The poverty situation in rural areas has been further exacerbated by the coronavirus disease 2019 (COVID-19) pandemic, which has put a strain not only on the national health system, but also on the entire economy. Virus control measures have directly affected employees and casual workers in the urban service sectors, while an estimated 900,000 outmigrants have lost employment and returned to Cambodia. These shocks are being transmitted to rural areas through the dual mechanism of loss of remittance income and the return of large numbers of migrant workers to their home villages, thus driving an increase in food demand. Poor and near-poor rural households’ livelihoods and food security depend on a mixture of rainfed agricultural activities – already affected by climate change – and wage earnings, including remittances from migrant workers. Cambodia’s agriculture and, in turn, its poverty reduction ambitions therefore need to find new engines for growth in addition to rice, which to date is the most developed value chain; gaps in knowledge and practice for competitive on-farm production and post-harvest management must be filled.

In 2020, the agriculture sector continued to play a significant role in the economy of the Kingdom of Cambodia, accounting for 22 per cent of the Kingdom’s GDP and employing one third of the Cambodian workforce. Over the last two decades, the country’s economy has grown by 7.5 per cent on average, reducing the rate of poverty from around 50 per cent to around 10 per cent of the population, although a large proportion of the rural population is only just above this line and about 41 per cent of children remain in multidimensional poverty.

**Cambodia**

Empowering rural people through a semi-intensive rural poultry production model

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**CASE STUDIES**

**Empowering rural people through a semi-intensive rural poultry production model**

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**PROJECT TITLE**

Accelerating Inclusive Markets for Smallholders (AIMS)

**COUNTRY**

Cambodia

**PROJECT AREA**

Nationwide

**IMPLEMENTATION PERIOD**

2017-2023

**TARGET GROUPS**

Primary beneficiaries are 75,000 poor and near-poor smallholder households. Secondary target groups are the other primary and secondary actors in the poultry value chain: farmer organizations, agribusinesses, service enterprises and industry associations.

**IFAD FINANCING**

US$36,257,000

**COFINANCING**

Local private-sector organizations (US$8,586,000), beneficiaries (US$8,116,000) and national government (US$8,854,000).
Market "pull" factors are an important opportunity for higher-value agriculture in Cambodia. Its geography is important – sitting between the large and increasingly affluent economic hubs in mainland South-East Asia, with Bangkok and Central Thailand less than 4 hours drive to the west, and Ho Chi Minh City and the Mekong Delta region of Viet Nam less than 2.5 hours to the east. The Bangkok and Ho Chi Minh City regions are large, fast-growing and increasingly affluent urban centres with strong food cultures that place greater value on premium “rural” products – such as traditional breeds of chicken. Together with the expanding domestic urban market, this has created a large and reliable market demand for Cambodia’s producers to target and thus share in regional economic growth.

In this context, the rising and dynamic poultry sector is considered one of the most promising agricultural food industries, fostering sustainable growth and contributing to poverty reduction. More than half of all Cambodian households raise poultry and, even though revenues from poultry represent relatively small proportions of total household revenues, the women accrue most of this income, which allows them to contribute to household and education expenses for their family (Heifer International Cambodia, 2013).

There is increasing demand for poultry, especially chicken, in Cambodia as a result of rising income, the growing population and the increase in tourist flow into the country, with consumption rising from almost 29 million kg in 2016 to 35 million kg in 2017, while the country could only produce 21 million kg. Given the fact that the capacity for national production of chicken is lower than current demand, there is a significant opportunity for smallholders to intensify sustainable production and improve the quality of poultry products to enter profitable markets.

