End of project popular science description

Introduction
Countrywide, Colombia raises and slaughters about 5 million pigs and produces about 450,000 tons of pork annually. Domestic consumption of pork have more than doubled in recent years. The country hopes to boost its economy even further by growing pork exports as well. At present, however, Colombian pork producers have limited access to foreign markets. That is partly due to the occurrence of notifiable diseases and food-borne pathogens like Salmonella, with salmonellosis being a noteworthy human health risk in the country.

In a Strategic Sector Collaboration (SSC) with partners in Denmark, Colombia have raised the veterinary and food safety standards in its pork industry with the goals to improve public health domestically and to increase the country's access to export markets for pork. The SalPork research project (Salmonella Control in the Colombian Pig Industry) included the SSC government institutions, Porkcolombia (industry organization representing about 80% of the country´s pig farmers), the Javeriana University, CES University, Danish Agriculture & Food Council, and University of Copenhagen. Joint studies aimed to determine Salmonella occurrence and risk factors at farm level and during slaughter at abattoirs. Cost-effective interventions to control Salmonella were identified and pilot tested at pig farms and abattoirs. Training and capacities were built to conduct risk factor studies, serotyping and whole genome sequencing (WGS) of Salmonella.

Results and Conclusions
Despite that COVID-19 caused various delays and challenges, planned activities were implemented and project objectives achieved. The involvement of a senior researcher from the Danish Agriculture & Food Council ensured that experiences by the Danish pig sector was introduced and built into the research activities. Risk factors for introduction and spread of Salmonella at pig farms were determined and communicated. Pilot tests of the use of organic acids in feed and water to pigs showed that such acids can cost-effectively substitute antimicrobial growth promoters and thereby lead to less resistance development. Spraying of organic acids and hot water were also effective in reducing faecal contamination and Salmonella levels at abattoirs.

SalPork introduced for the first time and built needed expertise among Colombian researchers (university, government, Porkcolombia) to apply modern cost-effective molecular techniques (WGS) to determine the epidemiology and disease burden (source attribution) of Salmonella in pigs. An established collaboration with the National Institute of Health will be important for future One Health efforts to use such capacity to control Salmonella and other infectious diseases in Colombia. A number of MSc thesis students conducted their research in SalPork and their results together with other project findings were presented at national and international conferences and published in international scientific journals.

It was an unique opportunity for the SalPork project that Porkcolombia (local project lead) and ICA (Instituto Colombiano Agropecuario) were main research partners and at the same time also main partners in the SSC program with the Danish Veterinary and Food Administration (DVFA). This allowed for a close coordination and collaboration with the SSC program that was supported by active engagement and easy dialogue with the sector counsellor at the Danish Embassy in Bogota. This set-up enabled a wide and direct dissemination of research findings to the Colombian pig farmers through Porkcolombia and to the Ministry of Agriculture and Rural Development. The involvement of Javeriana University (Bogota) and CES Universidad (Antioquia region) strengthened the collaboration between Porkcolombia, ICA and INVIMA and the two universities.

A visit to Denmark of the Porkcolombia leadership at the end of the project was important to strengthen to relationship with the Danish Agriculture & Food Council, DVFA, and the International Centre of Antimicrobial Resistance Solutions (ICARS). ICARS has subsequently provided technical and financial support to Porkcolombia and the Colombian government to support a prudent use of antimicrobials and combat antimicrobial resistance in the pig sector.

Recommendations

Private sector organizations and cooperatives, i.e. Porkcolombia, are important research partners to ensure that research conducted is relevant and addressing real problems. They can also be a key actor for dissemination and update of research findings. SSC partner institutions should be engaged already in the planning of research activities to ensure relevance and uptake of research findings. The established collaborations between the two Colombian universities and Porkcolombia, e.g. through joint research positions, can found a strong basis for future efforts to improve food safety and strengthen the pig sector.