JULY 2021

COMPLETE SCALING READINESS STUDY OF

Tropical Poultry Genetic Solutions Strategy In Ethiopia, Tanzania and Nigeria

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR RESEARCH PROGRAM ON Livestock

ETHIOPIA, TANZANIA, NIGERIA

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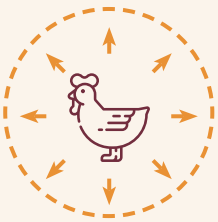
Executive Summary

Tropical Poultry Genetic Solutions Strategy (TPGS) is a promising strategy that aims to improve the productivity and volume of chicken production in tropical countries. International donors, private sector investors, and public enterprises in Ethiopia, Tanzania, and Nigeria have provided significant support to improve the poultry sector. Among them, the International Livestock Research Institute (ILRI) support is critical for TPGS efforts. TPGS's strategy has been championed primarily by CGIAR, Tanzania Livestock Research Institute, Federal University of Agriculture Abeokuta, Sokoine University of Agriculture, PICO, Koepon, Ethiopian Institute of Agricultural Research, Haramaya University, Obafemi Awolowo University, National Animal Production Research Institute of Nigeria (NAPRI) and Wageningen University and Research Centre.

TPGS has been designed, developed, and delivered through multiple interventions. Among them, African Chicken Genetic Gains Project (ACGG) is the most significant contributor to the advancement of the TPGS. Since the inception of ACGG, TPGS has been implemented fully in Ethiopia, Tanzania, and Nigeria and partially in Kenya, Ghana, and Zimbabwe in Africa and Cambodia, Myanmar and Vietnam.

Between 2014 and 2021, TPGS has contributed to a 200% to 300% increase in Chicken body weight, 100% to 160% in Egg production in Ethiopia, Tanzania, and Nigeria. As a part of the TPGS, more than 38800 new breed chickens were distributed, initially benefiting to 145000 smallholder farmers. The number of new breed chickens available in Ethiopia, Tanzania, and Nigeria is estimated to be more than a million, helping millions of Ethiopian, Tanzanian, and Nigerian farmers.

200% to 300%



Increase in Chicken body weight

100% to 160%

Egg production

145000

Benefited smallholder farmers

This document is prepared to complement International Livestock Research Institute (ILRI) efforts in Ethiopia, Tanzania, Nigeria. It utilizes state-of-the-art Scaling Readiness[1] to assess the current TPGS scientifically and provide recommendations for further improvements. The information presented in the document was synthesized from the study of the evidence on the components of TPGS in Ethiopia, Tanzania, Nigeria, and the rest of the world. The evidence collection is partially guided by selected experts who have significant knowledge and experience in designing and implementing components of TPGS.

2. https://www.ilri.org/news/ilri-impact-scale-program-shares-insights-scaling-tools-and-practices-cgiar-science-leaders-and

The study has benefited from the initial steps of the Impact at Scale Framework [2]. Before this deep-dive study, the ACGG team has drafted a scaling ambition and updated it based on feedback from a representative group of chicken value chain stakeholders. For Ethiopia, by 2025, the ACGG project and partner organizations want to disseminate 120 million tropically adapted dual-purpose improved chicken breeds with appropriate packaging for about 4.8 million smallholder producers in Ethiopia to enhance livelihood outcomes. This commonly agreed scaling ambition helped to formulate the goals of the TPGS.

The study consists of three parts that address the needs of different users. The first part, Scaling Readiness Assessment, provides a detailed description and the diagnosis of the TPGS using an innovation and science perspective. It also presents the Scaling Readiness graph of the TPGS and the innovation package that aims to improve the use of the TPGS at scale in Ethiopia, Tanzania, Nigeria. The second part, Scaling Readiness Evidence Review, articulates the findings of this study by discussing the evidence sources and gives an extensive list of the resources analyzed and used in writing this study. It also provides further insights in using the Scaling Readiness in assessing the impact potential of innovations at scale. The third part, Scaling guidelines, presents the synthesis of the findings and provides actionable recommendations to designers, sponsors, and managers of TPGS projects, programs, and policies and professionals of specific innovations and components in the TPGS in Ethiopia, Tanzania, Nigeria.

The study is the first deep-dive Scaling Readiness Study on genetic livestock innovations and technologies. The information, measures, and recommendations in the study are based on diverse evidence sources. The study covered approximately 149 evidence sources, including journal articles, books, maps, reports, statistics, web pages, and complementary interviews for identifying and formulating innovations and their components. Evidence sources were in English.

2. https://www.ilri.org/news/ilri-impact-scale-program-shares-insights-scaling-tools-and-practices-cgiar-science-leaders-and

The Scaling Readiness Assessment of TPGS in Ethiopia, Tanzania, Nigeria shows that TPGS is an innovation. Chicken breeding activities have a long history, and there are already strategies for improving the genetic profile of chicken breeds. However, TPGS has ten novel components (Figure 1 - circles), which, as a group, haven't been implemented in Ethiopia, Tanzania, or Nigeria for improving productivity and volume of chicken production.

The Assessment also indicates that TPGS does not consist of only genetic technologies and innovations. Although, genetic innovations such as Chicken Breed Genetic Profiles, New Breed Chickens and On Station, and On-Farm Chicken Breed Testing Methods are essential components of the TPGS, it also includes organizational arrangements such as National Innovation Platforms, Subnational Innovation Platforms, and Public-Private Partnership Arrangements in an integrated manner.

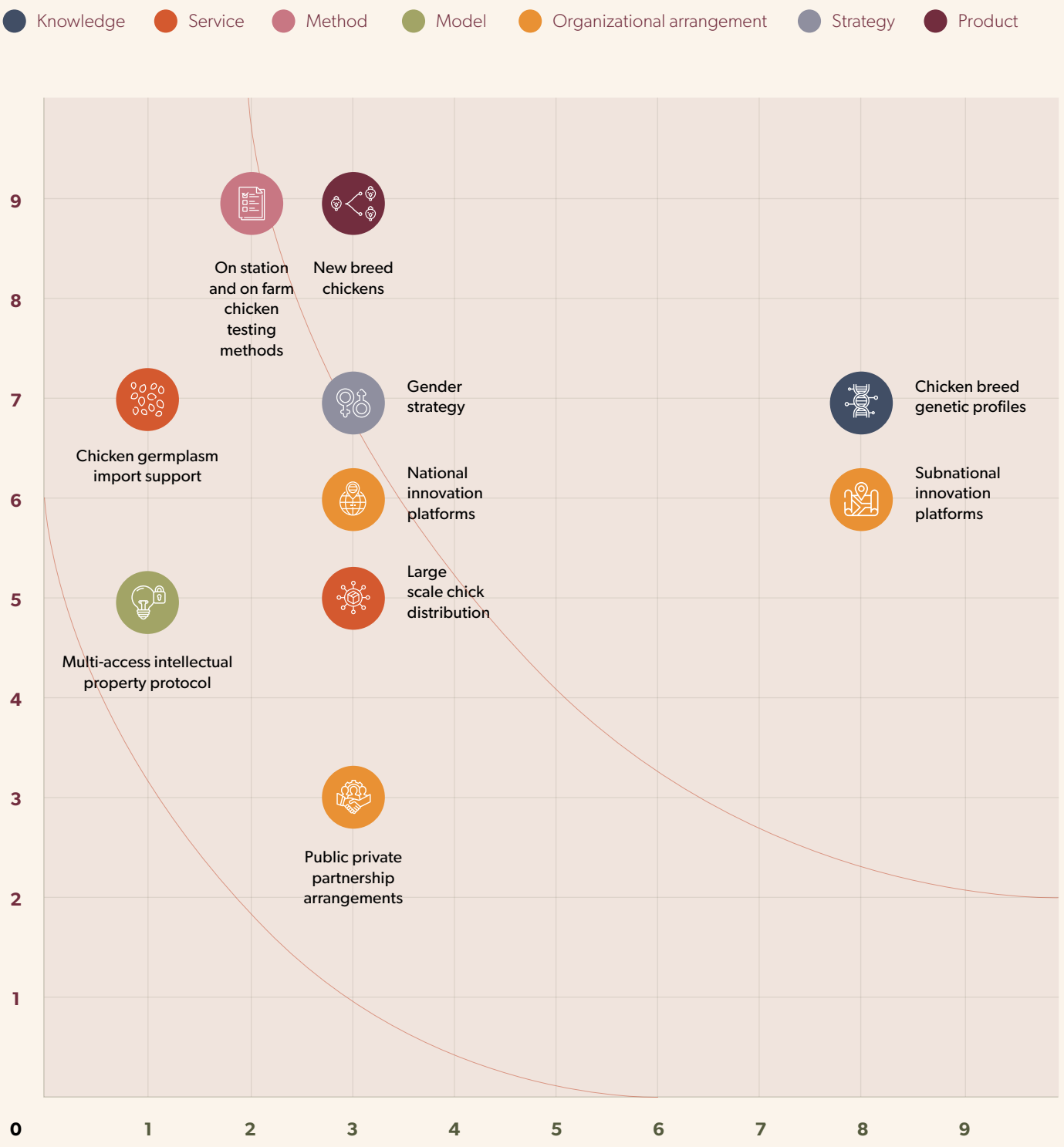
The Assessment shows that the Readiness (functional performance) and Use levels of the ten novel components presented as circles in Figure 1 below are different. Public-Private Partnership Arrangements, Chicken Germplasm Import Support, and Multi-access Intellectual Property Protocols have lower functional performance and were used by fewer stakeholders involved in the ACGG project. Meanwhile, Chicken Breed Genetic Profiles, Subnational Innovation Platforms and New Breed Chickens have relatively higher functional performance. They are used by more stakeholders in the Chicken Value Chain, including stakeholders who were not involved in the ACGG project. Therefore, interventions aiming at improving productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria have a more considerable potential contribution to impact at scale if they prioritize improving the Readiness and Use of Public-Private Partnership Arrangements, Chicken Germplasm Import Support, and Multi-access Intellectual Property Protocols in the short and middle term.

Figure 1: Scaling Readiness Assessment of the Tropical Poultry Genetic Solutions Strategy For Ethiopia, Tanzania, Nigeria - July 2021 for improving productivity and volume of chicken production

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Nigeria and Tanzania, July 2021

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Tanzania, Nigeria has

6.4	3.5	22.4
Average Readiness Level	Average Use Level	Average Scaling Readiness Level
Vertical axis	Horizontal axis	



Based on the findings presented partially above and other findings articulated in this study, the Scaling Readiness Assessment team specifically recommends that interventions aiming to improve TPGS invest in the following:

RESEARCH FOR DEVELOPMENT ACTIVITIES

further develop Chicken Germplasm Import Support Options that work best in the context of Ethiopia, Tanzania, Nigeria and validate its performance for the specific conditions there

design applied research setup and validate the role of Multi-access Intellectual Property Protocols in improving productivity and volume of chicken production

validate the current conceptual models on Public-Private Partnership Arrangements implemented in African Chicken Genetic Gains Project by comparing and contrasting the existing arrangements with proven arrangements in other livestock sectors in and beyond Ethiopia, Tanzania, Nigeria

communicate and collaborate with the researchers conducting conceptual or theoretical research on Direct engagement options with critical policymakers in livestock sectors in Ethiopia, Tanzania, Nigeria and consolidate the recommendations on how to best organize effective direct engagement with policy decision-makers

collaborate with the research community working on Village Vaccination and Deworming Model in Nigeria and other countries with similar context for identifying the necessary updates in the current implementation of the model

design experimental research setup and validate the role of Import Credit Instrument in supporting private chicken enterprises in times of international economic crises similar to Covid-19 that influence foreign exchange availability

photo credits: ILRI/ Camille Hanotte

UTILIZATION ACTIVITIES

organize awareness-raising events with partners of the ACGG project and develop a shared understanding of effective engagement options that can convince them to use Chicken Germplasm Import Support provided by the project

organize awareness-raising events with the partners of the intervention on Multi-access Intellectual Property Protocols and develop a shared understanding with them on how best to benefit from Multi-access Intellectual Property Protocols on chicken genetics

engage with the designers and developers of Public-Private Partnership Arrangements who are not involved in the ACGG Project, such as researchers, managers and practitioners of other research and development projects, individual or corporate innovation brokers operating in the chicken sectors, and generate learning about how best to use the Public-Private Partnership

ideate, together with key private sector partners, about how ACGG Project and other interventions can directly engage with key policymakers in a complementary way with the innovation platforms and country poultry forums

co-organize more significant engagement events with the partners already convinced about Village Vaccination and Deworming Model in Nigeria for increased implementation of the model in different locations across Nigeria

ideate about how ACGG Project and other interventions can work on Import Credit Instrument with financial and governance actors in Ethiopia, Tanzania and Nigeria

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Scaling Readiness Glossary

Scaling Readiness is a decision support system to support international research for development projects and programs implemented by CGIAR in designing, developing, disseminating, delivering, and improving the use of innovations at scale. Scaling Readiness concepts and indicators used in this study are explained in the Scaling Readiness Glossary below. More general information about Scaling Readiness can be accessed via www.scalingreadiness.org. For the science dimensions of Scaling Readiness, a recent research paper[1] and implementation of the Scaling Readiness Guide[2] can be helpful. A recent case study[3] can give more information about the scope of Scaling Readiness Assessments. To have more information about Scaling Readiness and its implemented cases, don't hesitate to contact murat.sartas@cgiar.org.

