

## Opportunities for growing the pork sector in low- and middle-income countries

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*Ma Thi Puong feeds her pigs on her farm near the northern town of Mieu Vac, Vietnam.*

### A growing pork sector in low- and middle-income countries

Over the past decade, pork production in low- and middle-income countries (LMICs) has increased significantly. In 2010, LMICs produced approximately 87.4 million metric tons (MT) of pork. By 2020, this figure had increased to around 112.8 million MT, representing an increase of approximately 29% ([here](#)). This growth has been driven by increasing demand for meat products, arising from changing dietary preferences, rising incomes and urbanization, amongst other factors. As this demand continues to grow, it is likely that pork production in LMICs will continue to increase in the coming years.

- 90.1 million metric tons pork produced by Asian LMICs in 2020: a 30% increase from 2010
- 3.1 million metric tons of pork produced by African LMICs in 2010: a 28% increase from 2010

## The importance of pig keeping to smallholder livestock keepers

Pig keeping is an attractive option for smallholder livestock keepers. Pigs generate income, can empower women, contribute to food and nutritional security, and diversify the household livelihood portfolio.

Since they can be raised on small plots of land and require relatively little capital investment, pigs are often a preferred livestock species—particularly by women. They generate quick returns due to the short generation intervals and large litter sizes. In addition, pig manure can be used as crop fertilizer.

The Food and Agriculture Organization of the United Nations (FAO) estimates that there are over 100 million smallholder pig keepers worldwide and that smallholder pig production accounts for up to 85% of the global pig population. These small-scale producers are found mainly in Asia but also in other regions such as sub-Saharan Africa and Latin America.

## The challenges faced by smallholder pig sectors

Despite the importance of pig keeping to millions of smallholders, the sector has many challenges (for example, [here](#), [here](#), [here](#), [here](#), [here](#)).

Due to less than optimal practices in feeding, herd health, choice of breeds and biosecurity, pig productivity remains low. African swine fever is a persistent threat, leading to high pig mortalities and significant economic loss. Additionally, pigs are highly sensitive to heat stress, which is of particular concern in regions experiencing rising temperatures. Unfortunately, access to inputs like affordable high-quality feeds and services such as extension remains weak, further hindering productivity. Unstable markets also pose a challenge and producers, especially women, may lack negotiating power when it comes to sale prices.

Unsafe pork is associated with human health burdens. In Africa, unsafe pork is responsible for approximately 200 disability-adjusted life years (DALYs) per 100,000 people per year, while in Southeast Asia, the burden ranges from 21 to 60 DALYs per 100,000 people per year, depending on the region. Comparatively, multi-drug resistant tuberculosis results in 52 DALYs per 100,000

people per year ([here](#)). One particularly concerning health risk is cysticercosis, which can arise from consuming uncooked pork. This condition is caused by *Taenia solium* tapeworm larvae invading the brain and central nervous system, resulting in seizures, brain damage and even death. Finally pig biodiversity, which is important to maintain for long-term food security in the face of new challenges, is rapidly declining, due to a handful of breeds dominating globally.



*Indigenous pigs can be preferred by specific ethnic groups in Vietnam. Whilst slow growing, the meat is tasty and they can be sold at higher prices ([here](#)).*

## The work of the International Livestock Research Institute on pork value chains

The International Livestock Research Institute (ILRI) is a global research organization that works for better lives through livestock in developing countries ([here](#)). ILRI has been fostering vibrant, inclusive and sustainable pork value chains in LMICs for more than a decade. The focal countries for this work include Uganda, with scaling of proven approaches to Rwanda, and Vietnam, with scaling to Laos and Cambodia.

Some key elements of ILRI's approach are the co-development and co-testing of solutions with partners, addressing constraints and capitalizing on opportunities across the value chain (rather than at a single value chain node), ensuring equitable opportunities and benefits through both accommodative and transformative approaches (gender and youth lens), catalyzing private sector investment, knowledge sharing and capacity building, and facilitating a stronger enabling environment.

**Uganda pork value-chain.** Since 2012, ILRI and its partners have collaborated with stakeholders in Uganda's pork value chain to address the growing demand for pork products. Whilst, in 2012, the pig sector was largely 'invisible' to decision-makers and investors, the joint work of ILRI and partners resulted in a noticeable increase in knowledge, awareness and action within the industry. For example, pork is now recognized within the meat category prioritized in the Ministry of Agriculture, Animal Industries and Fisheries' agro-industrialization program ([here](#)). Further, many of the innovations developed for the pork value chain in Uganda are now being scaled to Rwanda, where the pork value chain faces similar issues.

ILRI's partners in this work are from both the private and public sectors. They include women and men pig keepers, farmer groups or cooperatives, input service providers and market agents, different levels of government, national universities and agricultural research institutes, international universities and other institutions.

**Vietnam pork value chain.** ILRI has been involved in the pork value chain in Vietnam since 2008, with a strong focus on pork safety, which consumers and stakeholders had identified as a concern. To improve pork safety, ILRI and partners identified the most significant hazards in the pork value chain, quantified the related risk to consumers, and developed low-cost, contextualized solutions to lessen these risks ([here](#), [here](#)). In addition, awareness of food safety and related policies were increased through involvement in food safety-focused working groups and the UN Food Systems Summit. These approaches have been adapted and implemented in other countries in the region, such as Cambodia and Laos, where similar challenges around pork safety exist. ILRI also works on many other aspects of the pig value chain in Vietnam ([here](#)).