The main challenges for Cambodian small-scale poultry production are high mortality rates (up to 80 per cent), low productivity and effects related to climate change such as prolonged droughts and floods. Four fifths of rural poultry owners do not have access to formal credit programmes or government incentive schemes, or to animal health and technical advisory services. This results in owners having limited knowledge of chicken-raising, breed selection, feed and feeding, disease prevention and treatment. Two other important challenges are, firstly, the market linkages between small-scale poultry producers and major urban markets, which are highly fragmented, in part because supply is scattered and infrequent, with farmers selling few chickens, irregularly and on their own; and secondly, the mindset of farmers, who have always considered chickens to be for their own use and an unreliable source of income, and have given little attention to how poultry are raised.
Accelerating Inclusive Markets for Smallholders (AIMS), a project of IFAD and the Royal Government of Cambodia, aims to increase returns from farming for more than 75,000 smallholders (including young people) through efficient public sector investment. More specifically, AIMS delivers substantial and sustained direct financial benefits through the inclusive development of five high-value product value chains serving domestic and export markets, namely: quality-assured rice, vegetables, backyard chicken, cassava and raw silk. Among these, the poultry production value chain has been identified as having high potential for rapid scale-up to boost the rural economy, improve food security, create employment opportunities for workers who have lost their jobs and compensate for lost incomes.

The project’s strategy for supporting the development of the small-scale poultry value chain includes (i) supporting public and private sector partnership and market linkages for smallholder farmers; (ii) strengthening chicken clusters as business-oriented entities; (iii) identifying appropriate technologies suited to the local climate and context; (iv) enhancing farmers’ capacity to increase animal production and productivity; and (v) linking farmers with financial institutions on credit programmes to develop end-user financing mechanisms.

THE "CASE" - AN INNOVATIVE SEMI-INTENSIVE RURAL POULTRY PRODUCTION MODEL

Within the framework of the AIMS project, IFAD, together with Green Innovet Cam (GIC), a social development enterprise, supported the development of an innovative semi-intensive rural poultry production model that enables smallholder producers, including poor and landless households, to enhance productivity through new sustainable practices.

The model was initially developed in the context of the Tonle Sap Technology Demonstrations for Productivity Enhancement project and the Tonle Sap Poverty Reduction and Smallholder Development project, which were funded by the Asian Development Bank and IFAD. The model has since been gradually refined during the implementation of the IFAD-supported project Scaling up of Renewable Energy Technologies in Rural Cambodia (S-RET), the Agricultural Services Programme for Innovation, Resilience and Extension (ASPIRE) and AIMS.

The proposed semi-intensive poultry production model allows smallholder farmers in Cambodia to upgrade their poultry production system from "small extensive scavenging" and "extensive scavenging" to "semi-intensive", according to the Food and Agriculture Organization of the United Nations (FAO) categorization. The model is characterized by two main phases.

Phase 1 – Setting up poultry breeding units

The semi-intensive poultry production model helps farmers to improve their chicken production at the community level and increase their income generation. Chick production farms are responsible for producing 21-day-old vaccinated chicks that can be sold to all cluster members who are interested in the chicken-fattening process (phase 2). The poultry production unit is divided into modular "blocks" (ranging from 1 to 10 blocks depending on farmers’ capacity), where one rooster and nine hens of local breed are kept to produce fertile eggs. This model includes the set-up package (including vaccination, feed and a net) and a solar egg incubator with 2 or 10 blocks, for 500 and 2,000 eggs, respectively.
The chicken-growing and finishing phase (described here as the “fattening” phase) follows the same approach as the production phase. First, farmers are provided with a set-up package, including a chicken pen model. Second, farmers are trained in market-oriented broiler production. Farmers also take part in theoretical training on the technical aspects of poultry housing and equipment construction, breeding, feeds and feeding techniques, and poultry health care (such as adoption of biosecurity measures, disease prevention and deworming). Finally, farmers are invited to visit the “demonstration farms” of peer farmers so that they can gain from their knowledge and experience while identifying practices and methods they could replicate or adapt on their own farms. On demonstration farms, farmers receive practical training in chicken pen construction, chicken feed mixing, sanitation, vaccination, disease prevention and economic analysis.

The semi-intensive poultry production model strengthens links between farmers and markets. The main aim is to support the establishment of a value chain that is characterized by efficient flow between poultry breeders supplying their communities with 21-day-old vaccinated chicks and farmers raising and selling broilers to meet the market demand and increase their family income. GIC acts as facilitator by connecting poultry producers to collectors and buyers; supports farmers in accessing markets or collection points; and assists in the negotiation of product price.