EVIDENCE-BASED MEASUREMENT

Measures in Scaling Readiness are calculated using evidence. Specific claims of Readiness and Use measures are assessed through a hierarchy of sources of verification. High-quality science articles and other peer-reviewed documents are the first sources. In their absence, technical documents or other publicly scrutinized documents are used to back up specific evidence claims. In the lack of any documents, multiple experts' opinions with sufficient competencies are triangulated to identify the measures.

INNOVATION COMPONENT

Knowledge, technology, a concept, practice, etc., that constitutes a part of innovations. Innovations have many components. Some of them are novel and play critical roles in the functioning and use of the innovation in the contexts the intervention operates for achieving specific intervention goals. They can be stand-alone innovations for other contexts and goals, but for the specific goals and contexts, an intervention operates, they work as a part of a larger innovation. In Scaling Readiness, these novel components of innovations are identified, characterized, and diagnosed. Research for development interventions can control or significantly influence the design, development, and delivery of innovation components.

INNOVATION

A novel product, service, arrangement, or purposeful combination with economic, environmental, health, industrial, etc., benefits. Innovations are different from inventions since innovations have explicit implementations. A product, service, arrangement, or combinations need to have a clear use objective to be considered innovation. Innovations can be technical or social. They can be tangible and intangible. In Scaling Readiness, innovations are characterized, diagnosed, and strategized. Research for development interventions can control or strongly influence design, development, and delivery innovations and catalyze or support their use at scale.

INNOVATION PACKAGE

The combination of the innovations an intervention aims to design, develop, deliver with other innovations necessary to use them at scale. Innovation packages usually consist of technologies and other products, services, organizational and institutional arrangements, and systems required to improve awareness of accessibility, affordability, and other characteristics of an innovation that influence the functioning and use at scale. Innovation Package is the fundamental unit of analysis for scaling innovations in Scaling Readiness. Research for development interventions can influence the design and delivery of innovation packages, but they can not control it. Many innovations in the innovation packages are beyond the control and influence zone of interventions; therefore, partnerships are vital in improving the overall Scaling Readiness of Innovation Packages.

INNOVATION READINESS LEVEL

It indicates how mature or practical an innovation is to achieve its use objectives. It can be considered as a systematic answer to the question "how good an innovation functions." It can be between 0, which indicates that the innovation is just an idea in the mind of its potential designers and developers, and 9, suggesting that the innovation is a proven innovation with clear evidence of its value measured in terms of livelihood impact profit, etc. Research and development projects increase the Innovation Readiness Levels by improving the design of the innovations, developing and validating the improved designs in uncontrolled and controlled conditions.

INNOVATION USE LEVEL

It is a number indicating the level of the use of innovations at scale. It can be considered as a combined systematic answer to questions of "who uses an innovation and in which order of magnitude." It can be between 0, indicating that the innovation is not being used in the context an intervention aims to increase the use of the innovation, and 9, which suggests that the innovation is being commonly used among the users who are not involved in any innovation design, development or dissemination processes. Research and development projects increase existing innovation use levels by disseminating the innovations and expanding the use of innovations by other innovation professionals who are not involved in the same projects and users who are not involved in any innovation processes.

INTERVENTION

A coherent set of planned activities for achieving specific goals in a defined period in a specific space. An intervention is a general name of a project. Although most interventions are projects, there are other types of interventions such as programs, a specific combination of projects for achieving higher-level objectives, and initiatives that refer to a set of planned activities, usually without explicit specification of goals and period. Scaling Readiness can be used for multiple types of interventions, e.g., projects, programs, policy interventions.

SCALING READINESS LEVEL

A single number combines the Readiness and Use level of all the innovations in an Innovation Package. It can be considered as a single answer to the question of "what is the likelihood that an innovation package will achieve impact at scale." There are different ways of calculating the Scaling Readiness Levels based on the management system's preferences. It can be an average level, a minimal level, or a weighted average level. In this study, two Scaling Readiness Levels are documented; the Average Scaling Readiness Level and Scaling Readiness Score. The Average Scaling Readiness Level is the multiplication of the averages of the individual Innovation Readiness and Use levels of components or innovations. Scaling Readiness Score is the multiplication of the Readiness and Use levels of the minimum level component or the innovation in the package. Scaling Readiness Score is a more strict version focusing on the minimum. It aims to help the designers of the interventions prioritize the bottleneck components or innovations that hinder the high impact at scale.

BOTTLENECK COMPONENT OR INNOVATION

A subset of components of an innovation or innovations in the innovation package perform worse and are used by fewer users than the other components or innovations. In Scaling Readiness, the bottleneck components of an innovation or the bottleneck innovations in an innovation package are used to prioritize the activities of research for development intervention to achieve maximum impact at scale with minimum cost and resource use. Bottleneck components and innovations are not universal and depend on the specific time, space, and goals. Identifying Scaling Readiness Levels and the Scaling Readiness Score present the set of bottlenecks.

CHARACTERIZATION

Characterization is the first step of the Scaling Readiness Cycle. It includes the activities to document and classify three critical units, i.e., interventions, innovations, and stakeholders. One of these three critical units, innovations and their components, is characterized in this study using a customized version of Scaling Readiness Step 1.

DIAGNOSIS

Diagnosis is the second step of the Scaling Readiness Cycle. It includes assessments of the characteristics of the interventions, innovations, and stakeholders generated in the first step and the implications of these characteristics in achieving impact at scale. Diagnosis of the innovations and Innovation Packages are made in this study using a customized version of Scaling Readiness Step 2.

STRATEGIZING

Strategizing is the third step of the Scaling Readiness Cycle. It includes identifying tailor-made fit-for-purpose strategies for addressing the diagnosis step and improving the impact at scale performance using a set of hierarchical strategic options. Strategizing is done partially in this study by using a customized version of Scaling Readiness Step 3.

PART A

Scaling Readiness Assessment of Tropical Poultry Genetic Solutions Strategy in Ethiopia, Tanzania, Nigeria

photo credit: ILRI/Apollo Habtamu

The Scaling Readiness Assessment provides detailed information about Tropical Poultry Genetic Solutions Strategy (TPGS) in Ethiopia, Tanzania, Nigeria and complementary innovations necessary to improve chicken production productivity and volume.

Specifically, it presents

- the essential characteristics of TPGS relevant for its performance at scale
- the diagnosis of these essential characteristics from an innovation and scaling perspective
- the Readiness and Use levels of the novel components of TPGS
- innovations that are necessary to achieve a positive impact from using TPGS at scale
- the diagnosis of the innovations from an innovation and scaling perspective
- the Readiness and Use levels of the innovations in the TPGS innovation package

This part focuses on innovation description and assessment. It aims to provide a deeper understanding of innovation-related information relevant to achieving impact at scale by implementing the TPGS. It is designed to be a stand-alone document for

managers of projects, programs, and policies related to TPGS who are interested in developing a deeper understanding

designers, developers, and managers of specific innovations and components in Tropical Poultry Genetic Solutions Strategies

The procedures and the tools for identifying the Scaling Readiness measures and the evidence sources are not articulated in this part. More information about the measures can be accessed from the Scaling Readiness Evidence Review (Part B) and Annexes. The assessment also does not articulate the implications of the findings for designing and implementing innovation and scaling projects, programs, and policies. A synthesis of the findings and recommendations is provided in the Scaling Readiness Guidelines (Part C)

Innovation Profile of TPGS

Scaling Readiness Innovation Profile is a tool to describe the characteristics of an innovation aimed to be designed, developed, disseminated, or to be used at scale. It aims to contribute to improving the impact of TPGS at scale through

i. presenting gaps in the design of TPGS,

ii. developing a shared understanding between international donors, private sector investors, national governments, local governments, producers' organizations, and private sector multipliers and distributors about what TPGS is and what it entails and

iii. creating a brief communication product for presenting the innovation to various stakeholders.

In this document, a customized version of the Innovation Profile is used to characterize TPGS. In this section, the Innovation Profile Sheet, an overall diagnosis of the results in the Innovation Profile Sheet, and Innovation Readiness and Use assessments of the TPGS are provided.

photo credit: ILRI/Apollo Habtamu

Innovation Profile Sheet

TROPICAL POULTRY GENETIC SOLUTIONS STRATEGY

TPGS is a Strategy for improving productivity and volume of chicken production. It addresses the need for accessing, producing, and selling productive and healthy chicken breeds. By combining new genetics, improved local breeds, and enhanced delivery systems, it provides high-producing but low-feed-input birds vaccinated and suited to local conditions. Relative to its alternatives, it provides a holistic and integrated multi-stakeholder solution to significant bottlenecks in smallholder-based low-input chicken production systems.

APPLIED BY

- Smallholder farmers
- Family farmers
- Private sector multipliers
- Distributors

SUPPORTED BY

- International donors
- Private sector investors
- Public enterprises

BENEFITS

- Smallholder farmers
- Family farmers

AIMS AT

- Reducing poverty in all its forms everywhere
- Reducing hunger
- Achieving food security and improving nutrition
- Promoting sustainable agriculture

PROS

- Increase incomes
- Decrease animal and human health risks
- Sustainable

CONS

- Requires coordination at scale

CONTRIBUTES TO

Novel Components of TPGS in Ethiopia, Tanzania, Nigeria

CHICKEN BREED GENETIC PROFILES

an inventory in which several interest traits are documented in detail for multiple breeds so that relative advantages and disadvantages of breeds can be presented and a more informed breed selection process can be pursued

CHICKEN GERMPLASM IMPORT SUPPORT

supporting import of genetic materials from one country to another via multiple channels such as preparation of legal documentation, supporting testing of the germplasms at the customs etc.

ON-STATION AND ON-FARM TESTING METHODS

testing the new ideas, designs, and application prototypes in controlled and semi-controlled environments (In agricultural and food sectors, typical controlled environments are research stations located in usually several non-central districts, and typical semi-controlled environments are the farms of selected farmers based on their capabilities and representativeness)

MULTI-ACCESS INTELLECTUAL PROPERTY PROTOCOLS

intellectual-property models that enable the use of the technology or products with different licensing arrangements depending on the characteristics of the use or users. In multi-access models, some user might need to pay while others might use it technology or innovation without payment

NATIONAL INNOVATION PLATFORMS

organization of regular facilitated events at the national scale in which various innovation management and coordination related activities are discussed, agreed and co-implemented

SUBNATIONAL INNOVATION PLATFORMS

organization of regular facilitated events at the subnational scale in which various innovation-related activities are discussed, agreed and co-supervised.

PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS

organizing multiple facilitated events that representatives from the public sector such as directors and technical staff from ministries together with the private sector such as company managers sales representatives attend and engage in a structured dialogue

NEW BREED CHICKENS

producing distributing, and promoting new breeds of chicken

GENDER STRATEGY

considering gendered participation influence of different gender groups in the activities of the intervention and the benefits different gender groups drive from the intervention as an integral part of the more extensive intervention strategies

LARGE SCALE CHICK DISTRIBUTION

distributing the chicks to many households living in an extended area in sufficient quantities that can kick start a small chicken production business

Innovation Profile Diagnosis

This part provides information about the diagnosis of the Scaling Readiness Assessment team on the components of the innovations presented in the Innovation Profile Sheet.

USERS

TPGS is used by international donors, private sector investors, national governments, local governments, producers' organizations, and private sector multipliers and distributors in Ethiopia, Tanzania, Nigeria but also benefits smallholder farmers, family farmers, and rural households. Most of the activities relevant for TPGS are financed by International donors, Private sector investors, Public enterprises, including International Livestock Research Institute (ILRI).

This indicates a broad understanding of the stakeholder landscape by the ACGG project managers and effective implementation of multi-stakeholder engagement activities. Overall, the current configuration of stakeholders involved in TPGS in Ethiopia, Tanzania, Nigeria is conducive for improving productivity and volume of chicken production and can facilitate generation and dissemination of germplasms, data, and knowledge for global smallholder chicken production. Therefore, the Scaling Readiness Assessment team recommends continuing the existing approach and activities to multi-stakeholder engagements.

MAJOR CONTRIBUTIONS OF TPGS IN ETHIOPIA, TANZANIA, NIGERIA TO SUSTAINABLE DEVELOPMENT GOALS

ACGG Project aims at reducing poverty in all its forms everywhere and reducing hunger, achieving food security, improving nutrition, and promoting sustainable agriculture contribute to SDG 1 and 2. Implementing various poultry genetic gains strategies across different locations worldwide shows that intensified poultry production is risky in the tropical areas and commercially inviable for small producers-based chicken production systems. However, the low-input-based system approach taken by the TPGS is considered promising for addressing poverty and food security and aligned with SDG 1 and SDG 2.

