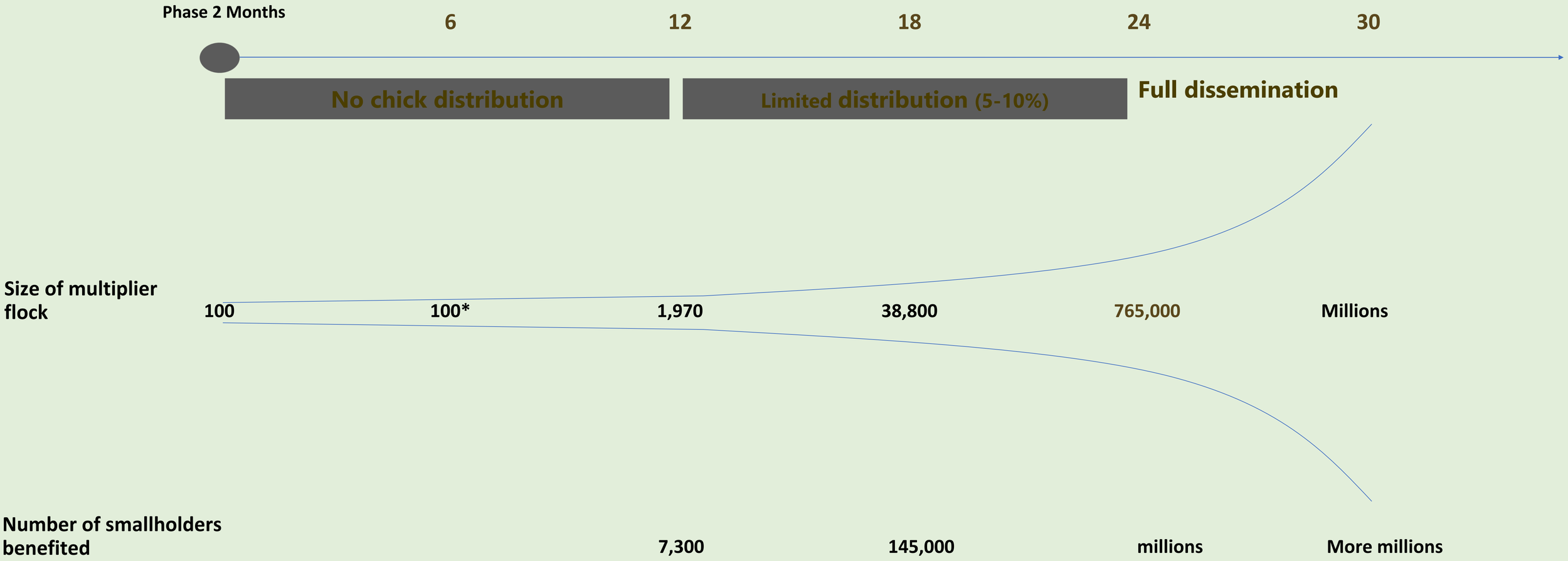
# Farmer preferred breed (s)
# Chicken's high rate of reproduction enables rapid scale - distribution could begin after 6 months




- ✓ SL Tanzania, AKM G Tanzania, Amo Farms in Nigeria and Ethiochicken in Ethiopia

**This model can be implemented simultaneously in multiple geographies.**

# How and Why AsCGG?

✓ Interest of researchers and development partners in South East Asia
- expressed interest in learning from the experiences of ACGG.