A core factor of the model is the capacity-building component covering the whole duration of the project. GIC provides technical training to groups of poultry-breeding farmers and indigenous chicken growers through a knowledge-sharing programme that builds on a farmer-to-farmer knowledge-sharing approach. GIC staff and farmers come together in monthly meetings to share updates and good practices on their poultry farms. Capacity-building activities are also included in the model and selected poultry farmers make their farms available as “demonstration farms”. Through field visits, GIC offers technical advice on how to conduct field demonstrations for other farmers, and on how to monitor and collect data. Farmers are encouraged to visit other farms in the village to identify which practices they can use, and pass on the knowledge they have gathered from the training sessions. Technical specialists and village animal health workers trained under AIMS conduct regular visits to farmers to ensure that the model is working properly and, if any issues arise, provide advice and support.

In addition to strengthening the linkages between breeding and fattening units, the model builds the capacity of poultry-breeding entrepreneurs to become extension/farmer promoters for new village chicken growers’ groups. GIC works to ensure the provision of continued technical backstopping once the project reaches its end.
The specialization into two different production phases, notably the breeding and the rearing (fattening) phases, along with properly built poultry facilities (using local material), the adoption of biosecurity measures and vaccination, and the regular provision of clean water and feed (70 per cent of which is produced on farm) results in a drastic reduction in mortality rate (from 80 per cent to 10 per cent on average). In particular, the creation of two phases is what helped farmers make the transition to approaching their poultry production as a household enterprise rather than a traditional livelihood/subsistence activity. In doing so, they are more mindful of production practices to ensure they make money.

- The separation of day-old chicks from adult birds prevents the spread of disease and increases efficiency in production (there is less competition for feed, with a more efficient conversion rate, resulting in shorter fattening cycles; in three months, birds can achieve the carcass weight of 1-1.2 kg requested by the market).

- The model uses local breed birds, which are slower to grow but likely to have a better nutrient profile than intensively raised commercial hybrid broilers. In addition, 70 per cent of the feed is produced on farm while 30 per cent is commercial feed. This practice reduces the cost of production since feed represents the highest cost (70-80 per cent). Importantly, it also makes net income more reliable as farmers are less vulnerable to changes in commodity price volatility (which is reflected in commercial feed prices). Usually, feed prices vary far more than the selling price of chickens. For poor smallholders, therefore, using their own feed is very useful in reducing these market risks.

- The organization of production in batches of 50-100 birds allows a more regular supply for the market and income generation for farmers. With 20-50 farmers conducting the fattening process in a commune, this then becomes a good place for more traders and a virtuous circle of reliable supply develops. This, in turn, attracts more buyers leading to a growth in production and more opportunities.

- The hands-on training and knowledge-sharing programme, followed by regular technical backstopping by GIC technical specialists and village animal health workers contributed to the efficient training of poultry farmers and built their confidence in the effectiveness of the new practices, resulting in a high technology transfer rate.
Before starting to raise chickens, Chheang used to commute to Thailand to work in the construction sector, to assist her family, who were facing food shortages and indebtedness.

Since becoming involved in the new chicken-raising model implemented by GIC, she has gained technical knowledge and access to the market, and thanks to the AIMS network she now has meetings with a commercial intermediary every two weeks.

Using the new semi-intensive poultry production model has reduced the mortality rate of her chickens and increased her household income. Chheang now feels more involved in her community because several members of the village have asked to visit her farm and to be trained in the new poultry-keeping techniques.

Their main source of income has always been vegetable farming, but, as the market was not stable, they started raising chickens, increasing their revenue tenfold.

Since October 2019, they have been involved in the GIC semi-intensive poultry production model through the AIMS project and sold more than 1,300 chicks in one year.

Heng’s son also decided to build a chicken farm close to their home. Like Chheang, Heng also confirmed that she now has a greater role not only within her own household but also within her community.
KEY RESULTS

A survey has been carried out with a sample of AIMS beneficiaries to identify the main impacts after the initial months of implementation of the GIC semi-intensive poultry production model. Five respondents were interviewed on the poultry-breeding model, and 20 on the chicken-fattening phase. Both men and women, of different ages and at different locations, were interviewed.

The respondents running breeding farms reported that before the implementation of AIMS they kept flocks in a traditional way, averaging 50 birds with occasional sales of day-old chicks, whereas now they can sell up to 2,000 vaccinated chicks (21 days old) monthly to customers from a breeding stock of 90-100 birds. All of them stated that before AIMS they bought feed from markets, whereas now 60-70 per cent of the feed they use is local and produced on their own farms and only 30 per cent is commercially sourced. Another key achievement from the implementation of GIC’s semi-intensive poultry production model, besides the huge increase in production level, is that farmers can now access veterinary services and technical advice whereas previously they had not been able to.

