Development of innovative site-specific integrated animal health packages for the rural poor

Grant factsheet

Programme goals and objectives

Livestock contribute to the livelihoods of roughly 70 per cent of the world's poor, supporting farmers, consumers, traders and laborers throughout the developing world. The increasing demand for livestock products for the growing populations of developing countries, particularly in Africa, offers new market opportunities for poor farmers in rural areas. Success in raising small-farmer productivity leads to improvements in household food security, nutrition and income, leading to poverty reduction. However, in vast areas of sub-Saharan Africa, increased and sustained animal production by small farmers is greatly hampered by livestock diseases. Animal diseases severely constrain livestock enterprises of smallholder livestock keepers in sub-Saharan Africa but are not given the attention they deserve by the global community. Important diseases affecting livestock productivity include tick-borne diseases, tsetse-transmitted trypanosomiasis, gastrointestinal parasitism and diseases caused by biting insects (mosquitoes). The consequences of these diseases range from US$3 billion losses for gastrointestinal parasitism, about US$4.5 billion for trypanosomiasis, to US$20 billion for tick-borne diseases worldwide annually. Lack of synergetic work, inadequate technologies for the prevalent production systems, insufficient attention to local community requirements and potentials, lack of proper guidelines and the limited capacity of livestock keepers to deliver and implement animal health and production packages continue to hamper livestock production, improved household food security and income generation.

The goal of this IFAD grant to FAO was to develop holistic animal health packages for the management and control of animal disease constraints/risks for improved livestock production and increased opportunities for rural development, improving food security and alleviating poverty. The specific objective was to develop innovative site-specific animal health packages and validate them for enhanced livestock management opportunities for the rural poor communities. The main element of these packages was the Livestock Protective Fence (LPF), which was tested in three different agro-ecological zones on three different livestock production systems: dairy cows in Kenya, pigs in Ghana and small ruminants in Burkina Faso. The LPF is a net which is impregnated with the synthetic pyrethroid Deltamethrin, a "safe and environmentally friendly" insecticide. The LPF is supplied by Vestergaard Frandsen (a private enterprise http://www.vestergaard-frandsen.com) and the commercial name is ZeroFly® Livestock. In Burkina Faso, LPF was complemented by other interventions aimed at controlling internal and external parasites. In addition to the three target countries, project activities also benefitted other countries in which LPF adoption training was undertaken, including Benin, Burundi, Côte d'Ivoire, Eritrea, Ethiopia, Liberia, Mali, Niger, Nigeria, Rwanda and Togo. A socio-economic and animal productivity study was carried out in each of the three target countries to evaluate the impact of the applied technical package, i.e. LPF and, in Burkina Faso, also the interventions to control parasites.

Map of Project Area

At a glance (ID 1000003248):

Grant Implementing Agency: FAO

Theme: Innovative Animal Health Packages

Benefitting Countries: Burkina Faso, Ghana, Kenya

Total Programme Cost: USD 3.6 million

IFAD Contribution: USD 1.6 million

Co-financing (other donors): USD 2.0 million

Partners: ICIPE, CIRDES, PATTEC National Offices, Private Sector

Effectiveness and duration: July 2009 – March 2014

Figure 1. Livestock Protective Fence (LPF)

Target group/beneficiaries

The project activities were implemented in three countries – Burkina Faso, Ghana and Kenya. Direct beneficiaries were small-holder livestock keepers, farmers (including women), farmers' associations/ organizations and Extension Services. Indirect beneficiaries included NARS, International and Regional Research Institutions, like ICIPE, Nairobi, Kenya, CIRDES, Bobo Dioulasso, Burkina Faso and the National Office of the PATTEC of Burkina Faso, Ghana and Kenya. Training involved 496 farmers (60 percent were women) in Kenya, 332 farmers (35 percent women) in Ghana and 116 farmers in Burkina Faso. Additional training was provided to students and trainees from vocational schools, and officers from veterinary services. International training course provided to 16 participants from West African countries.

The project proved relevant to IFAD's target group, namely poor smallholder livestock keepers and rural agricultural communities, including women. In Kenya, at least a million smallholder farmers depend on dairy farming for their livelihood. In addition to family labour, dairy farming generates jobs in wage labour and mobile milk trading. The increased quality of milk production fosters market-driven development of the informal dairy industry, which works with poor smallholder dairy producers and traders to strengthen their capacity to respond to market opportunities.

Major results and impact

This grant was implemented and coordinated by FAO on behalf of the Secretariat of the Programme Against African Trypanosomosis (PAAT). Project-level execution was undertaken by partner institutions including ICIPE, CIRDES and national PATTEC offices, ensuring the participation of national institutions, the rural poor and other stakeholders for the best impact of technology application. The project was successful in developing an innovative technology, guidelines for investment, strategies for control of animal diseases and their adoption by stakeholders.

