

The small livestock advantage

A sustainable entry point for
addressing SDGs in rural areas

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Abbreviations and acronyms

ASFs	animal-source foods
FAO	Food and Agriculture Organization of the United Nations
GHG	greenhouse gas
IFAD	International Fund for Agricultural Development
LNWMGA	Lesotho National Wool and Mohair Growers Association
LFSS	livestock farmer field school
Mt	megatons
OECD	Organisation for Economic Co-operation and Development
POG	Pass on the Gift
PAFA	Project d'Appui aux Filières Agricoles (Agricultural Value Chains Support Project)
PROSALAFSA	Sustainable Rural Development Project for the Semi-arid Zones of Falcon and Lara States
RMLSP	Rural Microfinance and Livestock Support Programme
SDGs	Sustainable Development Goals
WAMPP	Wool and Mohair Promotion Project





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Introduction

This report presents selected achievements and lessons from the growing portfolio of small livestock investments supported by the International Fund for Agricultural Development (IFAD). The introduction summarizes IFAD's key messages on investing in small livestock development and gives an overview of IFAD-supported actions and the impacts of work with smallholders in developing countries.

“Human progress has been dependent on livestock products and services since at least the advent of agriculture and even the most modern post-industrial societies remain critically reliant on animals for food and nutrition security.”

Food and Agriculture Organization of the United Nations (FAO, 2018)

There is no universal and unique definition of “small livestock”, but in the context of this report the following species will be considered: poultry (chickens, geese, ducks, turkeys, guineafowl, pigeons and quail), swine, small ruminants, guinea pigs and rabbits.

Five case studies from the IFAD portfolio (on projects in Afghanistan, Lesotho, Nepal, Senegal and Venezuela) illustrate with concrete examples how IFAD is working to support smallholders. The final section presents some lessons learned from IFAD's support to the sector and looks ahead to the Twelfth Replenishment of IFAD's Resources and beyond.









The critical role that the small livestock sector can play in addressing, directly or indirectly, many of the challenges that the world is facing – such as extreme poverty levels for 689 million people living on less than US\$1.90 a day, 690 million people hungry (FAO, IFAD, UNICEF, WFP and WHO, 2020) and soils, freshwater, oceans and forests being rapidly degraded – has been widely recognized (FAO, 2018a). Even though the small livestock sector is facing rising challenges itself, including transboundary diseases, emerging infectious diseases such as COVID-19, the adverse effects of climate change, variable farm gate prices and antimicrobial resistance, it can strongly contribute to the achievement of the Sustainable Development Goals (SDGs). The small livestock sector has the capacity to provide adequate and reliable supplies of healthy and nutritious food, creating employment opportunities in the whole food chain, empowering rural women and young people, and strengthening households' financial, physical and social assets.

Since their inception, IFAD's investments in livestock have been guided by the objectives of (i) reducing hunger and malnutrition, (ii) empowering women and young people and (iii) providing a livelihood source for poor rural people. IFAD, given its goal of transforming rural areas and its experience in investing in smallholder farmers, has a central role in achieving SDG 1 (no poverty) and SDG 2 (zero hunger). IFAD's intervention approach with regard to livestock is strongly aligned with Target 2.1 (access to safe and nutritious food), Target 2.4 (sustainable food production systems) and especially Target 2.3: "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment." Moreover, IFAD is a leader in the use of innovative measures to promote rural women's empowerment and reduce inequalities, thus making a major contribution to SDG 5 (gender equality) and SDG 10 (reduced inequality).¹ By fostering inclusive, diversified and productive rural economies, IFAD also contributes to SDG 8 and, by investing in approaches to sustainable agriculture, to SDG 13 and SDG 15 as well.

Box 1 shows the contributions that the livestock sector makes to social, economic and environmental development and how IFAD is contributing to the SDGs through its investments in small livestock development.

1 <https://www.ifad.org/en/ifad-and-the-sdgs>

Box 1: Small livestock development and the SDGs

Goal	Contribution from small livestock development
 <p>1 NO POVERTY</p>	<p>Livestock, and in particular small livestock, represents an important asset of rural households and plays a fundamental role in achieving their livelihood objectives.</p>
 <p>2 ZERO HUNGER</p>	<p>The small livestock sector can (i) increase the direct consumption of animal-source foods (ASFs) and help generate income; (ii) support the creation of employment opportunities, thus enabling farmers to access from markets other foods such as fruit and vegetables that are not produced in their farms; and (iii) contribute to providing the world with sufficient and reliable supplies of meat, milk and eggs.</p>
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<p>The One Health approach, applied in designing and promoting livestock sector policies, strategies and actions, helps keep people healthy and production efficient (FAO, OIE and WHO, 2010).</p>
 <p>4 QUALITY EDUCATION</p>	<p>Consumption of ASFs improves children's cognitive and physical development as well as school attendance and performance (Neumann, Harris and Rogers, 2002). In addition, small livestock provides income to poor households that can be used to pay for schooling. Livestock farmer field schools (LFFS) can successfully develop livestock producers' critical analysis, decision-making and communication skills (FAO, 2018b), as well as their technical knowledge.</p>
 <p>5 GENDER EQUALITY</p>	<p>Through the small livestock sector, gender-responsive extension services and participatory training programmes for rural women can be developed, and access to land and productive assets, as well as to markets, credit and insurance, can be improved. Most of the time, investments in small livestock target women, since men tend to have more control over the larger animals for sociocultural reasons. This is therefore an important vehicle for women's empowerment and agency. In the case of large livestock, women provide the labour but have neither access nor control over the resources accrued.</p>
 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	<p>The small livestock sector contributes to the provision of clean, renewable energy by converting manure into biogas. Pigs, and to lesser extent poultry, provide excellent manure for biogas, especially in rural areas of many Asian countries.</p>
 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>Livestock production makes a major contribution to national economies worldwide. Globally, up to 1.3 billion people are employed in different livestock product value chains. Livestock production can boost economic growth in two main ways: through direct contribution to rural livelihoods and agricultural output, and, given the sector's various linkages with other industries, through the multiplier effects of livestock products moving along expenditure and supply chains (FAO, 2018a). The small livestock industry employs young people and women at various levels of the value chain: input supply, processing and value addition (including in the leather and mohair industries) to small livestock products.</p>
 <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	<p>The animal product processing industry is one of the fastest growing in emerging nations. The livestock sector provides opportunities for job creation, value addition, industrialization and more inclusive economic growth in the national economies.</p>

Goal Contribution from small livestock development



Pastoralism is a potent catalyst for smallholder income growth, with relatively low investment, input and labour costs. Small livestock development can be very effective in stimulating smallholder entrepreneurship and closing inequality gaps.



SDG 12 is concerned with sustainable consumption and production and aims to enable people to “do more and better with less”. Small livestock tend to have a low environmental footprint and can be consumed in a small number of sittings, thus reducing the need for preservation facilities.