The respondents from poultry-fattening units (those who buy the 21-day-old chicks from producers) also sold more poultry; they reported that monthly sales had improved from an average of 10 chickens before AIMS to almost 130 now. Like the farmers in the other group, they now make more use of veterinary services and technical advice than they did before AIMS. Thanks to the multi-stakeholder platforms promoted by the project, the costs of delivering such services have also reduced because of economies of scale, given that a larger number of farmers are involved in the same value chain. All of the respondents reported that they plan to expand their chicken numbers to increase sales, and 30 per cent showed an interest in becoming "solely" chicken producers.

According to the respondents of both groups, the main changes due to AIMS are (i) chicken mortality rate has decreased from 80 per cent to 5-10 per cent; (ii) chicken production is now a source of regular income for them; and (iii) market access has improved, giving them the opportunity to sell poultry at higher prices. Before the project, most farmers were migrating as seasonal workers to Thailand, Phnom Penh and other locations; they reported that raising poultry allowed them to generate income and stop migrating. They can now respond better to emergencies, since poultry can be sold quickly to cover the most urgent needs such as medicines and school materials.

The data collected through the survey are in line with results reported under the S-RET project funded by IFAD and the Global Environment Facility (GEF). Here, GIC implemented the same chicken production model including the use of photovoltaic power to run chicken egg incubators. The main results of the S-RET project were (i) chicken mortality rate decreased significantly; (ii) greenhouse gas emissions resulting from chicken production decreased because of the reduced need to purchase, transport and store petroleum fuels in remote areas for power generation and heating/brooding chicks; (iii) 60 per cent of beneficiaries were women, actively participating in poultry production; (iv) 15 households were interviewed in February 2020 and reported that the new model had allowed them to earn between US$150 and US$200 monthly, which was a positive contribution to their livelihoods.
The GIC model is undergoing constant improvements and, as a consequence, the investment return associated with the implementation of the model is increasing. In 2021, the actual cost for establishing GIC’s complete chicken-fattening package for 200 chicks, including three training events and six months of monitoring and technical support provided by GIC technical staff, is around US$1,628. In terms of productivity and economic returns on investments, the difference between traditional backyard poultry-keeping and the semi-intensive model is striking. Under the traditional system, a household usually succeeds in raising between 5 and 10 chickens per year, considering the very high mortality rate (almost 80 per cent).

Farmers keep chickens for up to eight months before selling them to the market. With GIC support, the mortality rate drops to 10 per cent and chicken-fattening units can sell chicks every 2-3 weeks by adopting a rotation scheme. A chicken-fattening unit with 200 chicks has a net profit of around US$650 in a three-month period; therefore, the farmer will earn a net annual income of around US$2,600. Even more impressively, poultry farmers setting up breeding units with a 500-egg incubator can produce 450 twenty-one-day-old chicks monthly, resulting in a net profit of around US$350 per month and US$4,366 per year.

**LESSONS LEARNED**

Establishing breeding units for the production of day-old chicks proved to be the first cornerstone of success for the model. Availability of sizeable quantities of day-old chicks of local breeds for sale is uncommon and the demand from poultry growers for access to batches of more than 50 day-old chicks is usually satisfied through importation or by local large-scale poultry farms. These two channels usually supply hybrid day-old chicks, which require expensive high-quality feed and are less suitable for smallholder farmers located in rural areas than for those in urban and peri-urban areas, where access to inputs and markets is easier. The importance of establishing poultry-breeding units that can develop viable rural poultry production systems is confirmed by the experience of the successful Bangladesh poultry production model (Islam and Jabbar, 2005).