The development of animal health packages in Kenya's livestock production system focused on the enhancement of milk productivity in zero-grazing units (ZGUs), with LPFs an essential component. The project sites selected included Kisii, where intensive zero-grazing is practised due to a shortage of grazing land that has forced farmers to adopt the zero-grazing model, in which dairy cows are kept and fed in shelters, and Bungoma, where semi-zero-grazing is practiced. All project activities were undertaken in collaboration with the Smallholder Dairy Commercialization Programme (SDCP). The new animal health package developed under the project proved to be an important tool for the control of animal disease constraints, leading to improved livestock productivity, improved food security and poverty alleviation, which were the main objectives of the project. The animal health package was developed in a participatory approach and optimized for intensive zero-grazing dairy farms in Kenya. Some of its most significant achievements are listed below. Following the intervention, milk offtake steadily improved (by 60 percent on the year preceding the project and by 20 percent on the year before). LPFs were noted as having a cumulative effect on milk production, with an increase recorded for both LPF-protected and pit waste-protected units. In semi-grazing units, the increase in milk offtake was 40 percent. The other major impact was the reduction in mastitis, which also occurred in both LPF-protected and waste-protected units, albeit with more comprehensive results in the former. Stomoxys, housefly and mosquito numbers were greatly reduced. There appears to be a positive correlation between the density of stomoxys and mastitis cases. In this study, the reduction in stomoxys was followed by a fall in mastitis cases. Household questionnaires allowed farmers to perceive a decrease in cases of malaria, with fewer cases per household per year. The reduction in mosquito numbers and the corresponding fall in malaria cases reported indicate that LPFs have the potential to impact upon human health and contribute significantly to the One Health concept. The average combined economic benefit per farm household exceeded USD 2,600.

In Ghana, prior to the project's intervention, communities had resorted to desperate measures in an attempt to reduce mortality caused by disease in pig production, for the most part tsetse-transmitted trypanosomiasis. These measures included pouring engine oil on piglets. In the project intervention area, the challenge posed by tsetse flies was significant, with 100 flies caught per trap per day before LPF intervention. Two months after the deployment of LPF, tsetse numbers had been reduced by more than 98 percent, while animal health had improved. Trypanosomiasis prevalence in pigs fell from 30 percent to zero within five months of the first use of LPF. Mortality in piglets fell by 80 percent in a year. An evaluation of the impact of LPFs on pig productivity showed that pigs in protected pigsties had a mean litter weight gain, from birth to weaning, that was around 10 kg higher (46.1±5.5 kg against 35.5±6.5 kg; $p<0.05$). This was attributed mainly to reduced tsetse pressure and, as a result, the reduced prevalence of tsetse-transmitted trypanosomiasis. In particular, pigs in protected pigsties showed a better overall productive performance than those that were unprotected. Farmers' perceptions regarding the use of LPF technology were positive. In general, farmers noted that LPF was successful in controlling not only trypanosomiasis but also other pests and nuisance insects, while pig health and productive performances were also improved. Farmers using LPF to protect their pigs sold six-week old piglets at twice the price obtained by farmers who did not use the technology (USD 30 compared to USD 15), owing to the better physical conditions of LPF-protected piglets. In addition, the cost of trypanocidal treatment was approximately 60 percent lower for farmers who applied the LPF technology than for those who did not. The main negative perception was the inadequate accessibility of LPF, given that the trial communities were located some distance from commercial centres. This observation makes it imperative to involve the private sector fully in the sale and distribution of LPF. The capacity of farmers to manage viable pig production units was strengthened as a result of

the training they received from the project. Their ability to keep good records, prepare more nutritious pig feed and maintain adequate pigsty hygiene was increased by more than 90 percent.

In Burkina Faso, the animal health package included treatments for gastrointestinal parasites and ectoparasites and vaccination against pasteurellosis in sheep and goats. Mortality decreased by 93 percent, growth rate increased by 12 percent and abortion rate fell by about 10 percent. This resulted in a higher proportion of animals sold to the market (17 percent more animals sold). The improved growth rate and physical conditions had a positive effect on selling prices, with an increase of 78 percent after intervention

The tested LPF technology proved effective against nuisance flies and vectors of diseases for animals and humans. Preliminary results also demonstrated that the LPF do not affect the ecology of butterfly and bee populations. This allowed for diversification of mixed productivity within the farm, for example with regard to milk, meat, silk and honey/wax. Meanwhile, together with Vestergaard Frandsen, there was a need to better understand the lifespan of the nets and to develop methodologies to recycle or dispose of them, as well as investigating their potential residue in the environment. The Atlas of Health and Climate, published by the World Health Organization (WHO), reports that the linkage between the diseases and climate change is well demonstrated and that maps have been developed to identify areas at risk around the world. The costs of controlling so-called “environmental diseases” is projected to increase by USD 2-4 million per year by 2030. Diseases such as malaria, dengue, trypanosomiasis and others transmitted by vectors will threaten a further two billion people in addition to the present population by 2080. Prevention is key to avoiding these disasters and the LPF technology integrated in holistic health packages represents a successful step forward in responding to this priority in poor countries worldwide.