The development of the small livestock sector can enhance the resilience of rural and pastoral communities to climate change and other shocks by incorporating climate change adaptation into the design of new livestock projects. The unsolved problem of land tenure in many countries often hampers the adoption of regenerative grazing management, through which goats and sheep could contribute to carbon sequestration. According to FAO,² on a commodity basis, while beef and cattle milk are responsible for the most greenhouse gas (GHG) emissions, respectively contributing 41 per cent and 20 per cent of the sector’s overall GHG outputs, small livestock products have a minor impact: pig meat, 9 per cent of emissions; chicken meat and eggs, 8 per cent; and small ruminant milk and meat, 6 per cent.



Livestock production can be instrumental in supporting sustainable rangeland management, preserving wildlife, and enhancing soil fertility, nutrient cycling and soil moisture retention.

IFAD’s first engagement in supporting investments in the small livestock sector dates back to 1988. During the 2010-2020 period, IFAD has invested in 111 projects with a component on livestock development (amounting to US\$567 million), most of them focusing on poultry and small ruminants.

IFAD-supported programmes have changed in both magnitude and focus. Nowadays, IFAD supports smallholder farmers in multiple areas, including protecting animal health, intensifying productivity in a sustainable manner, increasing the availability and accessibility of various services, and helping farmers link to profitable markets. Most IFAD-funded projects involve building capacity and knowledge and technology transfer through training and demonstrations, animal health services delivery, animal nutrition, feeding and breed improvement, good animal husbandry practices, credit for restocking and business development, processing, adding value to animal products and improving access to input and output markets. In addition, IFAD supports knowledge management activities and policy dialogue at country and regional levels on issues related to sustainable small livestock development.

2 <http://www.fao.org/news/story/en/item/197623/icode/>



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Rationale for investing in small livestock and key messages

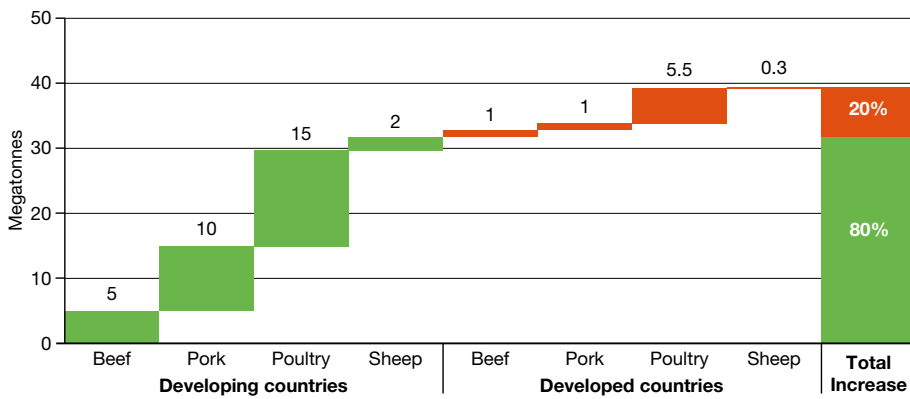
In the late 1970s, the combination of population growth, rising per capita incomes and progressive urbanization prompted a growing demand for ASFs in developing countries, which has been dubbed the “Livestock Revolution” (Delgado et al., 1999). This trend continued well into the next decades, affecting both livestock production systems and the world food economy.

According to the *OECD-FAO Agricultural Outlook 2020-2029* (OECD and FAO, 2020), global meat production is projected to expand by nearly 40 megatons (Mt) by 2029, and the bulk of this production growth is attributed to developing regions. Small livestock, and especially poultry and swine, represent the primary driver of growth in total meat production among smallholders because of the low costs, the short production cycle and the high feed conversion ratios.

Meat consumption volumes are also projected to increase in developing regions by approximately five times more than in developed countries.

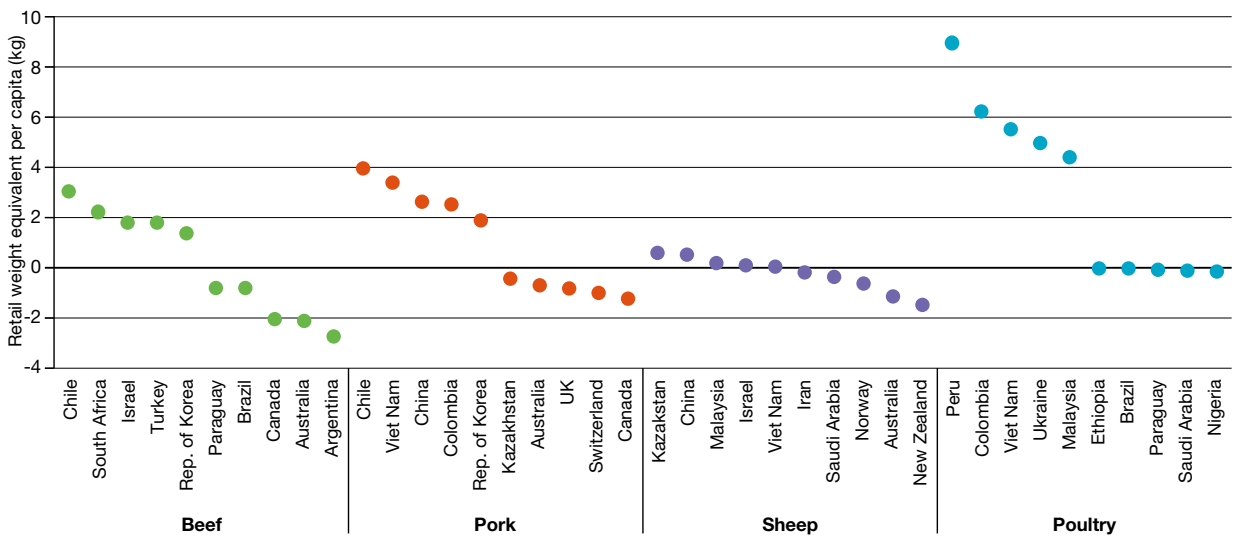
Poultry meat consumption is expected to increase globally to 145 Mt by 2029, with poultry expected to account for 50 per cent of the additional meat consumed because of its significant role in the national diets of several populous developing countries, including China and India. Global pork consumption is projected to increase to 127 Mt over the next 10 years and to account for 28 per cent of the total increase in meat consumption. Finally, global sheep meat consumption is projected to increase by 2 Mt by 2029, accounting for 6 per cent of the additional meat consumed. However, in many Middle Eastern and North African countries, where sheep meat is traditionally consumed, per capita consumption is projected to continue its long-term decline to the benefit of poultry (OECD and FAO, 2020).

Figure 1: Growth of meat production by region and meat type (2029 versus average 2017-2019)



Source: OECD and FAO (2020).

Figure 2: Top five countries by increased and decreased per capita consumption of different meat types (2029 versus average 2017-2019)



Source: OECD and FAO (2020).