TPGS targets the Sustainable Development Goal (SDG) Targets of 1.2, i.e., reducing the proportion of men, women, and children of all ages living in poverty in all its dimensions according to national definitions and 2.3, doubling the agricultural productivity and incomes of small-scale food producers in particular women, indigenous peoples and family farmers including through secure and equal access to productive resources and inputs knowledge financial services markets and opportunities for value addition and non-farm employment. However, the implementation of TPGS also contributes to the target of 5. a, *undertaking reforms to give women equal rights to economic resources as well as access to ownership and control over land and other forms of property financial services, inheritance and natural resources under national laws, by its gender focus and 17.6, enhancing North-South South-South and triangular regional and international cooperation on and access to science technology and innovation and enhance knowledge-sharing on mutually agreed terms including through improved coordination among existing mechanisms in particular at the United Nations level and through a global technology facilitation mechanism,* through its chicken genetic profiles and import support. The Scaling Readiness Assessment team recommends continuing the emphasis on SDG 1 and 2, which are well aligned with the priority needs of Ethiopian, Tanzanian, and Nigerians. It also advises to better document the spillover or indirect contributions of TPGS to SDG 5, gender equality, and SDG 17, partnership for the goals, as the documentation can be used to mobilize complementary resources and investment on the interventions working on TPGS across stakeholders and investors operating outside of agricultural and food sectors.

ADVANTAGES AND DISADVANTAGES OF TPGS IN ETHIOPIA, TANZANIA, NIGERIA

TPGS performs better at increasing incomes, decreasing animal and human health risks, and being financially more sustainable compared to its conventional alternatives. However, it requires coordination at scale. This situation is conducive to using TPGS in Ethiopia, Tanzania, Nigeria when there is a significant demand for chicken. Overall, the contexts in Ethiopia, Tanzania, Nigeria are very suitable for expanding chicken production. The benefits of increased capacity of chicken are supported by almost all actors of the value chain. Also, the organizations leading the work have a successful history of coordinating multiple actors at a large scale. Therefore, the Scaling Readiness team finds the advantages of TPGS significantly exceeding the potential disadvantages.

NOVEL COMPONENTS OF TPGS IN ETHIOPIA, TANZANIA, NIGERIA

To achieve a positive impact at scale, new interventions like ACGG Project need to do business differently and introduce novel components to TPGS in Ethiopia, Tanzania, Nigeria. Therefore, it is crucial to identify the novel components necessary to achieve the use of TPGS at scale and understand their current status to develop appropriate innovation and scaling strategies.

The research done by the Assessment team identified ten novel components of the TPGS. Three of them are organizational arrangements included in TPGS. All were already included in the proposals and project documents of the ACGG project. Since the Scaling Readiness Assessment team has not identified any novel components that were not included in the components of TPGS, no further details are provided in this subsection.

Scaling Readiness Assessment of TPGS

photo credit: ILRI/ Camille Hanotte

The Scaling Readiness of an innovation is the first metric used to assess the impact potential of TPGS in Ethiopia, Tanzania, Nigeria at scale. It focuses on the components of the Strategy and provides a holistic picture of Readiness and Use. Readiness measures how well the components of an innovation perform to achieve their desired objective. At the same time, Use is a measure that presents the type of people using the system and their numbers in magnitude terms. More information about the Readiness and Use measures can be found in the Scaling Readiness Evidence Review (Part B) and the Annexes.

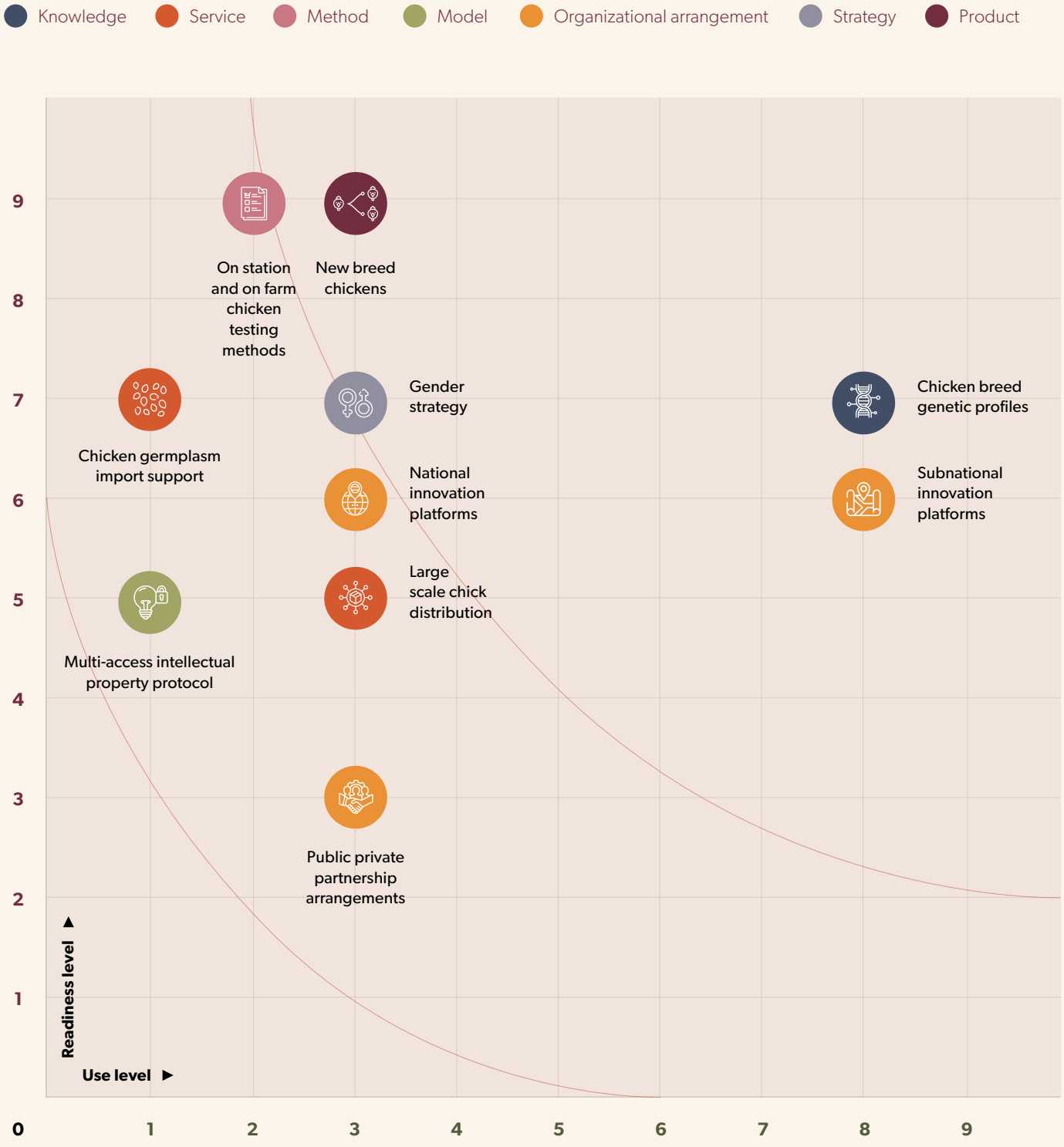
The Scaling Readiness Assessment team has prepared a Scaling Readiness Assessment for TPGS using the published evidence provided in the Evidence Review and the bibliography. The assessment results are specific for Ethiopia, Tanzania, Nigeria in July 2021 for the contribution of TPGS to the improving productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria. It can differ for other countries, for other periods, and in achieving other goals.

Figure A1: Scaling Readiness Assessment of the Tropical Poultry Genetic Solutions Strategy For Ethiopia, Tanzania, Nigeria - July 2021 for improving productivity and volume of chicken production

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Nigeria and Tanzania, July 2021

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Tanzania, Nigeria has

6.4	3.5	22.4
Average Readiness Level	Average Use Level	Average Scaling Readiness Level



The Scaling Readiness assessment of the novel components of TPGS in July 2021 in Ethiopia, Tanzania, Nigeria for improving productivity and volume of chicken production indicates that the components vary in terms of their Readiness, functional performance, and Use their actual use (Figure A1 - above). The component with the Minimum Readiness and Use levels is public-private partnership (PPP) arrangements with Readiness Level of 3. This implies that the conceptual model of how PPP arrangements can support the TPGS is already documented and referred by multiple partners of the ACGG project. Still, clear documentation about how it can add value to the TPGS is not accessible. The designers, developers, and implementers of TPGS are not aware of the role of PPP arrangements as a part of the TPGS.

The remaining nine novel components of the TPGS have Readiness Levels of 5 or more. In other words, they have completed their conceptual and application model stage, and the documentation about how they can be applied in Ethiopia, Tanzania, and Nigeria are well articulated in theoretical and applied evidence sources. Two of these components, the On-Station and On-Farm Chicken Testing Methods and New Chicken Breeds, have completed their development stage and were shown to contribute to improving productivity and volume of chicken production in Ethiopia, Tanzania, and Nigeria in experimental literature and impact studies for the pilot areas of ACGG project. The remaining seven novel components can benefit from experimental work and need documentation presenting evidence on their functioning.

Two of the novel components of the TPGS, Chicken Breed Genetic Profiles and Subnational Innovation Platforms, are already known and being used by a large group of their respective users (chicken research and development community and various stakeholders of chicken value chains) in Ethiopia, Tanzania, and Nigeria. The Scaling Readiness Assessment team could not identify evidence sources that show the use of the remaining eight novel components beyond the ACGG project team members and its partners. Two of the eight, Chicken Germplasm Import Support, Multi-Access Intellectual Property Protocols, were used only by the people and organizations involved in the ACGG project.

The components with the lowest Readiness and Use Levels were Public-Private Partnership Arrangements, Multi-Access Intellectual Property Protocol, and Chicken Germplasm Import Support. Since all the components of the TPGS need to function and be used for the TPGS to improve productivity and volume of chicken production in Ethiopia, Tanzania, and Nigeria, these lowest Readiness and Use Level components are the weakest part of the chain or bottlenecks for the performance of the TPGS. Therefore, the Scaling Readiness Assessment team recommends the interventions working on the TPGS to prioritize the work on Public-Private Partnership Arrangements, Multi-Access Intellectual Property Protocol, and Chicken Germplasm Import Support in Ethiopia, Tanzania, and Nigeria.

photo credit: Hannah Rollings

Innovation Package Profile for Tropical Poultry Genetic Solutions Strategy

Scaling Readiness Innovation Package Profile is a tool to describe other innovations necessary to use an innovation at scale. Innovations can not be used at scale without other innovations complementing their use. For instance, a machine can not achieve use at scale without complementary energy infrastructure, the best practices for using it, etc. The Innovation Package Profile differs from the Innovation Profile presented in the previous section. While the Innovation Profile focuses on work on the components that can be improved significantly using the core research and development capabilities of the ACGG Project, which can be classified as the components in the control and high influence zone of ACGG Project at large scale, the Innovation Package Profile focuses on innovations that need capabilities that go beyond the core research and development capabilities of ACGG to be ready and used at large scale, which can be classified as in the low influence or interest zone of the of ACGG project.

Scaling Readiness Innovation Package Profile aims to improve the performance of interventions through i) helping to identify other innovations systematically and ii) developing a shared understanding between the project managers, designers, developer, disseminators, and use partners about their complementary roles. This document uses an Innovation Package Profile to identify other innovations necessary to use "TPGS" at scale. In this section, i) the Innovation Package Sheet, ii) an overall diagnosis of the configuration of the Innovation Package Sheet, and iii) innovation Readiness and Use assessments of the Innovation Package are provided.

photo credit: Hannah Rollings

Innovation Package Sheet

INNOVATION PACKAGE FOR TROPICAL POULTRY GENETIC SOLUTIONS STRATEGY

PERSONAL BENEFIT AUDIO AND VIDEO STORIES OF USERS

A set of audio and videos products benefiting an individual, a household, or a community derives from the use of an innovation presented in a professional artistic way

for awareness about TPGS and convincing potential users

INTERVIEWS AND SHORT DOCUMENTARIES FOR LARGE OUTREACH MEDIA OUTLETS

Aset of audio-visual materials that are broadcast by the tv channels, radios, and other media outlets that have a large scale audience

for convincing potential users about TPGS

NATIONAL POULTRY FORUMS

A big multi-stakeholder event or a series of events in which a broad spectrum of stakeholders from different parts of a country come together to exchange opinions, nurture networks and do or finalize business deals

for convincing potential users about TPGS

DIRECT ENGAGEMENT WITH KEY POLICYMAKERS AND LARGE PRIVATE SECTOR INVESTORS

Pursuing opportunities in inviting, networking and engaging with policymakers who have the power to decide about the designing enacting policies

for convincing potential users and increasing accessibility of TPGS

PARTIALLY LOCALLY PRODUCED POULTRY PRODUCTION MACHINERY (AUTOMATED FEEDING AND INNOVATIVE WASTE MANAGEMENT)

Equipment designed and manufactured for increasing the effectiveness, efficiency, and achieving other desirable aspects in producing chicken

for affordability of TPGS

IMPORT CREDIT INSTRUMENT

A set of advantages provided to enterprises in accessing and paying credit in foreign currencies

for affordability of TPGS

LOCALLY SOURCED CHICKEN HEALTH PRODUCTS

A set of locally sourced organic and inorganic substances that are necessary for protecting and improving the health of the chicken

for effectiveness of TPGS

VILLAGE VACCINATION AND DEWORMING MODEL (NIGERIA)

A tailor-made combination of vaccination and deworming products, services and implementation principles that are suitable to the characteristics of villages

for effectiveness of TPGS

FEED APPLICATION FOR SMALLHOLDER PRODUCERS

An android/web software in which smallholder producers can get information and advice about various topics related to feedings, such as composition mix ratios, nutritional benefits, and prices

for the efficiency of TPGS

Diagnosis of the Innovation Package

This part provides information about the diagnosis of the innovations presented in the Innovation Package Sheet.