✓ ACGG team from ILRI organized a scoping visit (in April 2019)
- Met with researchers, development practitioners, private sector operators, met with smallholder farmers
- Tried to understand the policy and strategy environment in the countries
- Tried to understand the aspirations of the farmers, private sector operators
- Developed and submit a compressive report of the scoping visit to ACIAR and ILRI

# Smallholder Chicken Production system in SEA

Small holder chicken production is part of the socio-cultural make up and “balanced” farming system in South East Asia

Characterized as:

1. **Low input-output system**
   **Dominated by low-producing chicken genotypes**
2. **Poultry is owned and managed by household women;** income from the sub-sector managed by women
3. **Lack of effective long-term genetic improvement, multiplication and delivery systems**

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# **Opportunity**–smallholder chicken production system in SEA

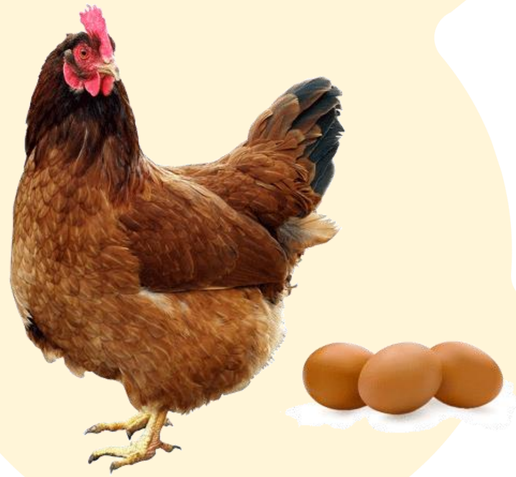
High potential for women's empowerment

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

Low-input-output system but with high potential for improved productivity across a range of systems

High potential for contributing to demand, income, dietary diversity at HH level and globally

Chicken production expanded by 56% in the last decade, growing from 5.9 mmt to 9.2 mmt in 2018, and is expected to reach 12.3 mmt by 2028



**Income +**

**Employment +**

**Nutrition**

**= Pathway out of poverty and equitable improvement of livelihoods**

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# AsCGG vision

*Smallholder commercial poultry production is seen as a science-led, productive, remunerative and sustainable business that creates national wealth, enhances local-level livelihoods, and improves nutrition of households, especially women, and their families, as well as other actors in the smallholder chicken value chain in South East Asia .*

# Project Aim

**Test and avail high-producing, farmer-preferred poultry genotypes to support increased smallholder chicken productivity as a pathway out of poverty in Cambodia, Myanmar and Vietnam.**


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# Innovation to be enabled by this project centres around five pillars

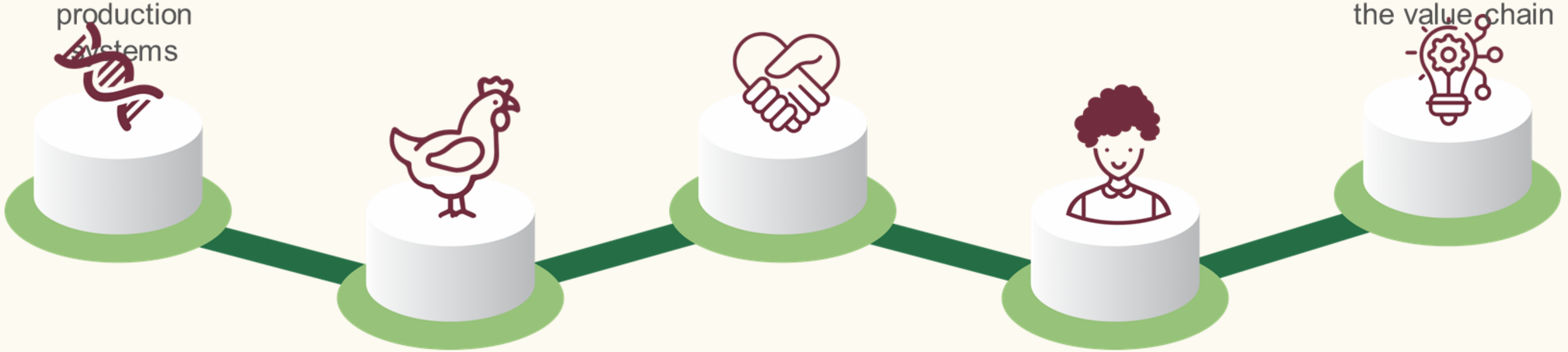
High-producing genetics that is well-adapted to low-input production systems