According to the OECD-FAO report, world milk production (81 per cent cow milk, 15 per cent buffalo milk, and 4 per cent goat, sheep and camel milk) grew by 1.3 per cent in 2019 to about 852 Mt. World milk production is projected to grow by 1.6 per cent over the projection period (to 997 Mt by 2029, faster than most other major agricultural commodities). India and Pakistan are expected to contribute more than half of the growth in world milk production over the next 10 years. In Africa, strong production growth is expected, mostly due to larger herds; these will usually have low yields via low-input systems, and a considerable share of milk production will come from goats and sheep.

World per capita consumption of fresh dairy products is projected to increase by 1 per cent over the coming decade. The share of fresh dairy products in world consumption is expected to increase over the coming decade as a result of strong demand growth in India, Pakistan and most African countries, driven by income and population growth (OECD and FAO, 2020).

Global egg production has been rising lately, and the latest figures from FAO suggest a 24 per cent increase in the past decade, from 61.7 million tonnes in 2008 to 76.7 million tonnes in 2018, with China leading the way and representing 34 per cent of the global market.³ China is followed by the European Union, the United States and India, and these four produce almost 60 per cent of the world's eggs.

The market pull created by this increasing demand creates a formidable market opportunity for smallholder producers. However, one of the major limitations of smallholders is the inability to comply with emerging food safety and quality standards because of their limited access to productive inputs, services and knowledge, which may restrict their participation in domestic as well as global markets. The national production systems need to support smallholders with adequate policies and incentive systems to be able to respond to this increasing demand.

3 <https://www.poultryworld.net/Eggs/Articles/2020/6/Global-egg-production-continues-to-rise-604164E/>



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Key message 1: Small livestock contributes to household food and nutrition security

Small livestock provide smallholders with milk, meat, eggs, wool and manure, making an important contribution to household food and economic security, and playing significant economic and social and cultural roles.

Small livestock contributions to food availability are both direct, by supplying nutrient-rich and affordable products for human consumption, and indirect, by enhancing crop, vegetable and other livestock production through the provision of manure and pest control (Wong et al., 2017). Small livestock also contribute to food accessibility, since the increased income allows households to procure from market other foods that they do not grow in their farms, such as fruit and vegetables.

ASFs are a valuable source of complete, high-quality and easily digestible protein, and they contain bioavailable iron, zinc, calcium, vitamin A and vitamin B12 (Enahoro et al., 2018). Even though ASFs are an important component of diverse diets, their consumption varies widely. For example, annual meat consumption ranges from less than 4 kg per person in some countries to more than 100 kg per person in others (FAO, 2020). Poor people often consume little or no ASFs for various reasons, including poor availability, lack of accessibility and dietary patterns that may result from customs, religious taboos or lack of knowledge about the nutritional importance of ASFs.

Eggs and milk are highly nutritious; in particular, eggs have all the nutrients required to support the development of a chick, and it is believed they have a nearly perfect balance of nutrients to meet human nutrition requirements (Vizard, 2000). Similarly, meat and edible offal contain high-quality proteins and important fatty acids, which can be monounsaturated, saturated or polyunsaturated.

ASFs, as the only natural providers of vitamin B12, are important for human nutrition throughout the entire life cycle, and even more so during particular phases of it, for healthy growth, development and functioning. Young children, for example, require foods that provide nutrients more efficiently since they have smaller stomachs. Moreover, nutrition affects both morphological and biochemical processes in the brain; therefore, nutrients that can be found in ASFs, such as iron, zinc, vitamin B12 and choline, are key for cognitive development and maternal nutrition (Goyal, Iannotti, and Raichle, 2018). It has been demonstrated that regular ASF consumption has significant positive effects on children's nutritional status, linear growth and educational outcomes, leading to increased income and productivity in adulthood (Murphy and Allen, 2003). In ageing adults, ASFs help in preserving memory, bone health, muscle mass and various other functions (Lonnie et al., 2018).



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Key message 2: Small livestock contribute to household economic security

Small livestock are instrumental for poor farmers in their path out of poverty; they are considered a key financial asset that can be sold to fulfil immediate cash requirements and meet basic household needs such as food, medicines and school fees. Small animals and poultry, rather than larger animals, are often the livestock of the rural poor because they require fewer inputs (land, feed, time, etc.), they are more prolific and offer a faster return on investment by having a higher turnover (Ampaire, 2011). Small livestock are often used to accumulate assets; farmers may have few animals, but when the herd/flock increases they can be sold to purchase more expensive animals that they could not otherwise have afforded (Nwafor, 2004). Livelihoods or income can also result from the sale of processed and added value products such as yoghurt, cheese and processed meats; these processed foods help to bridge food availability, especially during lean seasons.

Extensive poultry systems are most commonly found in rural, resource-poor areas (Gilbert et al., 2015). Poultry, being among the most affordable livestock, may be used to build a household's asset base or provide income in times of need. Moreover, poultry is an important resource for the most vulnerable people, such as those living with a disability or those affected by chronic illness, because they have minimal care requirements.

Box 2: Economic impact of IFAD-funded projects supporting small livestock

A recent impact assessment (Garbero, 2018) projected that 44 million beneficiaries will see positive gains in poultry asset ownership (28.8 million) and other livestock asset ownership (22.8 million). This is out of an overall beneficiary population of approximately 240 million reached by IFAD-supported projects that were either closing or ongoing between 2010 and 2015. A joint IFAD-International Goat Association study (Miller et al., 2012) revealed that the net income before labour cost increased to US\$240-340 per family in India, Nepal and Tajikistan and to US\$2,000-11,500 per family in Argentina, Brazil, Mexico, Morocco and Venezuela after an IFAD project intervention on goat development (during the period 2011-2013). In Rajasthan (where the imGoats project was implemented), resource-poor goat rearers earned 250-300 per cent higher incomes from goat rearing only by adopting improved goat management practices, improving herd size and engaging in goat rearing as an enterprise. In Mauritania (through the Programme for Poverty Reduction), on the basis of reports and the testimonies of the beneficiaries, an increase in production of approximately 500 tonnes of white meat a year (for a value of US\$1.5 million) was registered in the project area. In Senegal, through the Agricultural Value Chains Support Project (Project d'Appui aux Filières Agricoles – PAFA), a total of 1,966 women poultry producers have marketed 1,100,960 chickens.⁴

Source: IFAD (2019).

4 Internal communication, IFAD.



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Key message 3: Small livestock are gender-sensitive

Small livestock are important assets and sources of income for both women and men in developing countries, but they can make a crucial contribution to women's empowerment and gender equality, since women are more likely to be the owners of small livestock, while men tend to own large livestock.

In most IFAD projects, integrated home gardens are an entry point targeting women of reproductive age, and sometimes pregnant and lactating women in particular. Integrated homestead food production is considered to be a nutrition-sensitive, pro-poor and women-controlled approach to household food production; it includes vegetable and fruit gardens, backyard livestock-raising and small fish ponds. Home gardens are used mainly for the cultivation of vegetables and fruit trees, and often integrate one or two dairy cows or buffalo, and small animals such as poultry, pigs, goats (especially dairy goats), sheep, rabbits and guinea pigs (IFAD, 2015). This type of food production can enhance poor rural people's access to a variety of nutritious fresh foods grown in close proximity to their households and therefore is a means for women and their children to access a nutritious diet.