AWARENESS ABOUT TPGS AT SCALE

TPGS is known in the areas the ACGG project works due to multiple organizational arrangements included in the Strategy and word of mouth due to the visibility of the benefits for the farmers supported by the ACGG project. However, to improve the awareness of potential target smallholder farmers, family farmers, rural households, private sector multipliers and distributors in other areas cost-effectively, the interventions working on TPGS Strategy need an instrument. The literature on the awareness of rural users about innovations and the experience of the ACGG project show that personal benefit audio and video stories of users, i.e., a set of audio and videos products in which the benefits an individual, a household, or a community derives from the use of an innovation presented in a professional artistic way, can be a good choice.

BEING CONVINCED ABOUT THE BENEFITS OF TPGS AT SCALE

The research done for this document showed that most of the stakeholders of TPGS in the areas ACGG Project operate were convinced that the system contributes to improving productivity and volume of chicken production through multiple channels. However, to achieve large-scale use, the economic and social benefits of the system need to be presented clearly in a concise manner to a diverse set of stakeholders.

A potential innovation that can convince the general public about the benefits of the TPGS can be interviews and short documentaries for large outreach media outlets, i.e., a set of audio-visual materials broadcast by the tv channels, radios, and other media outlets that have large scale audiences. The interview of Dr Tadelle Dessie on BBC Africa can be a significant reference for developing the interviews and documentaries. Convincing the general public will not be sufficient to reach the large-scale use of the TPGS in Ethiopia, Tanzania, and Nigeria. It is also necessary to convince the stakeholders who operate in the delivery systems of chicken genetic gains and the vital financial decision-makers in chicken value chains. To convince the delivery system stakeholders, National Poultry Forums can be a good option. National Poultry forums create a space for different stakeholders to develop a shared understanding about the status, challenges, and opportunities in the delivery of new breeds of chicken, learn from each other, and create coalitions and business opportunities for continuous development and delivery breeds. When the forums are formalized, they can also raise funding and mobilize human resources to address various emergent needs of the chicken genetic gain delivery systems in Ethiopia, Tanzania, and Nigeria. Interviews, documentaries, and National Poultry Forums are beneficial but insufficient for convincing critical financial decision-makers in chicken value chains such as national and regional level politicians, senior experts in finance ministries, and large-scale private sector investors. The time and attention of the key decision-makers on strategies similar to TPGS are very scarce, and it is shown that their participation in multi-stakeholder processes is minimal. Therefore, the Scaling Readiness Assessment team recommends developing and utilizing direct engagement modalities with the critical policy decision-makers and large-scale investors operating in the chicken value chain in Ethiopia, Tanzania, and Nigeria.

ACCESSIBILITY OF TPGS

ACGG Project has made significant progress in increasing the accessibility of the new breed chickens to smallholder farmers, family farmers and rural households, private sector multipliers and distributors. However, since the demand for the new breed of chicken is high in the ACGG project's areas, early signs of accessibility problems appeared in these areas. As the geographical area covered by the TPGS extends, the accessibility gap will grow larger. Therefore, accessibility of the large groups of relevant stakeholders in the chicken value chain in Ethiopia, Tanzania, and Nigeria to the TPGS will require significant mid and long-term investments in the new breed chicken delivery infrastructure and capacity building within the local, new breed research systems. Resources of current investors in TPGS, international donors, and to a smaller extent private sector will not be sufficient to cover the necessary mid and long-term investment. While developing and utilizing direct engagement modalities with the critical policy decision-makers and large scale investors operating in the chicken value chain in Ethiopia, Tanzania, and Nigeria, the Scaling Readiness team recommends having a professional approach and using professional investment brokerage capabilities within and outside of the research for development system so that the required investment necessary for large scale accessibility are committed.

AFFORDABILITY OF TPGS

TPGS is based on a low input system approach to poultry production through capitalizing the genetic gains. Relative to its intense system alternatives, it is cheaper and more resilient to price shocks. However, sustaining the low input system at scale in the long term still requires a significant foreign exchange since most of the critical poultry production machinery is not produced in Ethiopia, Tanzania, and Nigeria and is imported from especially high-income countries. This import dependency can be mitigated over the long term as long as the chicken sector is profitable. However, the volatility of the international markets, novel risks such as the Covid-19 pandemic, and conflicts in Northern Regions of Ethiopia and Nigeria lead to periods of increase in the price of foreign exchange and foreign exchange scarcity, that can cause significant falls in profit margins or production failures due to broken equipment.

One innovation that can decrease the costs of new chicken breeds in the long term is designing and developing a Partially Locally Produced Poultry Production Machinery. Developing the capacity to locally repair and produce the poultry production machinery such as automated feeding machines and waste management equipment would decrease the vulnerability of the chicken value chain to foreign exchange shocks, reduce the risk of production and lead to a significant decrease in the cost of financing and production, eventually leading to the significant increase in the affordability of the chicken in Ethiopia, Nigeria, and Tanzania.

Another innovation that can increase the affordability of TPGS is an Import Credit Instrument, i.e., a set of advantages provided to enterprises in accessing and paying credit in international currencies such as local currency conversion, short-term debt relief, etc., for chicken producers multipliers and distributors. While the Partially Locally Produced Poultry Production Machinery reduces the costs in the long term, the Import Credit Instrument reduces the short term scarcity of foreign exchange. Since international impact investment portfolios are growing larger and impact investors are looking for high-impact return investments like new breed chickens, financing the new instrument by the governments of Ethiopia, Tanzania and Nigeria might incur less cost than they need to incur under normal circumstances. In brief, the Scaling Readiness Assessment team recommends interventions working on the TPGS to develop further and support the utilization of Partially Locally Produced Poultry Production Machinery and Import Credit Instrument.

EFFECTIVENESS OF TPGS AT SCALE

The innovations recommended in the awareness, convincement, accessibility, and affordability subsections above would already be sufficient for TPGS to have a large-scale positive impact in improving productivity and volume of chicken production in Ethiopia, Tanzania, and Nigeria. However, two more chicken health innovations, Locally Sourced Chicken Health Products and Village Vaccination and Deworming Model in Nigeria, can further contribute to impact by addressing critical issues.

Although pre-vaccinated new chicken breeds provided as a part of TPGS are more resilient and resistant to the tropical disease pressure, they still carry essential health risks. The chickens need a continuous supply of health products, and the supply requirement is more prominent in high disease pressure periods. Currently, most of these health products are imported and prone to the same risks articulated in the affordability subsection above. To reduce these risks, locally sourcing chicken health products is vital. Due to Nigeria's logistical and organizational peculiarities, TPGS adopted a local village vaccination and deworming model. Improving the functioning and utilization of the model will lead to substantial improvement in chicken health. Therefore, the Scaling Readiness Assessment Team recommends the Locally Sourced Chicken Health Products and Village Vaccination and Deworming Model in Nigeria to increase the effectiveness of the TPGS.

THE EFFICIENCY OF TPGS AT SCALE

Another complementary contribution to the impact of the TPGS can be made via increasing its efficiency. Although, TPGS can have an impact without it, improving the feed aspects might lead to significant increases in productivity and chicken production volume in Ethiopia, Tanzania, and Nigeria. A high potential innovation that can improve feed is an android/web software in which smallholder producers can get information and advice about various topics related to feed, such as composition mix ratios, nutritional benefits, and prices, that is currently available in the Play Store. Although it needs further improvement, adaptation to the local conditions with limited use of smartphones in rural Ethiopia, Tanzania, and Nigeria, and dissemination at scale, the Scaling Readiness Team recommends the Feed Application for Smallholder Chicken Producers as it would decrease the cost of feed advice at large scale and increase the efficiency of the TPGS.

Scaling Readiness of Tropical Poultry Genetic Solutions Strategy Innovation Package

The Scaling Readiness of an Innovation Package is the final metric used to assess the impact at scale potential of TPGS. The scope of the Scaling Readiness of the Innovation Package goes beyond the components of TPGS, which were analyzed previously and include all the innovations in the Innovation Package Sheet and following diagnosis section.

The Scaling Readiness Assessment team has prepared a Scaling Readiness Assessment for the TPGS Innovation Package using the published evidence provided in the evidence appendix and bibliography. The assessment results are specific for Ethiopia, Tanzania, Nigeria in July 2021 for the contribution of TPGS for improving productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria. It can differ for other countries, for other periods, and in achieving other goals.

The innovations in the TPGS Innovation Package had a minimum Readiness level of 2 and a maximum Readiness level of 7 (Figure A2). Their Use level ranged from 0 to 8. The Average Innovation Readiness level was 5.56, and the Average Innovation Use level was 3.78. These corresponded to the Average

Scaling Readiness Level of 20.99 and a Scaling Readiness Score of 0 .

The Scaling Readiness Assessment of the TPGS Innovation Package indicated that product types of complementary innovations (Figure 2a - blue-coloured circles) have relatively high Readiness and Use levels. The complementary products to TPGS recommended by the Scaling Readiness Assessment team have completed the testing and validation of their conceptual and application models. They are available as applications in Ethiopia, Tanzania, and Nigeria. Among them, Personal Benefit Audio and Video Stories, and Smallholder Poultry Feed App (Nigeria) are validated using applied evidence. At the same time, the contribution of Locally Sourced Chicken Health Products, Poultry Production Machinery and Interviews, and Short Documentaries need to be documented using applied research.

The innovations with the lowest Readiness and Use levels were Direct Engagement with Key Policymakers and Large Scale Investors, Village Vaccination and Deworming Model, and Import Credit Instrument. The Direct Engagement with Key Direct Engagement with Key Policymakers and Large Scale Investors was proposed as a basic concept for TPGS. However, the Scaling Readiness Assessment team could not identify any application models articulating how the engagement could contribute to the TPGS and any ACGG official document referring to it. An application model for Village Vaccination and Deworming Model was prepared and used by the ACGG team and a few partners; however, how it improves the performance of the TPGS was not documented systematically. Import Credit Instruments were shown to contribute to implementing chicken sector strategies outside Ethiopia, Tanzania, and Nigeria. However, the Scaling Readiness Readiness team could not identify any evidence source for specific application of the Model in Ethiopia, Tanzania, and Nigeria. Also, no official ACGG project documents referring to the activities related to the import credit instrument could be accessed.

Since all the innovations of the TPGS Package need to function well and be used to improve productivity and volume of chicken production in Ethiopia, Tanzania, and Nigeria, these lowest Readiness and Use Level components are the weakest part of the chain or bottlenecks for the performance of the TPGS. Therefore, the Scaling Readiness Assessment Team recommends the interventions working on the TPGS to prioritize the work on Direct Engagement with Key Policymakers and Large Scale Investors and Import Credit instruments. Working on Village Vaccination and Deworming Model would also offer a significant performance gain.