### Innovations include:

#### Gender transformative innovations – for more equitable engagement and sharing of benefits between women and men, and increased women's empowerment

- Identification of gendered constraints and opportunities in the pig value chain
- Exploration of gender norms that may affect equitable participation in, and benefits from, pig enterprises ([here](#))
- Transformative and accommodative interventions to support the participation of youth and women in the pig value chain and their enjoyment of associated benefits

#### Feeding innovations – to overcome low feed availability and quality

- Development of low-cost and locally available feed rations ([here](#), [here](#))
- Training, mentorship and certification program for small-scale feed producers to improve feed quality and service provision ([here](#))
- Identifying suitable forages for pig feeding ([here](#)) and forage seed business models ([here](#), [here](#))
- Improved capacity of women and men pig keepers, and other actors, in feeding pigs at different stages of their life-cycle ([here](#))

#### Herd-health innovations – to overcome poor pig health and biosecurity

- Biosecurity practices to control African swine fever and other diseases ([here](#))
- Provision of advisory services on herd health practices by animal healthcare workers and interactive voice response ([here](#), [here](#))
- Strengthened *Taenia solium* (pork tapeworm) control through risk-mapping protocols to support national Taeniocide allocations combined with other contextualized interventions
- Tool for antimicrobial use in livestock ([here](#), [here](#))
- Improved capacity of women and men pig keepers in applying best herd health and biosecurity practices ([here](#), [here](#))



*A feed processor gathers material for processing pig feed in Uganda.*



### African swine fever vaccine and diagnostic innovations – to reduce impacts of African swine fever

- Live attenuated, killed virus and subunit vaccines for African swine fever (in development, [here](#))
- Validation of existing rapid African swine fever diagnostic tests under field conditions

### Genetic and breeding innovations – to improve access to farmer-preferred breeds

- Capacitating animal healthcare workers to provide pig artificial insemination services through technical training, entrepreneurship training and business model development
- Overcoming technical constraints to pig artificial insemination, such as the short semen lifespan
- Genomic and phenomic characterization of local pig breeds ([here](#)), and gendered breed and trait preferences ([here](#))
- Improved capacity of women and men pig keepers in pig breeds, breeding and artificial insemination ([here](#), [here](#))



A pig undergoing artificial insemination in Uganda.

### Extension innovations – to address poor access to advisory services

- Extension messaging for pig farmers and other value chain actors on integrated productivity-enhancing technologies and practices as well as marketing options, delivered through behaviour change communication approaches ([here](#))
- Digital platforms for exchange of information and market linkages and transactions

### Marketing innovations – for win-win business arrangements

- Business mentoring support to pig producers and pig buyers (aggregators) to formulate win-win business arrangements and enhance trust and value chain linkages ([here](#))
- Improved exchange of information between pork value chain actors for joint problem-solving of constraints, including on input and output market access for pig producers, via multi-stakeholder platforms or common interest groups ([here](#))



Low-cost pork safety interventions being applied at a wet market in Vietnam.

### Pork safety innovations – to reduce the risk of foodborne diseases associated with the consumption of pork

- Low-cost pork safety intervention package for traditional slaughter and retail outlets ([here](#))

### Policy innovations – for a more conducive policy environment

- Mechanisms and processes for sustaining effective engagement with policymakers for decision-making on the pig sector ([here](#), [here](#))

### Pig biobanking innovations – for maintenance of pig genetic biodiversity

- Development of protocols for biobanking and restoration of local and endangered pig diversity using the induced pluripotent stem cell (iPSCs) technology

### Environmental innovations – to improve environmental sustainability

- Ex-ante environmental impact assessments to explore environmental trade-offs of different innovations for better decision-making



Growing pigs in Uganda.



Sow with piglets born from artificial insemination, in Vietnam ([here](#)).

Strong opportunities exist for ILRI to engage in additional countries to help facilitate vibrant, inclusive and sustainable pork value chains. ILRI's experience in engaging with local partners to co-identify key opportunities and constraints, co-scale contextualized versions of existing innovations or co-develop new solutions to emerging challenges means that change can be rapidly achieved. ILRI is currently seeking partners, particularly including donors, to support its work in growing pork sectors in LMICS.

View of female pig keepers from Son La province in Northwest Vietnam, who received training on pig production, including on the use of artificial insemination, here:

Quàng Thị Ly, Lèo Thị Xiền (Thai ethnicity, 31 years old). 'Since the project started, I have learnt about artificial insemination. With direct mating, it is difficult to transport the boars. .... I borrowed the boar from Mrs. Sáng in the village. The boar is a big male, and I had to ask for help to load him in a vehicle and put him in a pigsty. My husband was not at home, so it was very difficult for me to carry him. .... the two pigs have to be familiar with each other, so the boar can only be returned the following day. Artificial insemination only takes 10–20 minutes. Artificial insemination is hygienic and free from infectious diseases.'





Female pig keeper feeding her sow in Uganda.

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