Farmer preferred breeds of chickens

Public-private partnership for improvement and multiplication

Women at the center to ensure success

Innovation platforms for developing solutions across the value chain



# What must be different?

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

2 From “silver bullets” to **researched options** *(informed by farmer’s experimentation and trials)*

3 From “we are here to offer you solutions” to **“we are here to work with you to find solutions”**

4 From pure focus on pushing ‘promising breeds’ to **recognition of importance of O x C** *(option by context)*

5 **Innovation Platforms** at national and community level as on-going processes for industry integration which outlive the current Project

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# Expected AsCGG project outcomes

1 **National decision makers** (governments, private sector, other development partners) have evidence-based recommendations

2 Through **public private partnerships**, smallholders have access to preferred, healthy and highly productive breeds

3 Baseline evidence of the broader impacts of improved poultry production and productivity to smallholder livelihoods

4 Increased empowerment of women smallholder farmers in the chicken value chain in rural communities

5 Functioning multi-country ‘south-south’ network of poultry scientists to support long-term chicken genetic improvement in Africa and Southeast Asia

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# The three cardinal aims of AsCGG–outcomes


**Employment Creation**


**Wealth Creation**


**Poverty Reduction**

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# Overview of AsCGG objectives

**1** Identify, characterize, and **test tropically-adapted chicken germplasm** to determine productivity across agro-ecologies and management conditions and to define farmer preferences.

**2** **Establish stable multiplication lines of farmer-preferred germplasm** and develop IP models to facilitate private and public sector access to the germplasms through a long-term genetic gains program focused on continual improvement

**3** **Develop and nurture Innovation Platform at different levels** to facilitate private sector engagement and business model development focused on empowering poor smallholder farmers, especially women, in the chicken value chain to improve their livelihoods

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# Research Questions

1. What are the existing smallholder poultry production and marketing systems in Cambodia, Myanmar and Vietnam?

2. What are the phenotypic and genetic characteristics of tropically adapted indigenous and exotic poultry breeds most suited to village poultry production in Cambodia, Vietnam and Myanmar?

3. What are farmer and consumer preferences for poultry traits and are there differences between men and women?

4. How can key public and private inputs and services be organised/strengthened to facilitate effective functioning of the smallholder poultry value chains?

5. What is the impact of foreign genetic importation on the diversity of indigenous chicken populations, and how can the indigenous germplasm be conserved?

6. How can increased empowerment of women smallholder farmers in the chicken value chain in rural communities be supported and encouraged?

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# Research activities

1. ***Understanding the knowledge base and the system, the animals***

- ✓ ***Literature review on existing village poultry production and marketing systems in Cambodia, Myanmar and Vietnam***
- ✓ ***Baseline survey to define and characterize current smallholder chicken production systems, including consumer demand for chicken in Cambodia, Myanmar and Vietnam***
- ✓ ***Confirm and characterise promising indigenous breeds in Vietnam, Cambodia and Myanmar***

2. ***Identifying, testing and setup long term genetic improvemet programs***

- ✓ ***Design and implement indigenous breed improvement program (IBIP) in Cambodia***
- ✓ ***Negotiate and access foreign Germplasm candidates - Myanmar and Vietnam***
- ✓ ***On-farm comparative testing (Vietnam): Performance test preferred local poultry breeds alongside the same number of imported indigenous breeds and examine the profitability/acceptability to different value chain actors***
- ✓ ***On-station comparative testing (Myanmar and Vietnam): Performance test preferred local poultry breeds alongside same number of imported indigenous breeds under controlled conditions***
- ✓ ***Evaluate the impact of foreign genetics on the diversity of indigenous chicken populations in Vietnam***

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# Research activities (Cont…)

***3. Capacity building***

- ✓ ***Demonstrate and build the capacity of national partners to cryopreserve Primordial Germ Cells (PCGs) of promising and endangered chicken ecotypes from Vietnam, Cambodia and Myanmar***
- ✓ ***Enhance the capacity of national agricultural research and development system on smallholder poultry value chain development - Vietnam, Cambodia and Myanmar***