Figure A2: Scaling Readiness Assessment of Tropical Poultry Genetic Solutions Strategy Innovation Package For Ethiopia, Tanzania, Nigeria - July 2021 for improving productivity and volume of chicken production

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Nigeria and Tanzania, July 2021

TPGS package has an

5.56	3.78	21.02
Average Readiness Level	Average Use Level	Average Scaling Readiness Level

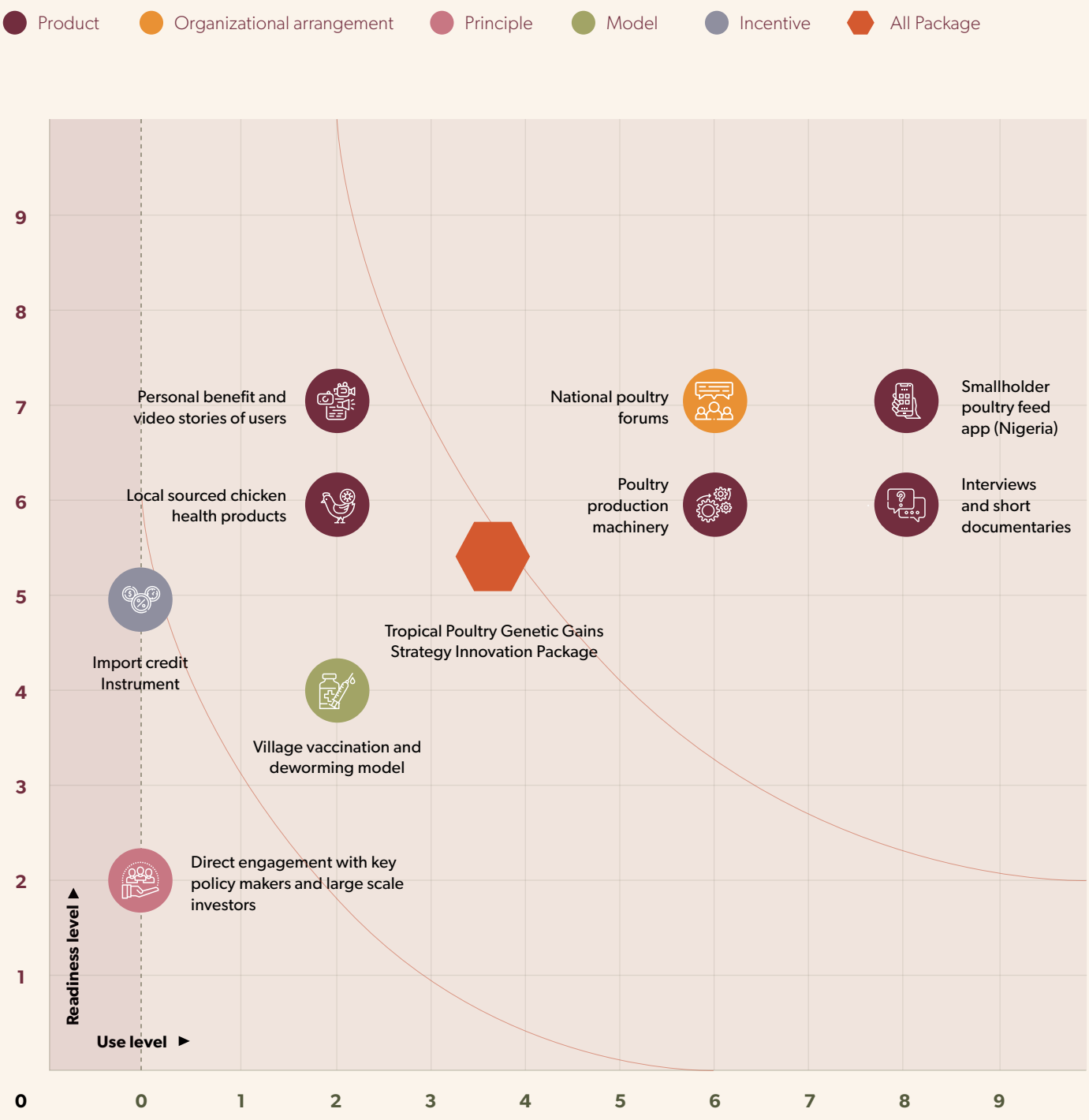


photo credit: ILRI/ Camille Hanotte

PART B

Scaling Readiness Evidence Review for the Tropical Poultry Genetic Solutions Strategy in Ethiopia, Tanzania, Nigeria

photo credit: ILRI/Apollo Habtamu

This Evidence Review provides a detailed explanation of the Readiness and Use levels of each of the components of the TPGS and the innovations included in the TPGS Innovation Package. It also links the study to the broader science and technical documentation of Scaling Readiness and Chicken Genetic Gains and Chicken Value Chain literature in Ethiopia, Tanzania, Nigeria, and globally. To support further inquiries about the quality of the Scaling Readiness Assessment and contribute to the design of other research and management interventions, it provides a complete list of the resources used to carry out the assessment.

The Scaling Readiness Evidence Review is at the research and science level. It aims to systematically assess the evidence sources and technical information about using Scaling Readiness Metrics.

The Evidence Review is designed to be a stand-alone document for

designers, developers, and managers of specific innovations and components in the TPGS

TPGS researchers

practitioners who are interested to learn more about doing Scaling Readiness Assessment

The basic information about the novel components of the TPGS and the descriptions of the innovations in the TPGS Innovation Package are not presented in detail in the Evidence Review. This information is available in The Scaling Readiness Assessment (Part A). The Evidence Review also does not articulate the implications of the findings for designing and implementing Scaling projects, programs, and policies. A synthesis of the findings and recommendations are provided in the Scaling Readiness Guidelines (Part C).

Evidence on the Scaling Readiness Assessment of the Innovation

The core innovation studied in this document is the TPGS in Ethiopia, Tanzania, Nigeria. It consists of the following ten novel components.

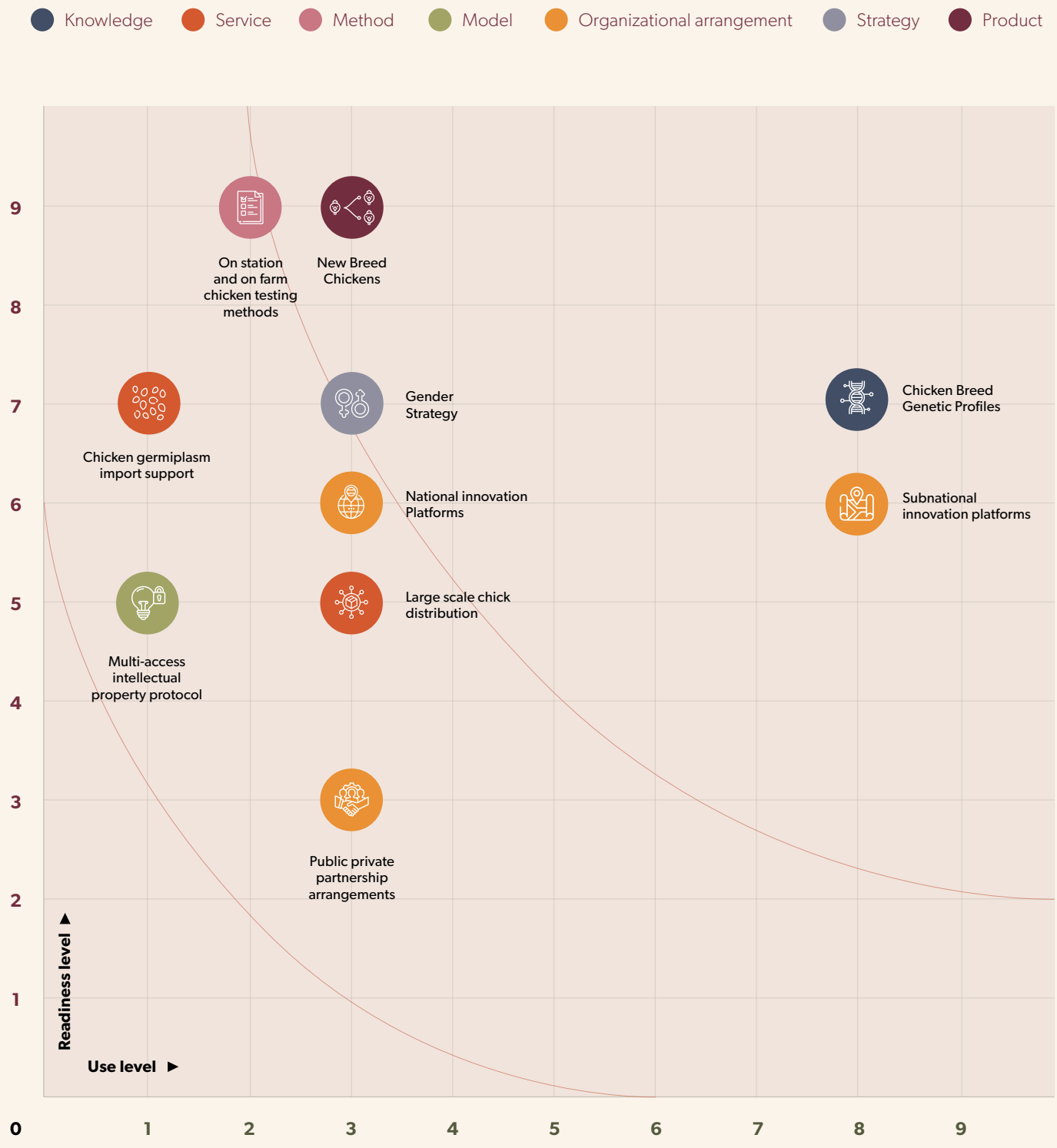
These novel components were identified by assessing the available evidence base about the agriculture and rural sector in Ethiopia, Tanzania, Nigeria and the key informant interviews with the experts working in various research and development organizations. The components might change across time depending on the changes in Ethiopia, Tanzania, Nigeria or reorientation of the objective from improving productivity and volume of chicken production to another objective. The components of TPGS have different Readiness and Use levels (Figure B1). In this section, each one of them is articulated individually.

Figure B1: Scaling Readiness Assessment of the the Tropical Poultry Genetic Solutions Strategy For Ethiopia, Tanzania, Nigeria - July 2021 for improving productivity and volume of chicken production

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Nigeria and Tanzania, July 2021

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Tanzania, Nigeria has

6.4	3.5	22.4
Average Readiness Level	Average Use Level	Average Scaling Readiness Level



Chicken Breed Genetic Profiles to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Chicken Breed Genetic Profiles refers to an inventory in which several interest traits are documented in detail for multiple breeds so that relative advantages and disadvantages of breeds can be presented and a more informed breed selection process can be pursued. There is applied evidence on the profiles' contributions to improving chicken productivity in Ethiopia, Tanzania, and Nigeria [4,5]. Therefore, It has a Readiness level of 7. The researchers and chicken breeders referred to the profiles, the primary users, who were not involved in the ACGG project [5], corresponding to a Use level of 8.

Chicken Germplasm Import Support to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Chicken Germplasm Import Support refers to supporting the import of genetic materials from one country to another via multiple channels such as preparation of legal documentation, supporting testing of the germplasms at the customs, etc. A conceptual model of using import support was provided by the literature[4,6], and applied evidence on its potential contribution to chicken genetic gain strategies was presented by the literature [7]. Therefore, It has a Readiness level of 7. The Scaling Readiness Assessment Team could only identify any reference on the import support except a short reference in the ACGG project webpage [8] corresponding to a Use level of 1.

On-Station and On-Farm Testing Methods to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria from July 2021 onwards

On-Station and On-Farm Testing Methods involve testing new ideas, designs, and application prototypes in controlled and semi-controlled environments. In agricultural and food sectors, typical controlled environments are research stations located in usually several non-central districts, and typical semi-controlled environments are the farms of selected farmers based on their capabilities and representativeness. The conceptual model of the contribution of the on-station and on-farm methods have been proposed in 2016 [4]. Also, the information about the application of the testing methods was extensively documented [9–12]. The research showed that the trials contributed to improving the productivity of Chicken production [13]. Therefore, It has a Readiness level of 9. The only participants of the testing methods were the partners selected by the ACGG project [13]; therefore, the testing methods had a Use level of 2.

Multi-Access Intellectual Property Protocols to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria from July

Multi-Access Intellectual Property Protocols refer to intellectual property models that enable the use of the technology or products with different licensing arrangements depending on the characteristics of the use or users. Some users might need to pay in multi-access models, while others might use the technology or innovation without payment. An application model for multi-access intellectual property protocols was proposed in literature [14] outside Ethiopia, Tanzania, and Nigeria. Therefore, It has a Readiness level of 5. The protocols were mentioned only in a publication referring to ACGG project [15], showing that the project team is the only stakeholder group working on the protocols. This corresponds to a Use level of 1.

National Innovation Platforms to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

National Innovation Platforms refer to the organization of regularly facilitated events at the national scale in which various innovation management and coordination-related activities are discussed, agreed and co-implemented. Conceptual models of the National Innovation Platforms were frequently covered by the ACGG project portal [4,16–18]. A detailed description of their application and the contribution of the National Innovation Platforms to the TPGS was provided [18]. Therefore, It has a Readiness level of 6. There were multiple events in which many of the stakeholder group representatives involved in the ACGG project participated in the National Innovation Platform [19,20]. Some included delivery and use support stakeholders not involved in the ACGG project [18], corresponding to a Use level of 3.

Subnational Innovation Platforms to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Subnational Innovation Platforms refer to the organization of regularly facilitated events at the subnational scale in which various innovation-related activities are discussed, agreed and co-supervised. The conceptual model of the Subnational Innovation Platforms was presented by the ACGG project portal[4,16–18]. A detailed description of their application and the contribution of the National Innovation Platforms to the TPGS was provided [18]. Therefore, It has a Readiness level of 6. The ACGG project has organized multiple events with the participation of stakeholders involved in project [18]. Other Subnational Innovation Platform events included participation from delivery and use support stakeholders and representatives of the smallholder chicken producers who were not involved in the ACGG project [21–23], which corresponds to a Use level of 8.