The vaccination of chicks is the second cornerstone of success. Selling vaccinated 21-day-old chicks reduces the risk of birds catching poultry diseases such as Newcastle disease and fowl cholera. In addition, since the main final product is poultry meat, the possibility that birds get sick before being sold or slaughtered after a production cycle of three months is much lower. Purchasing vaccinated chicks makes farmers’ work easier since they do not need to purchase, preserve and manage the vaccine for a large number of birds. The success of this practice is confirmed by similar positive experiences with smallholder poultry-breeding farms in rural Burkina Faso (Davies, 2020). Of course, poultry breeding stock will also have to be regularly vaccinated against prevalent diseases in the project area in accordance with a vaccination calendar.

A third element of success is the strict adoption of biosafety measures consisting of fencing animals in, limiting visitor access to poultry facilities, disinfecting shoes at the entrance (including those of the owner or other members of the family), avoiding mixing birds of different ages or even different species (e.g. ducks and chickens), and regularly cleaning and disinfecting equipment and rearing facilities.
Finally, the “learning by doing” training methodology, coupled with a technical follow-up service to assist smallholder farmers in the initial critical phases of production, resulted in a very high rate of technology transfer, shifting from a traditional to a more intensive production system. The same results have been observed in IFAD-supported projects in Afghanistan and India (namely the Rural Microfinance and Livestock Support Programme, Community Livestock and Agriculture Project in Afghanistan and the Meghalaya Livelihoods and Access to Markets Project in India). Other development projects have provided a single two-day training session for building the capacity of newly established poultry producers. This approach, although less costly, has consistently resulted in failure and overall waste of resources.

Lessons have also been learned about some aspects of technical production. Indeed, it emerged that there needs to be a clear market pull opportunity for a product in which initially poor small-scale producers can compete, such as traditional breeds of chicken that can grow well on locally produced feed if managed properly. In addition, the separation of the chick-hatching business from the fattening business has proved technically successful and, equally importantly, has enabled a more rapid shift to approaching small-scale commercial traditional breed chicken-farming as a business. This is fundamental to the transition and can be reinforced by business skills training coupled with technical training and mentoring. The financial business case and cash flow for both the chick-hatching enterprise and the fattening business are strong, and positive cash flow can be seen in the three to four months after the first investment – this makes it a lower risk for farmers and microfinance institutions (MFIs) to finance. Lastly, a focus on market-driven poultry production, a traditional domain for women, combined with high-paying flexible work can be the catalyst for wider transformative gender empowerment.

**SUSTAINABILITY**

The semi-intensive poultry production model introduced by GIC is implemented in close collaboration with the AIMS team, the local authorities and local government staff, which contributes to optimizing the impact and sustainability of the project. A great contribution is made by local government officers, who help to introduce new poultry production techniques, strengthen market opportunities and provide farmers with access to credit.

The sustainability of the GIC model will be ensured by identifying the most motivated and interested households as pioneers. These households will be trained to provide peer-to-peer assistance and extension services to other beneficiaries and villagers. The pioneer role has been introduced to promote indigenous knowledge and exchange alongside the “learning by doing” approach. It is expected that, even after the project comes to an end, farmers will continue to share the knowledge they acquire through technical training workshops, exchange visits and field days.

A number of challenges will need to be addressed to ensure full sustainability of intensified rural poultry production in Cambodia. A key element for ensuring sustainability and scaling up will be the shift from a “project-led” initiative to a private-sector enterprise. One lesson learned is that, despite the large increases in revenue and profits among the communities supported with this approach, it has proved difficult to turn the vital services provided by GIC to kick-start such production clusters into a financially viable business for GIC that can drive further expansion in the sector without donor support.
GIC should proactively move to the private sector, adopting business models already successful in other countries, such as Ethiochicken in Ethiopia or Chicken Basket in Kenya. Both ventures support the development of a wide network of poultry breeders and growers, ensuring the provision of day-old chicks with high genetic value, good-quality feed, equipment (especially poultry incubators) and veterinary products, and the facilitation of training, technical backstopping, access to finance and marketing of final products. The final aim will be to develop a coordination hub able to provide “one window” services to smallholder farmers. The continuous upgrading of small poultry producers’ capacity will be ensured through rural extension workers hired by GIC. This will lead to improved entrepreneurial skills and gains in productivity while creating a more stable and diverse supply of high-quality protein and micronutrients at the rural household level and on local markets. IFAD should support the development of such private entrepreneurship by providing initial economic support, and facilitating the strengthening of business development capacity and vision among company managers.