Knowledge generated

The project produced and shared its findings through reports, videos and various communication material (e.g. press releases on national press and TV, leaflets) to enhance the capacity of farmers and to promote the packages among policy-makers, development experts and other key stakeholders. Results in terms of knowledge management include development of training manuals, training course reports, technical reports, presentations given to international scientific conferences and institutions, and political audience, including donors. Results of impact of the LPF on animal health and production and on socio-economics were posted on the main FAO webpage reaching a worldwide audience. Some of the results can be assessed through the following links:

http://www.slideshare.net/dairyesada/livestock-protective-fence-lpf-for-enhanced-milk-production-and-mastitis-control-in-intensive-zerograzing-dairy-farms-in-kenyadr-rajinder-kumar-saini

https://www.youtube.com/watch?v=eD6Ve_SjW08

http://www.fao.org/3/a-i4397e.pdf

Lessons learned

The adapted packages were fine-tuned and replicated for wider dissemination in different agro-ecological systems and countries. Foundations were laid for different mechanisms geared towards effective dissemination to a wide range of end users. Such mechanisms included informing policy-makers of the project’s achievements through field visits, videos and media work, and the facilitation of institutional arrangements between partners. The effectiveness of LPF technology in target countries had a significant positive impact on animal health and productivity and on human health, helping to embrace the One Health concept and its potential regional and global impact. The fact that the LPF technology was tested in three different agro-ecological zones and in three different animal species provided the opportunity for a broad spectrum of replication. In Ghana and Kenya, the LPF was adopted by the national veterinary services indicating the opportunity for further replication of the technology in other Sub-Saharan countries. Considering the circumstantial evidence that malaria cases have been declining since project’s intervention in Kenya, the need for further investigation into the effects of LPF on human health, in partnership with WHO and the Ministry of Health, cannot be overstated. However, the need for further development of appropriate policies (e.g. registration and disposal of LPF nets) would be crucial in guiding future investments to further scale up the technology.

Way forward

The project was highly innovative in developing technology in partnership with the scientific and development communities, as well as the private sector. The LPF technology that was tested and adopted is quite simple and does not require significant know-how, unlike other vector and disease control strategies. It can be easily replicated in diverse agroclimatic conditions with different livestock species, and with a view to preventing animal and human diseases transmitted by vectors. The technology can be further applied for control of hygienic conditions of animal products, for instance with milk during milking process, and on farms, in villages schools, hospital and peri-urban areas, were nets can be used for fencing waste. In Kenya, local government and national officials see LPF as an integral part of their vector control strategies. The Government’s argument for scaling-up was strengthened by the changes to milk production in the target districts since the introduction of LPF. In Ghana, the Government included LPF in its development strategy for enhancing pig production in the country and earmarked part of its budget to the training of farmers and their linkage with the private sector to enhance the roll-out of LPF.

While considering the sustainability and the potential adoption of LPNFs, there is a lot to learn from the use of insecticide-treated nets (ITNs) for mosquito/malaria control. In this case mosquito nets are being spread both as public good (provided free of charge) and also through public-private partnerships but more importantly integrating ITN delivery with maternal and child health programmes (and immunization in particular). The use of ITNs are also part of the health policy in Sub-Saharan countries. This is a valid approach for the adoption of the LPNFs. In addition, it is important to keep in mind that LPNFs are being used/evaluated for protection of vegetables and are called Bionets or Agrinets.

In order for LPF to be rolled out in all sub-Saharan countries, it is important not only to enhance public-private partnerships with producers but also to take active steps to ensure the commercial registration of the product in all African countries. Appropriate policies for the disposal of LPF also need to be developed and disseminated with the product. In this regard, a document entitled "Disposal of Livestock Protective Fence (LPF) material" was produced. Further efforts are also needed to ensure increased adoption of this innovative technology together with different animal husbandry systems, in order to develop further integrated packages and disseminate them more widely among beneficiaries. Whatever the approach, major donor funding will be required as the project has just taken the first step. Moreover, further work needs to be undertaken to enhance awareness and at the same time working with the public and private sector in a complementary and supportive manner to ensure scaling up. Socio economic surveys have to be continued to give more information on the farmers' perception and adoption potential.

Grant linkages to IFAD investment projects:

- Small-scale Dairy Commercialization Programme, Kenya
- Sustainable Rural Development Programme and Community Investment Project for Agricultural Fertility, Burkina Faso

Links to grant documentation

- Grant Design Document: https://rms.ifad.org/OfficialRecords/OP2/FAO/001075/[0000121230]%2021-08-2008.pdf
- President Report: http://www.ifad.org/gbdocs/eb/95/e/EB-2008-95-R-42-Rev-1.pdf
- Project Completion Report: - https://rms.ifad.org/OfficialRecords/OP2/FAO/001075/[0000217593]%201085017.pdf
- Project website: http://www.fao.org/ag/againfo/programmes/en/paat/home.htm

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