Public-Private Partnership Arrangements to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Public-Private Partnership Arrangements refer to organizing multiple facilitated events that representatives from the public sector, such as directors and technical staff from ministries, and the private sector, such as company managers and sales representatives, attend and engage in a structured dialogue. A conceptual model of the Public-Private Partnership Arrangement was presented in 2016 [4] and validated using workshops [24]. Therefore, It has a Readiness level of 3. The website of the ACGG project [8] showed that partners of the projects involved in the arrangements corresponding to a Use level of 3.

New Breed Chickens to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

New Breed Chickens refer to producing, distributing, and promoting new breeds of chicken. Impact assessments showing the contribution of the New Breed Chickens to improving productivity and volume of chicken production were published in multiple evidence sources [25–27]. Therefore, It has a Readiness level of 9. Multiple documents are presenting the use of the New Breed Chickens by partners of the ACGG project [28–31] corresponding to a Use level of 3.

Gender Strategy to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Gender Strategy refers to considering the gendered participation influence of different gender groups in the activities of the intervention and the benefits different gender groups drive from the intervention as an integral part of the more comprehensive intervention strategies. Gender Strategy is one of the most documented components of the TPGS. The conceptual model of the Gender Strategy was presented in 2017 [18,32]. It was followed by the description of the application model [33,34], the validation of the applied model [35,36], and the detailed presentation of the application of the Gender Strategy [27] its validation [37]. Therefore, It has a Readiness level of 7. Multiple evidence sources present the ACGG stakeholders' initial participation in the Gender Strategy [38] and their effective engagement with it [19]. This corresponds to a Use level of 3.

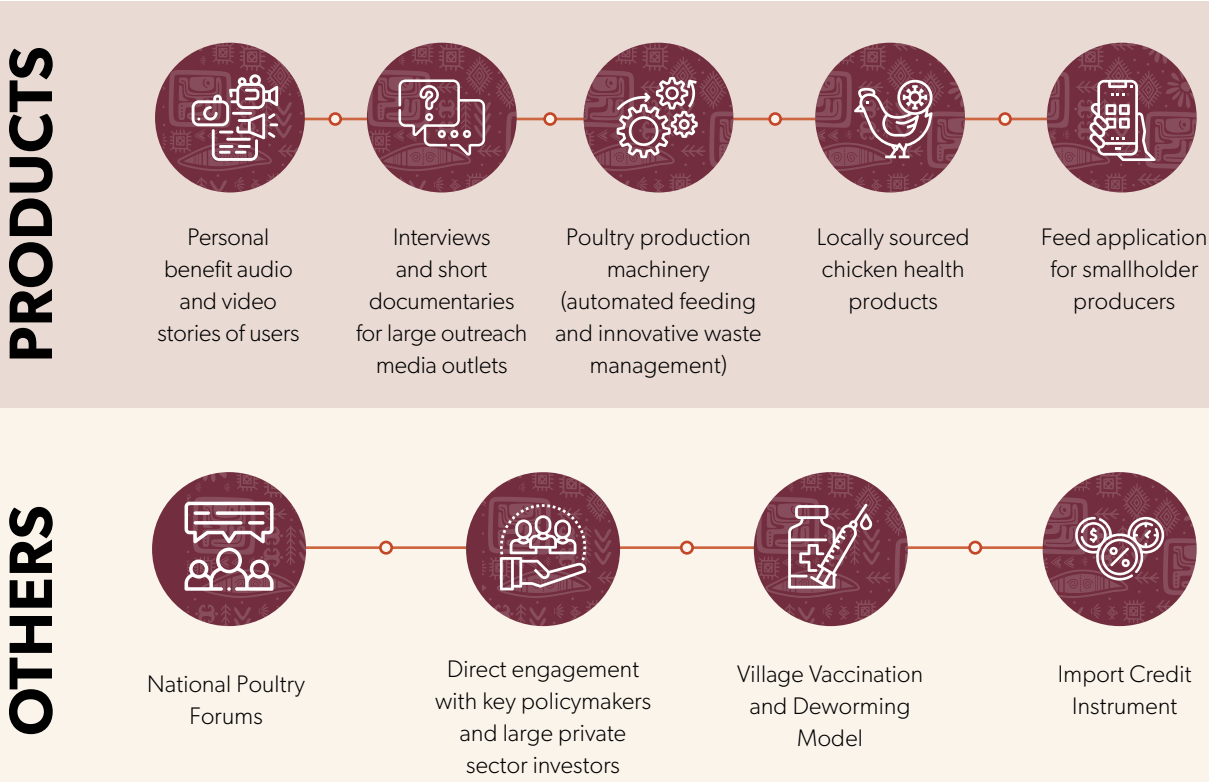
Large Scale Chick Distribution to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Large-Scale Chick Distribution refers to distributing the chicks to many households living in an extended area in sufficient quantities to kick start a small chicken production business. The conceptual model of the distribution was presented in 2016 [4], and a detailed application model was published in 2018 [39]. Therefore, It has a Readiness level of 5. The involvement of a large group of ACGG project partners was documented [40], corresponding to a Use level of 3.

Scaling Readiness Assessment of the Innovation Package

Tropical Poultry Genetic Solutions Strategy alone is not enough to achieve impact at scale. To show its full potential in improving productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria and achieve use at scale, it needs to be complemented by other compatible innovations that fit Ethiopia, Tanzania, and Nigeria. Innovation Package is a set of innovations including TPGS and other innovations that are needed to increase awareness of the stakeholders of the TPGS, convince them of the benefits of implementing it, and ensure that TPGS is available, accessible, affordable, user friendly, effective, and efficient.

The TPGS Innovation Package has nine more innovations. In addition to the system described in the previous section, it has five products and four other types of innovations, i.e., an organizational arrangement, a principle, a model, and an incentive instrument.



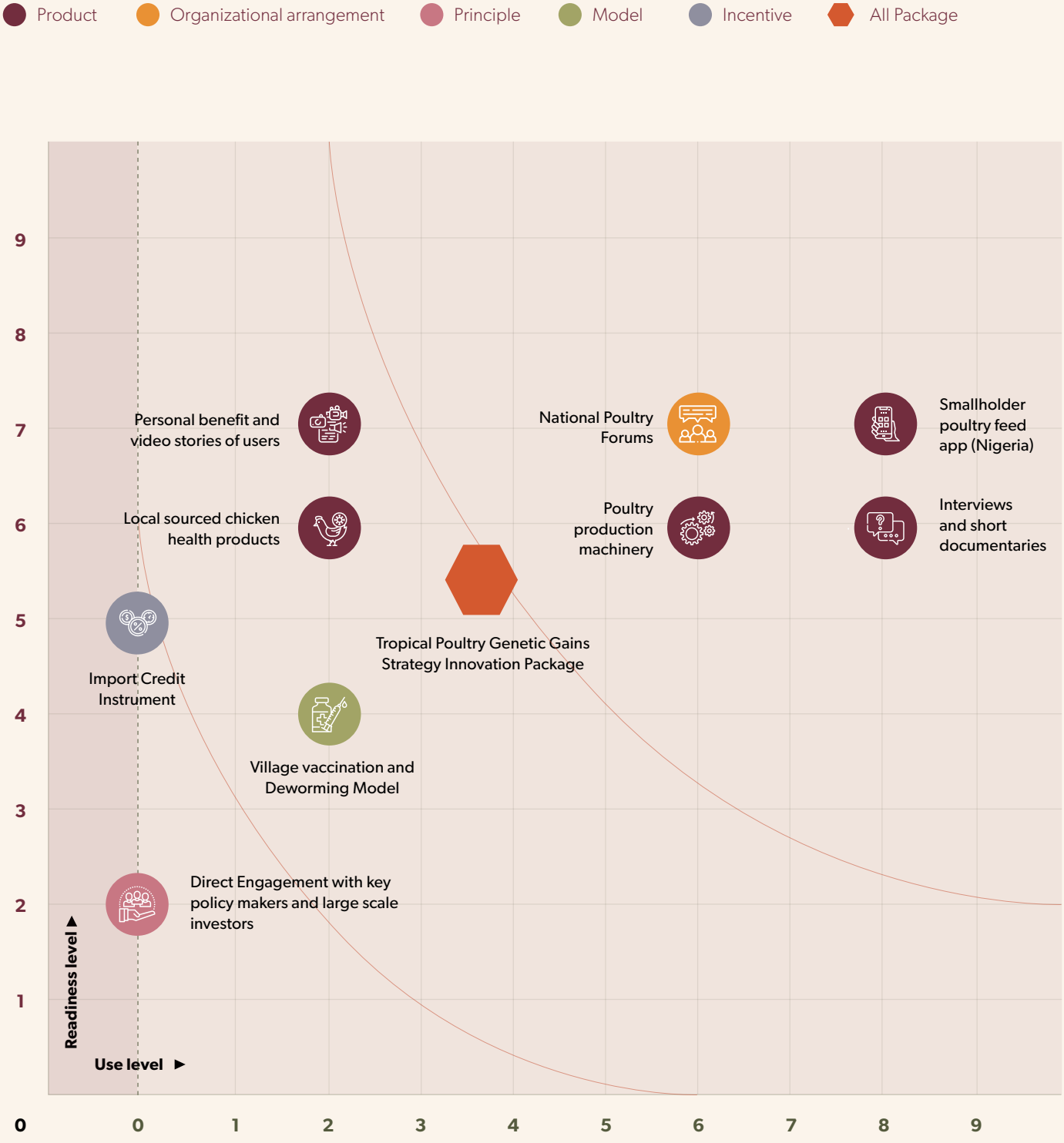
These complementary innovations were identified by assessing the available evidence base about chicken genetics and chicken value chains in Ethiopia, Tanzania, Nigeria and the key informant interviews with the experts working in various research and development organizations. The innovations might change across time depending on the changes in Ethiopia, Tanzania, Nigeria or reorientation of the objective from improving productivity and volume of chicken production to another objective. The complementary innovations of TPGS have different Readiness and Use levels (Figure B2). In this section, each one of them is articulated individually.

Figure B2: Scaling Readiness Assessment of the the Tropical Poultry Genetic Solutions Strategy Innovation Package For Ethiopia, Tanzania, Nigeria - July 2021 for improving productivity and volume of chicken production

Tropical Poultry Genetic Solutions Strategy in Ethiopia, Nigeria and Tanzania, July 2021

Tropical Poultry Genetic Solutions Strategy Innovation Package has

5.56	3.78	21.02
Average Readiness Level	Average Use Level	Average Scaling Readiness Level



Personal benefit audio and video stories of users to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021

Personal benefit audio and video stories of users refers to a set of audio and videos products in which the benefits an individual, a household, or a community derives from the use of an innovation presented in a professional artistic way. Multiple evidence sources empirically showed that the audio and videos contribute to implementing the strategies in the chicken value chains in Ethiopia, Tanzania, and Nigeria [41–44]. Therefore, It has a Readiness level of 7. Multiple sources indicated the use of the audio and video stories by the ACGG project team [45,46] and some of the partners [29,30,44] corresponding to a Use level of 2.

Interviews and short documentaries for large outreach media outlets to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Interviews and short documentaries for large outreach media outlets refer to a set of audio-visual materials broadcast by tv channels, radios, and other media outlets with large-scale audiences. Some interviews and short documentary applications were prepared in 2018 and 2016 [47,48] Therefore; It has a Readiness level of 6. The interviews and short documentaries were used by delivery and use stakeholders [47] and some end users not involved in the ACGG project [48] corresponding to a Use level of 8.

National Poultry Forums to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

National Poultry Forums refers to a big multi-stakeholder event or a series of events in which a broad spectrum of stakeholders from different parts of a country come together to exchange opinions, nurture networks, and do or finalize business deals. Evidence sources indicate that National Poultry Forums contribute to implementing the TPGS in Ethiopia, Tanzania, and Nigeria [21–23], corresponding to a Readiness level of 7. These forums included the stakeholders involved in the ACGG project, the partners, and a few delivery and use support stakeholders, implying a Use level of 7 [21–23].

Direct engagement with key policymakers and large private sector investors to improve productivity and volume of chicken production in Ethiopia, Tanzania,

Direct engagement with key policymakers and large private sector investors refers to pursuing opportunities in inviting, networking, and engaging with policymakers who have the power to decide about the designing, enacting policies and large scale national and international private sector investors who can make significant investments in the chicken sector in Ethiopia, Tanzania, and Nigeria. A conceptual model of direct engagement was proposed in 2019 [49,50], but the Scaling Readiness Assessment team could access no further documentation. This implies a Readiness level of 2. The Scaling Readiness Assessment team could not identify any official documentation corresponding to a Use level of 0.

Village Vaccination and Deworming Model to improve productivity and volume of chicken production in Nigeria July 2021 onwards

Village Vaccination and Deworming Model refers to a tailor-made combination of vaccination and deworming products, services, and implementation principles suitable to the characteristics of villages in Nigeria. The webpage of the ACGG presented a detailed application model [51], but the Scaling Readiness Assessment team could not identify any other evidence sources. Therefore, It has a Readiness level of 4. The only available evidence source showed that the Model was used by some of the partners involved in the ACGG project [51], corresponding to a Use level of 2.