A recent study on the contribution of small ruminants to food security showed that women prefer small livestock because of their more direct role in food security (Wodajo et al., 2020). Indeed, small livestock can be sold or exchanged to fulfil immediate cash requirements and, through meat, milk and eggs, it provides nutritious food for household consumption. Moreover, its production has short reproductive cycles and high reproductive rates to ensure sufficient food resources and income for the family. Moreover small livestock species are very resilient to extreme weather conditions, making them a stable asset for the household. Finally keeping small livestock such as poultry does not usually conflict with women's other household duties. In places where religious beliefs or social norms require women to stay in their homes or villages, keeping poultry or other small livestock in the household makes a convenient income-earning activity. Indeed, the preference for small livestock among women is in some country contexts driven by sociocultural issues, with men preferring large animals because of their higher value and women having limited access to or control over them.

Several studies show that small livestock are often reared under the complete control of women, which not only increases their empowerment but also enhances household food and nutrition security (Wong et al., 2017). Even in male-headed households, women are often responsible for decision-making on issues related to small livestock, especially regarding poultry production and sale. Income from the sale of small livestock products is often the main source of income for women and for female-headed households, whereas male-headed households usually have multiple income sources. Moreover, evidence shows that women's income leads to improvements in household health, education and nutritional status, and thus to higher food security levels. Indeed, it has been found that 90 per cent of income under the control of women is invested back into their households, in contrast with only 30-40 per cent for men, and that women use their income to increase the quantity and variety of foods purchased, for medical care and for schooling for their children (OECD, 2009).

Box 3: Women and livestock in Asia

Women make up not only around 70 per cent of the resource-poor but also the majority of poor livestock keepers. According to an extensive study by the International Livestock Research Institute, of the 600 million poor livestock keepers in the world, around two thirds are women and most live in rural areas. In Asian intensive livestock systems, more than three quarters of livestock-related tasks (feeding, taking care of young and sick animals, milking, etc.) are the responsibility of women. In India, the livestock industry is dominated by women, who provide 55 per cent of employed livestock-farming labour and more than 77 per cent of the work involved in taking care of animals. Furthermore, 93 per cent of people employed in dairying are women.

In Pakistan, poultry, sheep and goats are often the only source of income for women and are fully controlled by them. Women are responsible for 60-80 per cent of the work involved in feeding and milking cattle. A rural woman works 15.5 hours a day, spending 5.5 hours on caring for livestock but only 50 minutes on caring for her children.

Although the role of women in livestock production is, then, at least equal to that of men, their contribution and perspectives have remained underestimated, undervalued and widely ignored.

Source: FAO (2012).

Box 4: Women's groups and the Pass on the Gift mechanism

The Pass on the Gift (POG) system, promoted by Heifer International and implemented in several IFAD-funded projects around the globe, is a very good example of the women's empowerment potential of small livestock in poor rural societies.

POG is a hallmark of Heifer's approach and helps to empower beneficiaries, multiply project impact and strengthen community-wide resilience. POG requires that every Heifer project beneficiary pass on the livestock offspring, inputs, training and practical skills they gained from the project to others in their community.

The practice helps to empower community members, transforming them from the position of beneficiaries to donors as they pass on key inputs to other community members in need. POG also helps shape beneficiaries to be technical resources, as they help to disseminate improved practices and knowledge that they have gained from the project throughout their communities.

POG multiplies project impact by reaching new beneficiaries who may not have been originally targeted by the project. Examples of how farming families have implemented the POG idea demonstrate the immense imagination and generosity of the partner communities. In Haiti, project beneficiaries in Favette passed on offspring from their project-provided goats and chickens, as well as knowledge from their hygiene and sanitation training. This practice, at a minimum, doubles the impact of the original gift.

Another example is the Sustainable Agriculture Production Programme carried out by IFAD in Malawi, which made use of the POG mechanism to pass goats and chickens on to subsequent beneficiaries. Primary beneficiaries got 10 chickens (nine pullets and one cock) or five goats (four does and one buck). The primary beneficiaries who received chickens passed on to two secondary beneficiaries, each of them getting 10 chickens, with the same classification as the primary beneficiaries. On the other hand, the primary beneficiaries who received goats passed on five goats with the same classification to one secondary beneficiary. This process continues from secondary beneficiaries to third beneficiaries and so on. The Household Approach Assessment showed an increase in the proportion of households owning livestock. For example, Chiradzulu, Chitipa and Lilongwe registered increases 72 per cent, 62 per cent and 56 per cent, respectively, in household goat production. For chickens, Chitipa, Chiradzulu and Lilongwe registered increases of 100 per cent, 73 per cent and 67 per cent, respectively.⁵

In addition to empowering communities and multiplying project impact, POG helps to strengthen the overall resilience of smallholder farmers and their communities. Passed on gifts often offer both short-term and long-term benefits, improving food security and increasing incomes. For example, as project farmers graduate through a programme and pass on gifts such as new chicks, they help other farmers gain access to eggs for consumption, to strengthen their food security, and provide critical assets to help launch new agribusinesses for a new cohort of farmers.

Source: Heifer International (2019).

5 IFAD, *SAPP 2020 progress report* (internal document).



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Key message 4: Small livestock strengthen rural people's resilience to climate change

Livestock production contributes to climate change, and at the same time it is increasingly challenged by its impacts. Indeed, climate change affects livestock production in myriad ways, both directly, through impacts on livestock performance, and indirectly, through impacts on the environment, society and economy. Impacts will be experienced on forage yield, livestock productivity, ecological processes and farm-level profitability, possibly leading to changes in regional and national food production and incomes (World Initiative for Sustainable Pastoralism, 2010). The repercussions of climate change on the livestock sector will show themselves in changes in the quality and quantity of vegetation, in the reduced availability of fodder and water, and in an increase in climate change-induced diseases.

The small livestock sector has huge adaptation potential; sheep and goats transform rangeland plants that are useless to other livestock and humans into food for human consumption and for people living on marginal or infertile land (World Initiative for Sustainable Pastoralism, 2010). Pastoralists provide "valuable ecosystem services in a wide range of landscapes such as maintaining high levels of biodiversity, increasing vegetation soil cover, reducing erosion, preventing wildfires, maintaining infrastructures, dispersing seeds, allocating nutrients, and defragmenting landscapes" (Herrera, Davies and Manzano Baena, 2014). In fact, pastoralism supports several hundred million households in marginal, less productive lands, and pastoralists themselves are able to produce food where farmers cannot.⁶

Productivity improvements to reduce emission intensities and build resilience can be achieved through breeding, improved feed and nutrition, and measures for animal health and husbandry (FAO, 2017).

6 Pastoralism Knowledge Hub, 2016.

The mitigation of climate change could also be stimulated by selecting the more productive livestock and by improving traits such as live weight gain, milk yield and fertility.