***4. Institutional building***

- ✓ ***National innovation platform established in Cambodia (1) and Vietnam (1)Enhance the capacity of national agricultural research and development system on smallholder poultry value chain development Vietnam, Cambodia and Myanmar***
- ✓ ***Community level Innovation Platforms established - Cambodia (2) and Vietnam (6)***

| Project country | | | |
|---|---|---|---|
| Main project activities | Cambodia | Myanmar | Vietnam |
| | Literature review and baseline survey<br>On-farm Indigenous Breed Improvement Program (IBIP)<br>National Innovation Platform<br>Community Innovation Platform (x2)<br>Capacity building (national and community) | Literature review and baseline survey<br>On-station comparative testing at LVBD (Nay Pyi Taw)<br>Capacity building (national) | Literature review and baseline survey<br>On-farm comparative testing<br>On-station comparative testing at NIAS (Hanoi)<br>National Innovation Platform<br>Community level Innovation Platform (x6)<br>Capacity building (national and community) |
| Agro-ecology | Kandal province<br>Kampong Speu province | N/A – no field trials | Northwest,<br>Northeast<br>Red River Delta |
| Promising indigenous breeds | Sampov chicken<br>Kandong chicken<br>Skuoy chicken | Le Pyaung<br>Sittaguang<br>Fighting cock | Lac Thuy chicken,<br>Nhieu ngon chicken, and<br>Dong Tao or Mong or Mia chicken |
| Potential Tropically adapted and more productive chicken breeds to be tested* | N/A – Cambodia requested assistance in furthering existing Indigenous Breeding Improvement Program (IBIP) only | Kuroiler<br>Noiler<br>Sasso<br>Fayoumi<br>Black Australop and<br>Koekkoek | Kuroiler<br>Noiler<br>Sasso<br>Fayoumi<br>Black Australop and<br>Koekkoek |

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# What has been achieved thus far in the project implementation?

## Literature Review

https://dagris.info/acgg/Review-of-Chicken-Production-Marketing-and-Consumption-in-Myanmar.pdf
https://dagris.info/acgg/Review-of-Chicken-Production-Marketing-and-Consumption-in-Vietnam.pdf
https://dagris.info/acgg/Review-of-Chicken-Production-Marketing-and-Consumption-in-Cambodia.pdf

## Tools developed and ready to be used

**Training and reference manuals**

https://dagris.info/acgg/Rural-Poultry-Production-Producer-Level-Baseline-SurveyTraining-and-Reference-Manual.pdf
https://dagris.info/acgg/On-station-testing-training-and-reference-manual-Myanmar-and-Vietnam.pdf
https://dagris.info/acgg/On-farm-testing-training-and-reference-manual-Vietnam.pdf

**Data Collection tools**

https://dagris.info/acgg/Rural-Poultry-Production-Producer-Level-Baseline-Survey-Questionnaire.pdf
https://dagris/acgg/On-farm-performance-testing-data-collection-sheets-Vietnam.pdf
https://dagris.info/acgg/On-farm-preference-and-perception-of-farmers-data-collection-sheets-Vietnam.pdf
https://dagris.info/acgg/On-station-performance-testing-data-collection-sheets-Myanmar-and-Vietnam.pdf

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## ACGG parti

Posted on October 1, 20
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African Chicken Gene
collaboration led by th
Research Institute. Pa
Netherlands, Nigeria
make available high-p
genotypes that increa
productivity in Africa.

Permalink to ACGG partners

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# Vietnam

In Vietnam, drawing from unique experiences gained from the African Chicken Genetic Gains (ACGG) project, the Asian Chicken Genetic Gains (AsCGG) is implementing to test and make available high-producing, farmer-preferred genotypes to increase smallholder chicken productivity as a pathway out of poverty.