Another important element for sustainability is access to credit. In Cambodia, smallholder farmers have volatile incomes, and MFIs require collateral for loans, which smallholder farmers do not have. In this context, IFAD has supported the development of the Improved Group Revolving Fund (IGRF) mechanism under the Project for Agricultural Development and Economic Empowerment (PADEE), which successfully provided loans to farmers without requiring collateral. It is important to note that farmers were taking loans even though the interest rate was higher with the IGRF, at 2 per cent, than the 1.2 per cent from MFIs. Building on this experience, it is essential that IFAD develop more awareness among MFIs/banks through investment projects such as AIMS to increase confidence in lending to smallholder farmers; and further discuss the development of financial packages that can be adapted to the economic capacity of rural households wanting to engage in improved village poultry production.

Finally, to enhance sustainability, IFAD should engage with the Government of Cambodia to develop an appropriate policy and regulatory framework aimed at supporting rural poultry production while also ensuring that public health, traceability and quality standards of products are safeguarded. Another important policy area lies in facilitating the export trade (especially to Viet Nam and Thailand) for chilled, processed birds labelled as “free range and organically grown”, and in attracting investment in modern export-grade poultry slaughterhouses/processing facilities to serve these markets. These initiatives can have a long lead-time and so should be started soon, as production can grow rapidly and saturation of the market in the short period would be a risk.

**POTENTIAL FOR SCALING/REPLICATION**

The potential for scaling up has already been demonstrated over the past decade, when GIC had an important role in promoting livestock production for smallholder farmers through several IFAD initiatives such as the Tonle Sap Technology Demonstrations and Productivity Enhancement project and the Tonle Sap Poverty Reduction and Smallholders Development project.

As part of the S-RET project, GIC tested the use of a solar energy system for egg incubators for smallholders and developed agricultural investment-winning models based on a profitable investment plan that kept production costs low and production high. It is important to note that a small enterprise is now producing egg incubators locally with a capacity ranging from 200 to 2,000 eggs.
CONCLUSIONS

In an effort to improve and scale up sustainable poultry production in the country, IFAD and GIC adopted and promoted a semi-intensive rural poultry production model that enables poor and landless households to improve their livelihoods and enhance productivity through new sustainable practices.

The model has the potential to become a viable way to develop a vibrant economic sector involving small-scale producers who are able to supply high-quality local products, which are in high demand in urban markets. It builds entirely on local human resources, capital and natural resources. It is highly flexible, since it adapts well not only to resource-poor households but also to wealthier farmers. The model allows the development of short value chains supplying rural areas with high-quality protein and micronutrients but also more complex value chains involving traders, transporters, input suppliers, processors, street vendors and retailers.

The work of IFAD and GIC on small-scale poultry production has been effective in many ways. The semi-intensive poultry production model has helped integrate sustainable practices into agricultural activities. It has brought families and communities together, lessening challenges within and beyond households. The poultry value chain has also become more connected thanks to the enhanced market linkages and services established by IFAD. Although there are various challenges that persist, the initiative has been a means to improve conditions in rural areas. With the ability to benefit households on many levels, this initiative can open up more opportunities for strengthening smallholder poultry farming, and ensuring that the link established between farmers, markets and institutions remains favourable for the poorest and most vulnerable.

The challenge now is to develop an equally effective business model for GIC itself to enable it to drive further inclusive growth of the traditional-breed poultry sector in Cambodia, and equip it to extend its successful approaches to new opportunities – from traditional-breed pigs to replication in other countries.
ACKNOWLEDGEMENTS

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It has been reviewed by Sakphouseth Meng (Country Programme Officer, Cambodia, IFAD); Sinn Por (National Livestock Specialist, GIC); Pierre-Marie Borne (Public Affairs Director, Public Health Zoonoses and Food Safety at Ceva Santé Animale); Dr Marie Ducrottoy (Senior Program Manager at Ceva Santé Animale); Karan Sehgal (Natural Resources and Environment Officer, FAO); Nigel Smith (Inclusive Market Development Specialist); Giacomo de Besi (Livestock Development Specialist, FAO); Robyn Alders (Senior Consulting Fellow, Centre for Universal Health, Chatham House, and Honorary Professor, Development Policy Centre, Australian National University).

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