Feed quality can be improved through better grassland management, improved pasture species, forage mix, feed processing and the strategic use of supplements, preferably those available locally. GHG emission intensities will also be reduced through improvements in reproductive animal efficiency and reduced incidence and impact of diseases, parasites and insect burdens (FAO, 2017).

Regarding climate adaptation, small livestock have a great adaptive capacity. For instance, small ruminants are able to overcome the direct and indirect effects of heat stress thanks to a wide range of adaptive responses, such as reduced feed intake and rumination time and frequency that counteract the effects of heat and maintain thermal equilibrium (Joy et al., 2020). Their adaptation capacities and tolerance for rising temperatures are demonstrated by the fact that around 50 per cent of the world population of sheep and goats is found in the arid regions of the world (Gowane et al., 2017). Moreover, small ruminants emit less GHGs per kilogram of meat than large ruminants. The average emission intensity for products from ruminants were estimated at 2.8 kg, 3.4 kg and 6.5 kg of CO₂ equivalent per kilogram of fat and protein corrected milk for cow milk, buffalo milk and small ruminant milk, respectively, and 23.8 kg, 46.2 kg, 53.4 kg of CO₂ equivalent per kilogram of carcass weight for small ruminant meat, beef and buffalo meat, respectively (Opio et al., 2013).

Small ruminants can also adapt very well to water-limited areas, and, because of the increasing threats to water sustainability and availability posed by climate change, a shift from large to small ruminant production is taking place, especially in regions with low rainfall.

Over 56 per cent of the world's small ruminants are located in water-limited and dry zones in developing countries, whereas temperate and humid zones account for 27 per cent and 21 per cent, respectively (Marino et al., 2016). It is indeed for their ability to tolerate intermittent watering without heavily compromising production that small ruminants have an increasingly crucial role in enhancing rural people's resilience to a changing climate (Akinmoladun et al., 2019).

This capacity to withstand climatic shocks, combined with the fact that small ruminants are often associated with other agricultural activities in rural production systems, confers on small ruminants an essential role in reinforcing the resilience of the whole agricultural system, since they are used as a diversification strategy and to manage the risk of crop failure.

Small-scale poultry, for its part, is a year-round source of food. Indigenous poultry are hardy, well-adapted to their environments and genetically diverse; therefore they have the highest likelihood of survival in harsh conditions. Village poultry have greater disease resistance, a strong ability to scavenge and avoid predators, and high levels of broodiness, which all improve their survival rates (Wong et al., 2017). Indigenous poultry also have low carbon and water footprints because they do not require land clearing for production and their manure contributes to soil health (Chantalakhana, 2000).

Box 5: Role of small ruminants in overcoming food shortages in southern Madagascar

Southern Madagascar's agricultural production systems are characterized by severe episodes of drought, occurring every 3 to 5 years, creating temporary food shortages during the few weeks or months preceding the harvest. These episodes are known locally as "kere".

Small ruminants are a very important component but not the cornerstone of the production systems, which are mostly based on food crops. The role of small ruminants is to support and reinforce the rest of the system by playing a safety net role and helping families to cope with kere. Small ruminants and poultry are gaining importance for households, as they reproduce more quickly than large ruminants and are generally more resilient than zebu cattle, and thus help to restore depleted herds.

When kere occurs, the household can sell a part of the flock to buy enough food to make it through the critical period. During the few years that follow and precede the next episode of drought, the flock can be naturally restocked or, if the upcoming harvest is good enough, some animals may even be purchased after the harvest to reconstitute the flock.

Source: World Bank 2018



Case studies

The five case studies in the following pages present further examples of IFAD's approaches to and achievements in promoting food, nutrition and economic security for resource-poor rural women and men through investments in small livestock. The case studies have been selected from ongoing and recently completed IFAD investments in different countries because they demonstrate how IFAD's support for sustainable livestock development can deliver benefits in all of its mainstreaming areas: gender equality, youth, environment and climate change, employment, and food and nutrition security.

In the Asia and the Pacific region, the Rural Microfinance and Livestock Support Programme in Afghanistan illustrates how a combination of investments in the smallholder dairy and poultry sectors, and the provision of animal health and livestock services, succeeded in promoting local economic development.

In Nepal, the Improved Seeds for Farmers Programme demonstrates how IFAD has been creating sustainable productivity improvements through market-led demand for improved seeds and livestock, increasing national crop and livestock productivity.

The Wool and Mohair Promotion Project in Lesotho shows how to promote a sustainable system for climate-resilient management of grazing and rangelands through the introduction of climate-change adaptation measures in the value chain.

The Agricultural Value Chains Support Project in Senegal reveals the potential of a value chain approach to boost the production capabilities of participating households and encourage them to diversify their livelihood sources.

In the Latin America and Caribbean region, the Sustainable Rural Development Project for the Semi-arid Zones of Falcon and Lara States in Venezuela resulted in increases in agricultural production and local productivity through the introduction of appropriate agricultural techniques, such as goat management and cultivation practices in semi-arid areas.



Afghanistan: promoting local economic development through greater access to financial and animal health services

Key facts

Project name	Rural Microfinance and Livestock Support Programme
Dates	2009-2016
Financing	IFAD, domestic financing institutions
Targeting	Small-scale farmers and livestock keepers who have or aspire to have land and/or livestock; women, particularly women who are heads of households; and resettled or nomadic Kuchi pastoralists.
Programme objective	Among the objectives were to shape policies facilitating access for the poorest rural people to microfinance services, promote models of public-private partnership in the delivery of livestock extension and veterinary services, and reach out to nomadic Kuchis.

The sustainable development challenge

Afghanistan's population is one of the poorest in the world. When the Rural Microfinance and Livestock Support Programme (RMLSP) was designed, the country ranked 181st out of 182 countries according to the Human Development Index.⁷

7 <http://hdr.undp.org/en>

The conditions of hardship and insecurity still endured by most Afghans are the results of nearly 30 years of conflict that began with the Soviet invasion in 1979. With 75 per cent of the population living in rural areas and relying on the agriculture sector, the major issues Afghanistan had to face were (i) a lack of financial services; (ii) a lack of productive assets; and (iii) destruction or damage to agricultural production systems and infrastructure. During the design of this IFAD intervention, it was estimated that up to 70 per cent of the population experienced food insecurity, while 38 per cent faced chronic food shortages.

Even though in Afghanistan livestock has always represented a major source of cash income, over the past 20 years livestock numbers have reduced by 40 per cent among settled owners and by 60-70 per cent among the Kuchis (nomadic owners) as a result of persistent droughts and disruption of grazing routes due to insecurity and conflict.

Nowadays, the number of small ruminants in the country is estimated to be around 15 million, mostly sheep and goats. However, Afghans still have to face several challenges hampering the development of the small livestock sector, such as inadequate access to good-quality vaccines and animal health services, and overgrazed rangeland that has reduced animal productivity.