The national team is led by a project manager of the International Livestock Research Institute (ILRI) regional Hub in Hanoi, and researchers from the National Institute of Animal Sciences (NIAS).

Expected outcomes of the project include:

- Scientific achievements:

This component will generate new knowledge on the productivity of both indigenous and introduced chicken strains in the Vietnam smallholder context. The on-station chicken performance testing will measure the potential of selected chicken strains for egg productivity, growth, and product quality.

- Capacity development:

AsCGG project will enhance the national and cross-regional capacity of local partner institutions, optimising the diversity of both geography and skillsets of project partners. Selected individuals in Vietnam will travel to partner organizations so that they are exposed to different working environments, and cross-disciplinary visits will be encouraged.

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In addition to organizations recognized for specific projects and outputs, we thank all donors which globally supported the work of ILRI and its partners through their contributions to the CGIAR system

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# Tropical Poultry Genetic Solutions: Delivering farmer preferred, productive and ecologically adapted poultry to smallholders'

**Why**

- Indigenous chicken are locally adapted but with low productivity
- Poultry under the custody of women
- Present in all agro-ecologies, short generation time and high reproduction rate
- Impact on human income, health, nutrition and livelihoods

**Where**

- Nigeria
- Ethiopia
- Tanzania
- Burkina Faso
- Kenya
- Ghana
- Cambodia
- Myanmar
- Vietnam
- Zimbabwe

**ILRI**

- Range of technical genetic and social science expertise
- Strong partnership network and working experience in the project countries and private sector breeding companies
- Strong data collection infrastructure
- ILRI has pioneered the testing and deployment of improved chicken breeds (ACGG)

**Products**

**We will deliver:** Characterized tropical poultry productivity, adaptation and resilience traits. Markers and algorithms for genomic selection and editing. Three ongoing long-term genetic gain programs. New more productive and better fit 13 (9 with breeding companies and 4 with NARS) tropical poultry lines and their crosses. 15 per country PGC lines cryopreserved from indigenous chicken ecotypes

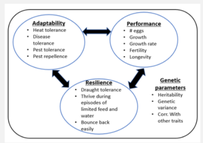
**5 years vision**: More productive poultry for better livelihoods and women empowerment

| Outputs | CapDev | Influences |
|---|---|---|
| Database of phenotypes, genotypes and environmental parameters including candidate genes and markers associated to adaptability, production and resilience traits | Private sector staff, PhD and MSc students, NARES researchers from project countries | IP and technical working groups, national and regional research and development systems, private sector breeding companies |
| Genomic and precision breeding tools (DNA markers, SNP chips) to accelerate Long term Genetic Gains programs | Private sector breeding companies and NARS from project countries | National and regional research and development systems, private sector breeding companies |
| Nine poultry lines and their crosses more productive across geographies, and four new selected indigenous breeds | NARS and Private sector officers trained (producers and mother units) | Local companies (hatcheries, feed and health service providers), NARS |
| Strategy/toolkit (feed, vaccination, management) and the capacity to use modern tools to drive accelerated genetic gains and to deliver more productive, farmer-preferred breeds | Private and public sector officers trained (producers and mother units), farmers and NGO | Local companies (breeding, hatcheries, feed and health service providers) |
| A collection of management options to enhance productivity, adaptability and profitability for all value chain actors | Private and public sector officers trained (producers and mother units), farmers and NGO | Private sector breeding companies and NARS |
| Indigenous chicken PGC lines cryopreserved in AU-IBAR regional genebanks | AU-IBAR regional genebanks equipped and their personnel trained in the recovery and biobanking of poultry PGC | Livestock Conservation Communities (AU-IBAR, FAO, country policy-makers) |

5-Years Budget $49 M

**ILRI and CGIAR Programs**
(Policies, Gender, LIMP Capacity Development, Health and Feed)

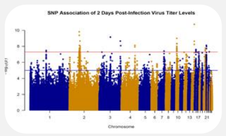
## RESEARCH LEADING TO OUTPUTS




Characterization of environmental, phenotypic and genetic parameters leading to the identification of productivity, adaptation and resilience traits for tropical poultry for genetic improvement