Feed application for smallholder producers to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Feed application for smallholder producers refers to an android/web software in which smallholder producers can get information and advice about various topics related to feed, such as composition mix ratios, nutritional benefits, and prices. The conceptual model of the app was presented in 2016 [4]; afterwards, a validated application model was described [39,52], and the Smallholder Poultry Feed App was published in the Google Play Store [53]. This corresponds to a Readiness level of 7. Google Play Store user comments show that some of the stakeholders not involved in the ACGG Project have used the app in their poultry production, implying a Use level of 8.

Import Credit Instrument to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria July 2021 onwards

Import Credit Instrument refers to a set of advantages enterprises have in accessing and paying credit in local or international currencies. A detailed application model about the instrument was provided in 2020 [54]. Therefore, It has a Readiness level of 5. The Scaling Readiness Assessment team could not identify any official ACGG project documents referring to the work on the Import Credit Instrument, corresponding to a Use level of 0.

Poultry production machinery (automated feeding and innovative waste management) to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria from July 2021 onwards

Poultry production machinery (automated feeding and innovative waste management) refers to Equipment designed and manufactured to increase effectiveness and efficiency and achieve other desirable aspects of producing chicken. Available evidence resources present how poultry production machinery can improve productivity and volume of chicken production [39,54]; however, there is no specific applied evidence about the contribution. Therefore, It has a Readiness level of 6. The machinery is used by a few delivery and use support stakeholders who are not part of the ACGG project corresponding to a Use level of 6.

Locally sourced chicken health products to improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria from July 2021 onwards

Locally sourced chicken health products refer to a set of locally sourced organic and inorganic substances necessary for protecting and improving chickens' health. Available evidence sources presented a detailed description of the application of the Health Products in Ethiopia, Tanzania, and Nigeria [54–56]. Therefore, It has a Readiness level of 6. The discussions about the ealth Products were limited to the project team and a few partners [54–56], corresponding to a Use level of 2.

photo credit: ILRI/Apollo Habtamu

PART C

Scaling Guidelines for Improving Tropical Poultry Genetic Solutions Strategy at Scale in Ethiopia, Tanzania, Nigeria

photo credit: ILRI/Apollo Habtamu

What Are The Scaling Guidelines?

The Scaling Guidelines bridge the results of the Scaling Readiness Study with the four major management questions vital for an intervention aiming to enhance the impact of TPGS at scale.

Specifically, they provide answers to

1. what is meant by TPGS in Ethiopia, Tanzania, Nigeria, or what do the ACGG Project aim to scale,
2. what should interventions working on TPGS need to prioritize to achieve high impact,
3. which complementary innovations do the interventions need to prioritize for achieving improving productivity and volume of chicken production at scale in Ethiopia, Tanzania, Nigeria and
4. which competencies and capabilities should the intervention managers look for within their organizations and other stakeholders operating in the agriculture for development landscape in Ethiopia, Tanzania, Nigeria.

The Scaling Guidelines are at the strategic level. They aim to be a first reference document for designing or adapting strategies and can be followed by a detailed action plan that can be integrated into the design and planning of the interventions to contribute to TPGS in Ethiopia, Tanzania, Nigeria.

The guidelines are designed to be a stand-alone document for

managers of TPGS projects, programs, and policies,

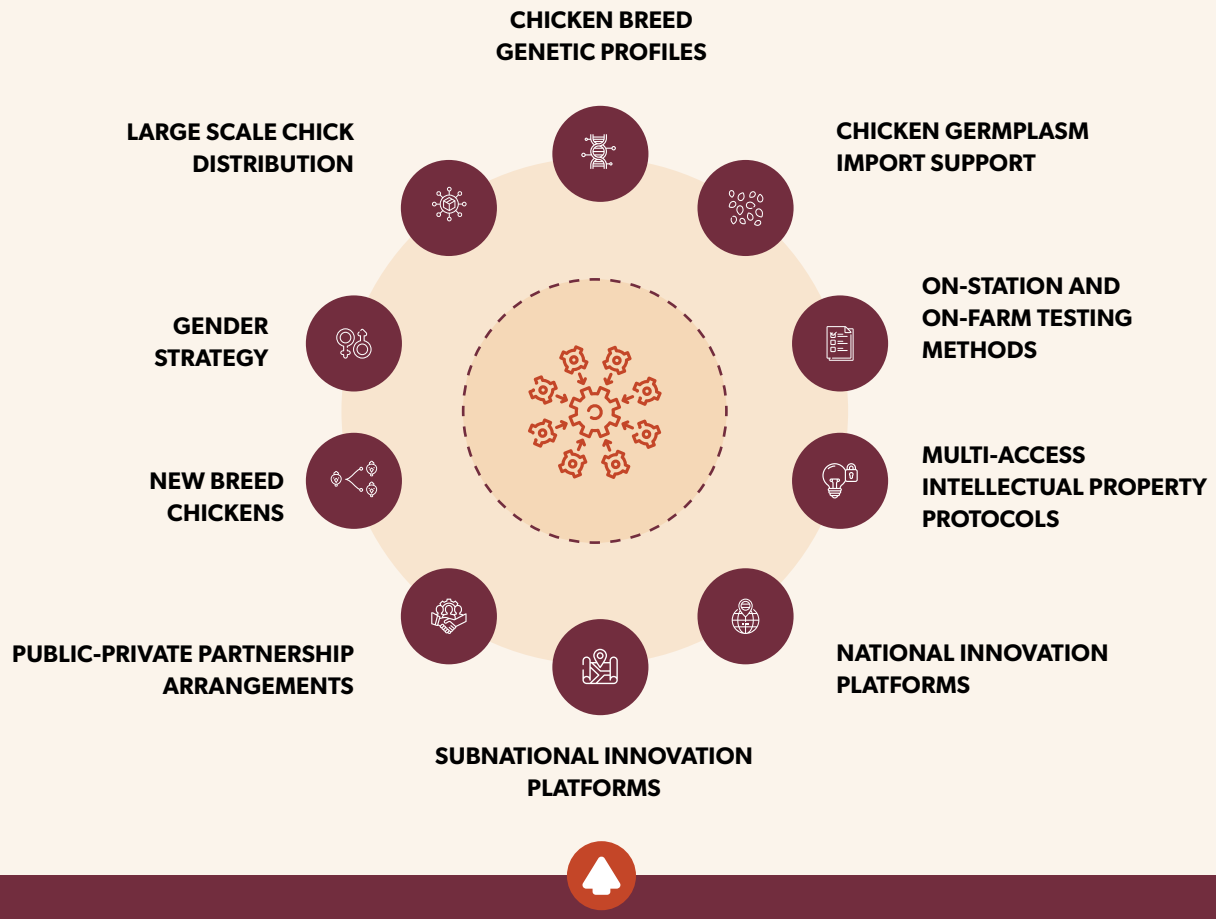
designers, developers, and managers of specific innovations and components in Tropical Poultry Genetic Solutions Strategies.

The Scaling Readiness measures and the evidence sources are presented but not articulated in this part. More information about the measures can be accessed from The Scaling Readiness Assessment (Part A). Detailed explanations about the measures and the evidence sources used to do the assessment can be accessed from the Scaling Readiness Evidence Review (Part B).

What Is Meant By TPGS In Ethiopia, Tanzania, Nigeria?

TPGS is a combination of products, services, organizational arrangements, knowledge, a model, a method, a strategy, and other various types of components. Among them, some are novel in Ethiopia, Tanzania, Nigeria. These novel components differentiate the TPGS from other conventional agricultural and food systems in Ethiopia, Tanzania, Nigeria and make the TPGS an innovation. In other words, the TPGS is Strategy Innovation. The TPGS components novel for Ethiopia, Tanzania, Nigeria might not be novel for other countries, and the system might not be considered an innovation in other countries.

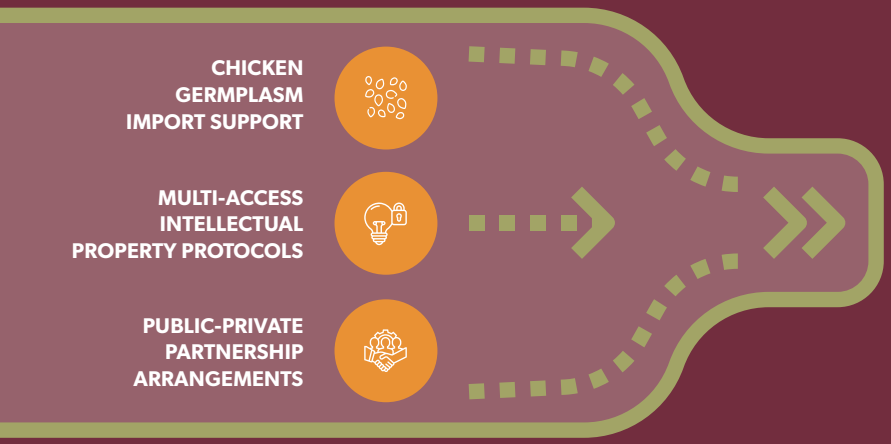
Specifically, TPGS in Ethiopia, Tanzania, Nigeria has the following ten novel components:



In brief, when an intervention mentions improving the use of TPGS at scale, it refers not only to increasing the use of some of Chicken Breed Genetic Profiles or Chicken Germplasm Import Support but the use of all the components listed above in an integrated way.

What Should The Interventions Need To Prioritize To Improve The Performance Of TPGS In Ethiopia, Tanzania, Nigeria?

The components of the TPGS have different Readiness and Use levels in achieving improve productivity and volume of chicken production. The Scaling Readiness Assessment of the TPGS showed that while some novel components are at the design stage, others are already tested and validated in Ethiopia, Tanzania, Nigeria. Some components are not known by international donors, private sector investors, national governments, local governments, producers' organizations, and private sector multipliers and distributors for the benefits of smallholder farmers, family farmers, rural households, private sector multipliers and distributors. At the same time, other components are implemented without support from the government, civil society organizations and international organizations.



The Scaling Readiness Assessment showed that Chicken germplasm import support, Multi-access intellectual property protocols, Public-Private partnership arrangements are the components that have the lowest functional performance and use among all the novel components. In other words, they are the bottlenecks for achieving impact from the use of the TPGS in Ethiopia, Tanzania, Nigeria for improving productivity and volume of chicken production.

Activities necessary to address the bottlenecks belong to two categories. The first category is the research and development (R&D) activities, including all research, design, development activities that increase the Innovation Readiness of components. The second category is utilization activities. Utilization activities include all adoption, practice, and implementation activities that increase the Innovation Use of the components. To address the bottlenecks that hinder the TPGS's impact at scale, the Scaling Readiness Assessment team at International Livestock Research Institute (ILRI) recommends the following activities.

- to validate the current conceptual models on Public-Private partnership arrangements implemented in African Chicken Genetic Gains Project by comparing and contrasting the current arrangements with proven arrangements in other livestock sectors in and beyond Ethiopia, Tanzania, Nigeria

Research and Development Activities

FURTHER DEVELOPMENT OF CHICKEN GERMPLASM IMPORT SUPPORT OPTIONS

Chicken germplasm import support refers to supporting the import of genetic materials from one country to another via multiple channels such as preparation of legal documentation, supporting testing of the germplasms at the customs, etc. It is one of the least mature components of the TPGS. There is already applied evidence on the role and contribution of Chicken germplasm import support to the performance of the TPGS. However, there is no experimental evidence on a specific well-described application that can improve productivity and volume of chicken production in Ethiopia, Tanzania, Nigeria. To improve the functional performance of Chicken germplasm import support, the Scaling Readiness Assessment team recommends experimental testing and validation of the current design of the application of Chicken germplasm import support and develop an innovation that works in the context of Ethiopia, Tanzania, Nigeria.

DESIGN APPLIED RESEARCH SETUP AND VALIDATE THE ROLE OF MULTI-ACCESS INTELLECTUAL PROPERTY PROTOCOLS

Multi-access intellectual property protocols are intellectual property models that enable the use of the technology or products with different licensing arrangements depending on the characteristics of the use or users. Some users might need to pay in multi-access models, while others might use technology or innovation without payment. It is another component with relatively low functional performance. The Scaling Readiness Assessment team has identified literature resources presenting applied evidence on the use of Multi-access intellectual property protocols as a part of TPGS However, the evidence is not based on experiments. Increasing the functional performance of Multi-access intellectual property protocols requires designing applied and later experimental research setup and validating the role of Multi-access intellectual property protocols. Therefore as a part of the R4D efforts, the Scaling Readiness Assessment team recommends designing an applied research setup and validate the role of Multi-access intellectual property protocols.