IFAD action

The RMLSP was the first IFAD-financed programme in Afghanistan. It was initially expected to reach completion in 2013, but an additional grant of US\$6 million was approved with a 3-year extension. The aim was to provide smallholders with access to credit and improve livestock health and rearing skills to enable increased productivity and incomes. The main institutional actors involved were the Ministry of Finance and the Ministry of Agriculture, Irrigation and Livestock; grassroots programme activities were carried out by FAO, the International Center for Agricultural Research in the Dry Areas and the Microfinance Investment Support Facility for Afghanistan; the Dutch Committee for Afghanistan was in charge of the veterinary services in the livestock development component.

The project was designed to invest in the smallholder livestock community through a combination of technical packages and advisory services, with the aim of gradually improving their creditworthiness. Moreover, to cope with low livestock productivity and poor marketability of products, owing to the lack of any processing and marketing infrastructure, the programme succeeded in establishing a network of five milk collection points and a dairy plant. The programme provided almost 235,000 livestock owners with access to animal health services through 30 supported veterinary field units, thus contributing to improving animal husbandry practices and animal health. Finally, 6,000 women were provided with basic poultry input and training, while almost 1,500 were provided with dairy goat production input.

The programme reached almost 1.7 million people. RMLSP expanded the range of available financial services so that poor rural households could have greater access to these services, allowing for more investment in productive activities, leading to increases in agricultural productivity and/or production and household incomes.



©IFAD/DCA (Dutch Committee for Afghanistan)

Among the financial products implemented there were (i) Sharia-compliant loans to overcome the prohibition of usury⁸ in Islam; and (ii) microfinance products for male and female livestock owners and farmers, such as loans to help farmers purchase feed during the winter or products to finance preventive measures in livestock production (e.g. vaccination and restocking of herds). At project completion, almost 40,000 households had gained access to rural financial services. Finally, a financial graduation programme was developed to provide households that had lost their livestock because of drought with development services to facilitate consumption stability.

Impact

The 2018 project evaluation carried out by the Independent Office of Evaluation affirmed that investments in the smallholder dairy and poultry sectors, and the provision of animal health and livestock services, had succeeded in promoting local economic development. The RMLSP pioneered the targeting of the ultra-poor approach through the Microfinance Investment Support Facility for Afghanistan. It has been particularly relevant to the context, as it helped beneficiaries who had previously been excluded from borrowing from microfinance institutions, allowing them to access these institutions through the use of innovative models. The targeting of the ultra-poor approach was scaled up by the World Bank and the Italian Development Cooperation and was also used in two other IFAD-financed projects, namely the Community Livestock and Agriculture Programme and the Support to National Priority Programme 2.

8 The action or practice of lending money at unreasonably high rates of interest.

The newly implemented rural finance products reached a total of 39,393 households, exceeding the revised target of 12,000 households. Specifically, almost 83 per cent of the loans provided were used by smallholders for investment purposes, including business expansion, or for the purchasing of farm inputs. The microfinance subcomponent of RMLSP not only increased access to and the reach of rural finance services but also provided the opportunity to incubate and develop a number of innovative loan products, such as Sharia-complaint loans, which helped the microfinance sector to offer a wider range of acceptable and sustainable financial services in rural areas.

Concerning livestock health and productivity, the project, thanks to the improved veterinary services, succeeded in reducing livestock mortality rates by 50 per cent. The veterinary field units and related extension services reached a total of 234,000 livestock owners; 4,200 extremely poor beneficiaries were supported with subsidized deworming campaigns; and, finally, almost 12,000 Kuchi households received veterinary services. Moreover, the improved rural poultry model scaled up in the project had a positive impact in contributing to the social and economic empowerment of women, and it has been applied in subsequent IFAD projects (the Community Livestock and Agriculture Programme and the Support to National Priority Programme 2).



Lesotho: supporting increased production and productivity of superior quality wool and mohair fibre

Key facts

Project name	Wool and Mohair Promotion Project
Dates	2015-2022
Financing	IFAD, the Organization of the Petroleum Exporting Countries Fund for International Development, the Adaptation for Smallholder Agriculture Programme, the private sector, local and national governments
Targeting	Smallholder farmers with the potential to increase the productivity of their sheep and goats through enhanced resilience to climate change; poor rural dwellers with access to the value chain through value-adding activities, or with the potential to become producers; and poor rural dwellers, especially women and young people, whose skills in textile and garment production for niche markets can be enhanced.
Programme objective	Boosting resilience to the adverse effects of climate change and economic shocks among poor rural people across the country.

The sustainable development challenge

Lesotho is a country highly reliant on rain-fed agriculture for food production, and therefore its agricultural economy is strongly vulnerable to climate-related challenges. Agriculture, and in particular livestock production, is a source of income for about

60 per cent of the population. A large share of livestock is reared for the production of wool and mohair, which makes the industry a significant contributor to agricultural gross domestic product. Consequently, the industry plays a crucial role in the livelihoods of around 250,000 households, whether directly or indirectly through participation in affiliated commodity chains (Ad Hoc Committee on the Wool and Mohair Industry, 2019).

Since wool and mohair production is predominantly in the hands of women and men smallholder farmers in the mountainous areas of the country, the sector is a major source of income generation for rural communities and, at the same time, holds considerable potential to alleviate rural poverty and food insecurity in Lesotho. The production of wool and mohair in Lesotho has a long history, and records of Basotho farmers raising merino sheep and angora goats date back as far as the 1860s (Hunter, 1987). Particularly in the mountains, sheep and goat herding has always been the main economic activity, and thus the rural people's subsistence has essentially been derived from wool and mohair marketing.

With over 1.6 million sheep and 909,000 goats (Lesotho Bureau of Statistics, 2020), Lesotho's wool and mohair industry has the potential for value addition, catering to higher value niche markets. Market opportunities and the quality aspects of existing cottage industries can be enhanced while providing greater economic and employment opportunities for women and young people in the mountain areas. Merino wool is the leading commodity exported by Lesotho, and the country is the second largest producer of mohair after South Africa, producing 14 per cent of the global output. The total export volume of both commodities reached over 6.6 million kilograms in 2017, of which wool made up around 88 per cent.⁹ However, factors such as overgrazing, land degradation, poor management practices and climate change had caused a decline in production and productivity in wool and mohair value chains, thus seriously threatening the livelihood of Lesotho's farmers.

When the project was designed, the country's extensive rangelands were estimated to be overstocked with cattle, horses, donkeys, sheep and goats by 40 to 80 per cent, thus resulting in increasingly poor sheep and goat productivity, poor reproductive performance, and low yields of wool and mohair. Degraded rangelands were even more sensitive to climate hazards because of poor water infiltration capacity and excessive water run-off.

Besides land degradation, the decreased productivity of wool and mohair value chains was also triggered by the high mortality rates of the animals. The main causes were poor nutrition, restricted access to improved genetic material and vaccines, poor animal health and limited capacity of livestock extension services. Among the major concerns for animal health was anthrax which is a highly climate-sensitive disease: increased rain intensity is able to unearth anthrax spores from previously buried anthrax-infected carcasses, thus contributing to the spread of the disease.

9 Exports all countries by selected commodity codes 2017, United Nations COMTRADE database: <https://comtrade.un.org/data/> (accessed 14 July 2020).