**Discovery and Translational Research**

## TRANSLATION LEADING TO OUTCOMES




Database of tropical poultry phenotypes and genotypes including polymorphisms and genes

Genomic and precision breeding tools to accelerate genetic gain in dual purpose poultry

**Markers and Gene Discovery**

**Genomic Selection and Editing**

## DELIVERY LEADING TO IMPACT

New tropical poultry lines that are more productive and better fit across geographies

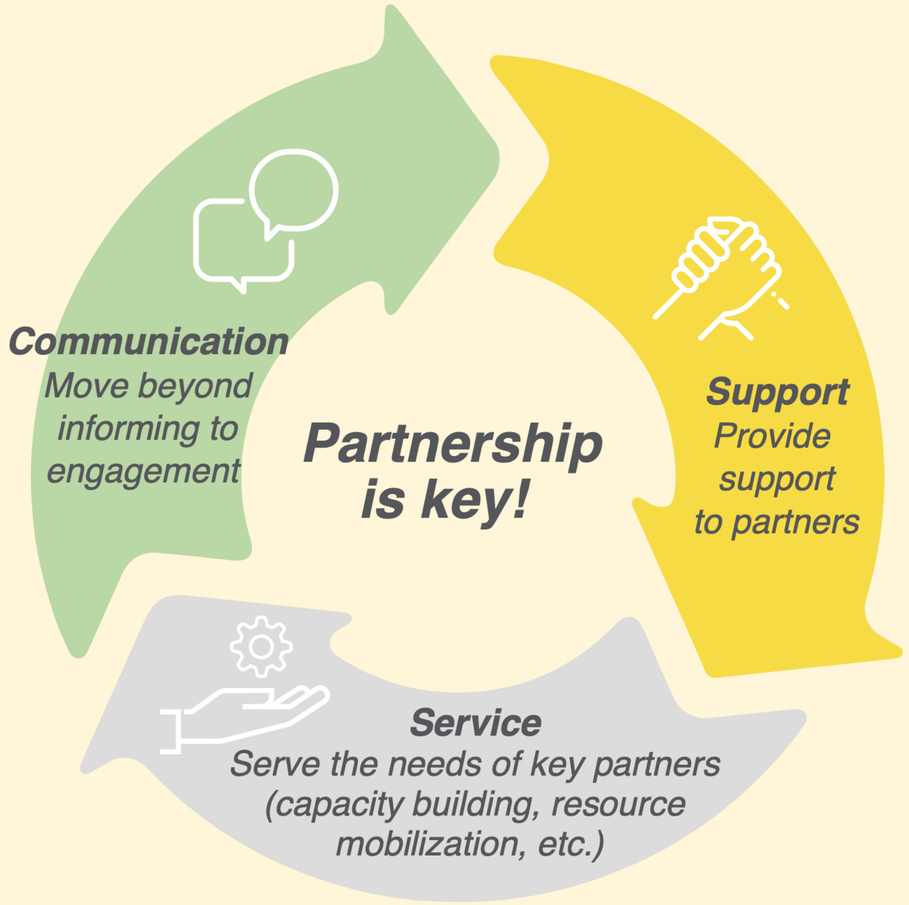
Scaled adoption and support to partners to help close key gaps for impact

**Technology Evaluation and Approval**

**Policy and regulatory environment and track program impacts**

**Partners roles:** International advanced research centers (e.g. UoN, CTLGH, Wageningen University, The University of Nottingham), NARES; international poultry breeding companies (e.g. Hendrix Genetics. Amo Farm, Hubbard) and in-country breeding companies (e.g. Ethiochicken, Silverlands), policy institutions (AU-IBAR, FAO)

# **Partnerships**–
integrated into AsCGG's core business

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# Partnering in project implementation

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# Thank you
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Cảm ơn

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