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

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Summary of the Findings from the ACGG Program

1. Productivity Gain
2. Nutrition Gain
3. Economic Gain
4. Functional Innovation Platforms
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
Farmer preferred breed(s)

Chicken’s high rate of reproduction enables rapid scale - distribution could begin after 6 months

Phase 2 Months

<table>
<thead>
<tr>
<th>Months</th>
<th>6</th>
<th>12</th>
<th>18</th>
<th>24</th>
<th>30</th>
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</thead>
<tbody>
<tr>
<td>No chick distribution</td>
<td>Limited distribution (5-10%)</td>
<td>Full dissemination</td>
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Size of multiplier flock

- 100
- 100*
- 1,970
- 38,800
- 765,000

Number of smallholders benefited

- 7,300
- 145,000
- millions
- More millions

✓ 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
Opportunity—smallholder chicken production system in SEA

- High potential for women’s empowerment
- 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
- 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

Pathway out of poverty and equitable improvement of livelihoods

- Income +
- Employment +
- Nutrition

Opportunity—smallholder chicken production system in SEA
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.
Innovation to be enabled by this project centres around five pillars:

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 and multiplication
4. Women at the center to ensure success
5. 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.
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
The three cardinal aims of AsCGG – outcomes

1. Employment Creation
2. Wealth Creation
3. Poverty Reduction
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.
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?
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 improvement 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
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)
<table>
<thead>
<tr>
<th>Project country</th>
<th>Main project activities</th>
<th>Cambodia</th>
<th>Myanmar</th>
<th>Vietnam</th>
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<td></td>
<td>Literature review and baseline survey</td>
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<td></td>
<td>On-farm Indigenous Breed Improvement Program (IBIP)</td>
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<td>National Innovation Platform Community Innovation Platform (x2)</td>
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<td>Capacity building (national and community)</td>
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<td>Literature review and baseline survey</td>
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<td>On-station comparative testing at LVBD (Nay Pyi Taw)</td>
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<td>Capacity building (national)</td>
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<td>On-farm comparative testing</td>
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<td>On-station comparative testing at NIAS (Hanoi)</td>
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<td>National Innovation Platform Community level Innovation Platform (x6)</td>
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<td>Capacity building (national and community)</td>
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<td>Agro-ecology</td>
<td>Kandal province</td>
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<td>Northwest, Northeast, Red River Delta</td>
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<td>Kampong Speu province</td>
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<td>Promising indigenous breeds</td>
<td>Sampov chicken</td>
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<td>Le Pyaung</td>
<td>Lac Thuy chicken, Nhieu ngon chicken, and Dong Tao or Mong or Mia chicken</td>
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<td>Kandong chicken</td>
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<td>Sittaguang</td>
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<td>Skuoy chicken</td>
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<td>Fighting cock</td>
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<tr>
<td>Potential Tropically adapted and more productive chicken breeds to be tested*</td>
<td>N/A – Cambodia requested assistance in furthering existing Indigenous Breeding Improvement Program (IBIP) only</td>
<td>Kuroiler</td>
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<td>Noiler</td>
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<td>Black Australop and Koekkoek</td>
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<td>Black Australop and Koekkoek</td>
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What has been achieved thus far in the project implementation?

**Literature Review**

**Tools developed and ready to be used**

**Training and reference manuals**

**Data Collection tools**
https://dagris.info/acgg/Rural-Poultry-Production-Producer-Level-Baseline-Survey-Questionnaire.pdf
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 (NAS).

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-farm 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, optimizing 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.
**Tropical Poultry Genetic Solutions:** Delivering farmer preferred, productive and ecologically adapted poultry to smallholders’ livelihoods

**Where:**
- Burkina Faso
- Zimbabwe
- International advanced research centers (e.g., Capacity Development, Present in all)
- Strong partnership network and working in the project countries and private sector breeding companies
- Strong data collection infrastructure

**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

**ILRI**

**Products:**
- 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)

**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

**Outputs**
- Database of phenotypes, genotypes and environmental parameters including candidate genes and markers associated to adaptability, production and resilience traits
- Genomic and precision breeding tools (DNA markers, SNP chips) to accelerate Long term Genetic Gains programs
- Nine poultry lines and their crosses more productive across geographies, and four new selected indigenous breeds
- A collection of management options to enhance productivity, adaptability and profitability for all value chain actors
- Indigenous chicken PGC lines cryopreserved in AU-IBAR regional genebanks

**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
- Private sector breeding companies and NARS from project countries
- National and regional research and development systems, private sector breeding companies
- NARS and Private sector officers trained (producers and mother units)
- Local companies (hatcheries, feed and health service providers), NARS
- Private and public sector officers trained (producers and mother units), farmers and NGO
- Local companies (hatcheries, feed and health service providers)
- Private and public sector officers trained (producers and mother units), farmers and NGO
- 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)

**Budget:** $49 M

**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

**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

**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

**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

Partnership is key!

- Communication: Move beyond informing to engagement
- Support: Provide support to partners
- Service: Serve the needs of key partners (capacity building, resource mobilization, etc.)
Partnering in project implementation
Thank you
Kyay Zu
Saum arkoun
Cảm ơn