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IFAD action

The Wool and Mohair Promotion Project (WAMPP) was introduced in 2015 and will end in 2022; it has the target of reaching 185,000 beneficiaries. Its goal is to boost the resilience of smallholder wool and mohair producers in Lesotho, enhancing their ability to cope with climate change and enabling them to generate higher incomes and more sustainable livelihoods. The implementing organizations include government ministries, the private sector, NGOs and farmers' organizations, such as the Lesotho National Wool and Mohair Growers Association (LNWMGA). The LNWMGA is the largest farmer association in the country, and its members rear more than 1.3 million sheep and 487,000 goats, making them the biggest producers of wool and mohair in Lesotho (Lesotho Wool Centre, 2020).

The project aims to increase the quantity and quality of wool and mohair produced through improved livestock production and management thanks to activities focusing on overcoming challenges related to feeding, breeding and animal health, in order to raise production standards and maximize returns. The project enhances the current capabilities of smallholder sheep and goat producers to understand and apply productive feeding regimes through training on forage production and research trials on improved forage species and by setting up a supply chain for bulk cereal grains. To overcome the challenge of acquiring good-quality breeding rams and bucks for producers' flocks, the project is rehabilitating two breeding centres and establishing a National Programme for Merino Sheep and Angora Goat Breeding. Finally, community animal health workers are being trained across the country to address the deficiency in veterinary services and improve the health of the animals. Moreover, disease prevention and treatment calendars for sheep and goats have been developed and epidemiological studies on the incidence

and least-cost control of parasites are planned, with the aim of developing a climate change animal health vulnerability map.

The project also increases market returns from wool and mohair production and processing for livestock producers through improving the quality of the fibre, while stimulating a niche cottage industry for wool and mohair tapestry products and providing a market outlet for unproductive animals that need to be removed from the rangeland.

Finally, in relation to increasing farmers' ability to cope with climate change, WAMPP aims to promote a sustainable system for climate-resilient management of grazing and rangelands through the introduction of climate change adaptation measures in the value chain. At the design phase, approximately 200 grazing associations were expected to be supported to establish a community-based rangeland management system to address the causes of rangeland degradation, while farmers have already started receiving weather updates via text message on their mobile phones.

Impact

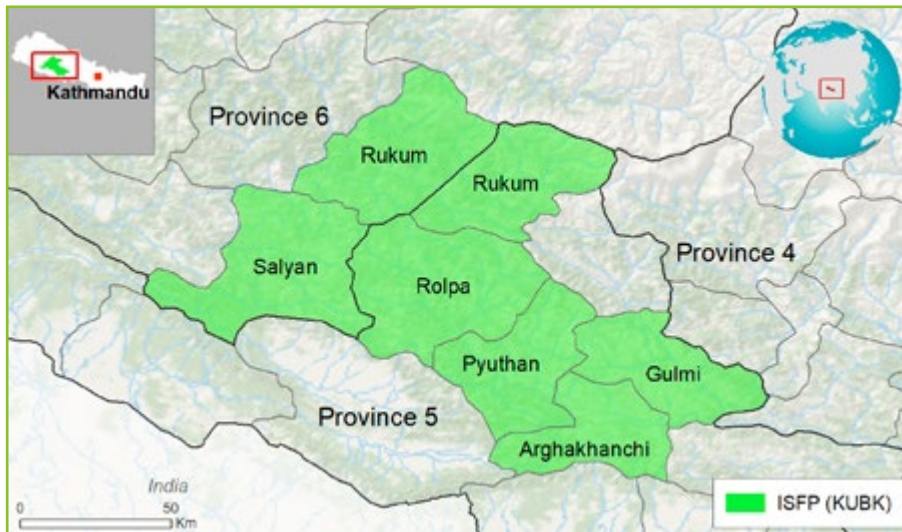
The mid-term review mission, conducted in 2019, reported significant advances in terms of increased livestock production (goats and sheep were procured for the national elite breeding flock and community animal health workers were trained) and value chain development (farmers were trained in income-generating activities or business management, and 22 shearing sheds and 20 km of roads were constructed).

The project is expected to achieve the following impacts: (i) a reduction in the prevalence of child malnutrition from 39.2 per cent (in 2009) to 32.7 per cent at project completion; (ii) climate resilience increased for 200,000 poor household members; (iii) assets ownership index improved for 50,000 households; (iv) degradation of mountainous rangelands reduced by 10 per cent on baseline; (v) hunger period reduced by 50 per cent for 25,000 households; and (vi) income improved by 50 per cent in 50,000 households.

The WAMPP activities are strongly contributing to increased agricultural productivity; significant increases in wool and mohair quality and quantity have been achieved as has improved breeding stock. The WAMPP rehabilitated two breeding centres and established a national elite breeding stock, currently consisting of 870 sheep and 220 goats. Through a culling and exchange programme to substitute unproductive sheep and goats with quality breeding stock, established in 2019, the WAMPP will contribute to ensuring the sustainability of the sector and improving the quality of wool and mohair. As a result of project interventions such as affordable feed and medical drugs, farmers can now harvest around 3.5 kg of wool per sheep, and around 0.85 kg mohair per goat, surpassing Lesotho's average yields of 2.63 kg and 0.75 kg, respectively. Both wool and mohair yields performed very well against the project design target range of 2.64 kg to 3 kg and 0.75 kg to 1.0 kg for wool and mohair, respectively, in less than 3 years of project implementation, in contrast to the 7-year goal.

Moreover, the mid-term review stressed that adaptation to climate change is being successfully implemented, not only because of the project's strong focus on adaptation and climate resilience but also thanks to the several measures taken to improve the resilience of local communities, such as the establishment of national rangeland monitoring systems. So far, 7,489 individuals (of which 55.8 per cent were women) and 158 community groups (with a total of 7,881 members, of which 52.2 per cent were women) have been engaged in natural resource management and climate risk management activities and in training on formulating environmental management plans.

The WAMPP is also succeeding in gender equality: most project activities have involved the participation of men, women and young people, especially with regard to training activities. The Participatory Integrated Climate Services for Agriculture training sessions had 65 per cent women participants, while the community animal health worker training sessions had more than 30 per cent women participants. Moreover, the establishment of new grazing associations offers an opportunity for WAMPP to increase outreach to women, including to encourage them to participate in leadership positions. The project aims to reach, by its completion, 32,000 women-headed households.



Nepal: agricultural growth accelerated by improved livestock and crop productivity

Key facts

Project name	Improved Seeds for Farmers Programme (<i>Kisankalagi Unnat Biu-Bijan Karyakram</i>)
Dates	2012-2019
Financing	IFAD, Heifer International, Government of Nepal and beneficiaries
Targeting	Groups and cooperatives engaged in seed and livestock production or the provision of financial services, and individual farmers adopting the improved seeds resulting from the programme, for a total of 150,000 households targeted.
Programme objective	Creating sustainable productivity improvements through market-led demand for improved seeds and livestock with the aim of testing and scaling up an agriculture-led growth model.