VALIDATE THE CURRENT CONCEPTUAL MODELS ON PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS

Public-Private partnership arrangements refer to organizing multiple facilitated events that representatives from the public sector, such as directors and technical staff from ministries, and the private sector, such as company managers and sales representatives, attend and engage in a structured dialogue. It has low functional performance in comparison to other components. There are studies presenting models of how Public-Private partnership arrangements can function as a part of chicken value chain strategies. However, they are broad and do not provide details of how Public-Private partnership arrangements can be an effective part of the TPGS. Therefore, the Scaling Readiness Team recommends validating these conceptual models on Public-Private partnership arrangements by comparing and contrasting and improving the functional performance of Public-Private partnership arrangements in Ethiopia, Tanzania, and Nigeria.

Utilization Activities

ORGANIZING AWARENESS-RAISING EVENTS WITH THE PARTNERS OF THE ACGG PROJECT TO INCREASE THE USE OF CHICKEN GERMPLASM IMPORT SUPPORT PROVIDED BY THE PROJECT

Chicken germplasm import support is one of the least used components. The Scaling Readiness Assessment team could not identify any use of Chicken germplasm import support in Ethiopia, Tanzania, Nigeria outside of the ACGG project core team. Improving the functional performance of Chicken germplasm import support necessitates organizing awareness-raising events with the intervention partners, developing a shared understanding with them, and implementing customized engagement options that can convince them to use or apply for the support. Increased awareness, shared understanding, and convinced intervention partners would minimize the loss of the messages of the ACGG Project about Chicken germplasm import support.

ORGANIZING AWARENESS-RAISING EVENTS WITH THE PARTNERS OF THE ACGG PROJECT ON MULTI-ACCESS INTELLECTUAL PROPERTY PROTOCOL

Multi-access intellectual property protocols are one of the components with low Use. The Scaling Readiness team could not identify any use of Multi-access intellectual property protocols in Ethiopia, Tanzania, Nigeria outside of the ACGG project core team. The Scaling Readiness Assessment team recommends organizing awareness-raising events with the intervention partners, developing a shared understanding, and implementing customized engagement options that can convince them to use or apply Multi-access intellectual property protocols to improve the utilization. Increased awareness, shared understanding, and convinced intervention partners will minimize the loss of the messages of the ACGG Project about Multi-access intellectual property protocols.

ENGAGING WITH THE DESIGNERS AND DEVELOPERS OF PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS AND GENERATING LEARNING ABOUT HOW BEST TO USE THE PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS TO SUPPORT THE TPGS.

Public-Private partnership arrangements are another one of the least used components. Available documents showed that the ACGG Project partners commonly use Public-Private partnership arrangements. The Scaling Readiness Assessment team suggests the ACGG focus on engagement with the designers and developers of Public-private partnership arrangements who are not involved in the Project to increase the functional performance of Public-private partnership arrangements.

Which Complementary Innovations Do The Interventions Need To Prioritize For Improving Productivity and volume of chicken production At Scale In Ethiopia, Tanzania, Nigeria?

Achieving a high functional performance TPGS alone will not be sufficient to positively impact the productivity and volume of chicken production in Ethiopia, Tanzania, and Nigeria. To ensure sufficient use of the system at scale, it is essential to improve the other innovations that will complement TPGS, i.e., complementary innovations.

The Scaling Readiness Assessment identified the following nine complementary innovations and assessed the Readiness and Use levels for each of them.

Personal Benefit Audio And Video Stories Of Users

Interviews And Short Documentaries For Large Outreach Media Outlets

National Poultry Forums

Direct Engagement With Key Policymakers And Large Private Sector Investors

Village Vaccination And Deworming Model (Nigeria)

Feed Application For Smallholder Producers

Import Credit Instrument

Poultry Production Machinery (Automated Feeding And Innovative Waste Management)

Local Sourced Chicken Health Products

The complementary innovations had different Readiness and Use levels. Among them, the Direct engagement with key policymakers and large private sector investors, Import credit instrument and Village vaccination and deworming model had relatively low Readiness and Use levels and are the bottlenecks in the TPGS innovation package.

Research and Development Activities

COMMUNICATING AND COLLABORATING WITH THE RESEARCHERS AND PRACTITIONERS WORKING ON DIRECT ENGAGEMENT WITH KEY POLICYMAKERS AND LARGE PRIVATE SECTOR INVESTORS

Direct engagement with key policymakers and large private sector investors refers to pursuing opportunities in inviting, networking and engaging with policymakers who can decide about the designing enacting policies. It is one of the least mature innovations of the TPGS Innovation Package. Scaling Readiness research identified current conceptual desktop research activities on the role of the Direct engagement with key policymakers and large private sector investors in TPGS. To improve the functional performance of Direct Engagement With Key Policymakers And Large Private Sector Investors, the Scaling Readiness Assessment team recommends communicating with the researchers and practitioners working on Direct engagement with key policymakers and large private sector investors. This can lead to quick gains in developing insights about theories or models that Direct engagement with key policymakers and large private sector investors.

COLLABORATING WITH THE VILLAGE VACCINATION AND DEWORMING MODEL RESEARCHERS

Village Vaccination and Deworming Model refers to a tailor-made combination of vaccination and deworming products, services, and implementation principles suitable to villages' characteristics. It is one of the least mature innovations of the TPGS Innovation Package. Currently, there are initiatives making desktop research on application models of Village Vaccination and Deworming Model in TPGS. To improve the functional performance of the Village Vaccination and Deworming Model in Nigeria, the Scaling Readiness Assessment team recommends collaborating with the Village Vaccination and Deworming Model researchers. This can save resources and help designing an application model for the Village Vaccination and Deworming Model that improves the performance of TPGS.

DESIGNING EXPERIMENTAL RESEARCH SETUP AND VALIDATE THE ROLE OF IMPORT CREDIT INSTRUMENT

Import Credit Instrument refers to a set of advantages enterprises have in accessing and paying credit in local or international currencies. The Scaling Readiness Assessment team has identified literature resources presenting applied evidence on the use of Import Credit Instrument as a part of the TPGS Innovation Package. However, the evidence is not based on experiments. To improve the functional performance of the Import Credit Instrument, the Scaling Readiness team recommends designing an experimental research setup and validate the role of the Import Credit Instrument. Experimental evidence will pave the way to develop more effective Import Credit Instruments and enable significant performance gains for the TPGS.

Utilization Activities

IDEATING ABOUT HOW ACGG PROJECT AND OTHER INTERVENTIONS CAN WORK ON DIRECT ENGAGEMENT WITH KEY POLICYMAKERS AND LARGE PRIVATE SECTOR INVESTORS

Direct engagement with key policymakers and large private sector investors is one of the least used innovations in the innovation package. Improving the use of Direct engagement with key policymakers and large private sector investors necessitates ideating about how ACGG Project and other interventions can work on Direct engagement with key policymakers and large private sector investors. Ideation, especially in collaboration with some key stakeholders, will be the first step to utilize better Direct engagement with key policymakers and large private sector investors in Ethiopia, Tanzania, Nigeria at scale.

CO-ORGANIZING MORE SIGNIFICANT ENGAGEMENT EVENTS WITH THE PARTNERS ALREADY CONVINCED ABOUT VILLAGE VACCINATION AND DEWORMING MODEL (NIGERIA)

The Village Vaccination and Deworming Model in Nigeria is one of the least used innovations in the innovation package. Improving the Village Vaccination and Deworming Model's use necessitates co-organizing larger engagement events with the partners already convinced about Village Vaccination and Deworming Model. Co-organization will accelerate the use of the Village Vaccination and Deworming Model and contribute to the performance of the TPGS.

IDEATING ABOUT HOW ACGG PROJECT AND OTHER INTERVENTIONS CAN WORK ON IMPORT CREDIT INSTRUMENT

Import Credit Instrument is one of the least used innovations in the innovation package. Improving the use of the Import Credit Instrument necessitates to ideate about how ACGG Project and other interventions can work on Import Credit Instrument and create plans. Ideation, especially in collaboration with some key stakeholders, will be the first step to better utilize Import Credit Instrument in Ethiopia, Tanzania, Nigeria at scale.

photo credit: Hannah Rollings

Which competencies and capabilities should the intervention managers look for within their organizations and other stakeholders operating in Ethiopia, Tanzania, and Nigeria's agriculture for development landscape?

Advancing the priority work on the components of TPGS and complementary innovations requires a specific set of competencies. Interventions targeting the priority work need to access these competencies by including the intervention teams or establishing collaboration mechanisms. These competencies are from different disciplines such as science, research, and development, agronomy, communication, and ICT. Specifically, the Scaling Readiness Assessment team recommends having the following competencies

photo credit: ILRI/Apollo Habtamu

Priority	Competences on
to further develop Chicken Germplasm Import Support Options	Chicken breeding, chicken genetics, import legislation of genetic materials, international trade and logistics
to design applied research setup and validate the role of Multi-access intellectual property protocols	Legal research, intellectual property protocols, applied research methods, experimental research methods
to validate the current conceptual models on Public-Private partnership arrangements	Multi-Stakeholder processes design, advocacy, public relations, Public-Private partnerships, action research
to communicate and collaborate with the researchers conducting conceptual or theoretical research on Direct engagement options with critical policymakers in livestock sectors in Ethiopia, Tanzania, Nigeria	Policy engagement, advocacy, lobbying, investment brokering, policy research, social theory, political theory
to collaborate with the research community working on Village Vaccination and Deworming Model in Nigeria and other countries	Chicken vaccination, community development, animal health research methods, social research methods
to design experimental research setup and validate the role of Import Credit Instrument in supporting private chicken enterprises in times of international economic crises similar to Covid-19 that influence foreign exchange availability	Experimental research, finance, credit instrument design, chicken business management, international economics, impact investing
to organize awareness-raising events with the partners of the ACGG project and develop a shared understanding with them in implementing the most effective engagement options	Communication, knowledge management, multi-stakeholder process facilitation, stakeholder management, event management
to organize awareness-raising events with the partners of the intervention on Multi-access intellectual property protocols and develop a shared understanding with them	Communication, national and international intellectual property laws, knowledge management, multi-stakeholder process facilitation, stakeholder management, event management
to engage with the designers and developers of Public-Private Partnership Arrangements who are not involved in the ACGG Project and generate learning	Multi-Stakeholder processes design, Multi-Stakeholder processes facilitation advocacy, public relations, Public-Private partnerships
to ideate, together with key private sector partners, about how ACGG Project and other interventions can directly engage with key policymakers in a complementary way with the innovation platforms and country poultry forums	Policy engagement, advocacy, lobbying, investment brokering, policy research, social theory, political theory, innovation platforms
to co-organize larger engagement events with the partners already convinced about Village Vaccination and Deworming Model in Nigeria for increased implementation of the model in different locations across Nigeria	Event management, animal vaccination, animal health research methods, community relations
to ideate about how ACGG Project and other interventions can work on Import Credit Instrument with financial and governance actors in Ethiopia, Tanzania and Nigeria	Experimental research, finance, credit instrument design, chicken business management, impact investing, process facilitation, process management

Annex-1: Innovation Readiness Levels [1]

Innovation Readiness Level	Innovation Readiness Category	Description
0	Idea	Thinking about a novelty's ability to solve a problem
1	Hypothesis (proven)	Cognitively validated idea: Hypothesis
2	Basic Model (unproven)	Desktop research on the hypotheses' ability to solve a problem using existing conceptual/theoretical evidence
3	Basic Model (proven)	Conceptual/theoretical validated set of interrelated hypotheses: basic model
4	Application Model (unproven)	Desktop research on the basic model's ability to solve a problem using existing applied evidence
5	Application Model (proven)	Validated basic model using applied evidence: applied model
6	Application (unproven)	Experimental research on application model's ability to solve a problem in the controlled conditions
7	Application (proven)	Validated applied model using experimental evidence: application
8	Innovation (unproven)	Testing the capacity of the application to generate value by solving a problem in a specific uncontrolled context
9	Innovation (proven)	Validated application using evidence on the value: innovation

Annex-2: Innovation Use Levels [1]

Innovation Use Level	Innovation Use Category	Description
0	None	The novelty is not used for achieving the objective of the intervention in the specific spatial-temporal context where the innovation is to contribute to achieving impact
1	Team	The novelty is only used by the intervention team
2	Partners (rare)	The novelty has some use by the intervention partners
3	Partners (common)	The novelty is commonly used by the intervention partners
4	Unconnected designers and developers (rare)	The novelty has some use by designers and developers who are not directly involved in the intervention
5	Unconnected designers and developers (common)	The novelty is commonly used by designers and developers who are not directly involved in the intervention
6	Unconnected delivery and use support stakeholders (rare)	The novelty has some use by delivery and use support stakeholders who are not directly involved in the intervention
7	Unconnected delivery and use support stakeholders (common)	The novelty is commonly used by delivery and use support stakeholders who are not directly involved in the intervention
8	Unconnected end-users (rare)	The novelty has some use by the end or final users who are not involved in the intervention
9	Unconnected end-users (common)	The novelty is commonly used by the end or final users who are not involved in the intervention

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