The sustainable development challenge

Nepal has just been reclassified from a low-income country to a lower middle-income country, according to the World Bank.¹⁰ Agriculture is central to the national economy, with nearly 80 per cent of all households (3.4 million) and two thirds of the national labour force highly reliant on the sector for their livelihoods. Livestock is important

¹⁰ <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

throughout the country, particularly in the mountain zone, with estimated national populations of 8.5 million goats, 4.7 million cattle and 4.7 million buffalo in 2009. An estimated 65 per cent of all agricultural households held both goats and cattle. Despite the widespread distribution of livestock, earnings in Nepal from livestock production are low. Moreover, the livestock sector mostly suffers from inadequate nutrition, poor genetic quality and inadequate advisory services. The dairy sector has also suffered from the scattered nature of milk production; large dairies often either operate at half their operational capacity or rely on imports of fluid milk or skimmed milk powder.

Urban-rural disparities are among the main challenges that Nepal has had to face; not only is the poverty rate in rural areas significantly higher than that in urban areas but access to services and infrastructure is far more limited. Moreover during the project implementation, it was estimated that almost 80 per cent of farm holdings were primarily producing for home consumption and just 1 per cent for commercial purposes. It was also observed that the annual production was not sufficient to feed the household over the year in 60 per cent of holdings, and 20 per cent of households were experiencing a food deficit for more than half the year.

IFAD action

The Improved Seeds for Farmers Programme was implemented from 2012 to 2019. Its development objective was to create sustainable productivity improvements through market-led demand for improved seeds (cereals and vegetable) and livestock, with the aim of testing and scaling up an agriculture-led growth model. The programme reached out to approximately 202,761 households (91,794 directly and 110,967 indirectly).

The project increased national crop productivity by expanding the activities of the formal seed sector in Nepal. The programme massively expanded local improved seed production for both cereals and vegetables, supporting closer linkages between producers and the formal sector and an upgrade of the Seed Quality Control Centre offices, and assisting input suppliers and traders in the seed value chain. The project involved almost 25,829 households (57 per cent female-led, 13.5 per cent Dalit and 23 per cent Janajati), grouping them into 482 producer groups/cooperatives for truthfully labelled seed production.

The project improved livestock productivity, enhancing goat and dairy production and strengthening district livestock services. Small livestock productivity was fostered through (i) breed improvement, (ii) nutrition and management, (iii) veterinary services development, (iv) farmer training and (v) market linkage development, including establishment of livestock markets.

Some key activities included importing improved breeding stock and semen (Boer goats), establishing community-based breed selection, extending planting of forage species, developing fodder tree nurseries, improving livestock sheds and expanding access to livestock insurance schemes, which are good for resilience



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building. Veterinary services have been improved through training of village animal health workers as well as through an extension of the vaccination programmes. LFFSs have also been implemented under the improved goat productivity component. The programme supported groups, cooperatives and communities in establishing 23 milk-chilling centres under public-private partnership and eight goat collection hubs/livestock markets.

Impact

A project completion review mission took place during January 2020, and the report clearly reveals that the programme succeeded in achieving the overall development objective of supporting accelerated agricultural growth. The programme increased the availability of improved seed to producers and that of improved genetics to livestock producers, and it facilitated group action to improve access to finance. Approximately 7,942 tons of cereal seeds and 534.5 tons of vegetable seeds were produced, generating overall net margins of US\$3.15 million for the seed groups and US\$2.9 million for the seed companies.

Significant progress was made in terms of enhanced dairy and goat meat productivity, with buy-back agreements between producers and buyers; the programme exceeded its targets in terms of productivity enhancement and adoption of improved management practices. Indeed, milk, goats and crops and productivity were expected to increase by 50 per cent, 25 per cent and 15 per cent, respectively, while at project completion increases in milk, goat and crops productivity were 40.2 per cent, 34.42 per cent and 14.21 per cent, respectively. A striking result concerns

the percentage of dairy animals and goats covered by routine vaccination against zoonotic diseases. The project succeeded in reaching 100 per cent of animals in the project area. The community Boer breeding herds have supplied genetic material (50 per cent blood level) to 37 districts out of 77 in the country.

The community is strongly empowered: almost 28,000 people have been trained in production practices and technology, of which almost 18,600 are women, significantly exceeding the initial target of 17,000 people trained. Moreover, the formation of small farmer agriculture cooperatives has been supported, and thanks to this about 40,515 households have gained access to financial services for local entrepreneurship development.



Senegal: agricultural diversification and access to market for improved livelihoods

Key facts

Project name	Agricultural Value Chains Support Project (PAFA)
Dates	2010-2016
Financing	IFAD, Global Environmental Facility, the Organization of the Petroleum Exporting Countries Fund for International Development, the national government and project beneficiaries
Targeting	Vulnerable small-scale farmers who have limited family labour; those with small and often degraded land holdings and a narrow range of income sources; women and girls and their organizations; and underemployed young people aged 18 to 30 years.
Programme objective	Improving the incomes and livelihoods of poor farming families in Senegal's groundnut basin by integrating farmers into profitable value chains based on local agroecological potential.

The sustainable development challenge

Senegal is at the most south-western part of the bulge of Africa. It has a desert in the north and a moist, tropical area in the south. Livelihoods have always been heavily dependent on natural resources and, thanks largely to groundnut-growing, Senegal's groundnut basin has long been the country's most vibrant agricultural region, representing 57 per cent of the country's arable land.



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During the IFAD project implementation period, the country was already experiencing a steady economic decline mostly caused by continued land degradation, climate change and a collapse of the groundnut-based economy. Indeed, for decades, Sahelian Saharan countries have faced a persistent lack of rain, and, despite all efforts to combat desertification, one third of the land area had become arid and semi-arid, and 35 per cent of arable land was estimated to be threatened.

The decline of soil productivity caused agricultural production to fall, drastically reducing people's incomes, increasing the spread of rural poverty and affecting local food security. The lack of sustainable alternative sources of income and basic infrastructure (both economic and social) resulted in a massive exodus, particularly of young people, as a result of the persistence of rural poverty.

Despite the reduction in pastoral areas, livestock is an important component of the production systems, and the keeping of livestock, particularly modern poultry and dairy, had begun to develop also in suburban areas, as a means of agricultural diversification. The main challenge was that most smallholders were still unable to enter the markets that were opening up.

IFAD action

The PAFA project was implemented between 2010 and 2016 in four regions of Senegal's groundnut basin. The intervention aimed to diversify production and shape remunerative and sustainable value chains in order to improve the income-earning potential of small-scale family farms. The main institutional actors involved were the National Agricultural and Rural Advisory Agency and the Regional Development Agency; the lead agency was the Ministry of Agriculture in Senegal.

The programme reached out to almost 38,000 households living in the groundnut basin, achieving 120 per cent of the initial target. These households were integrated into profitable value chains, namely for millet, cowpea, sesame, bissap and farm poultry, to take advantage of the local agroecological potential.

PAFA improved incomes and food security in the groundnut basin through agricultural diversification and access to market, development of infrastructure and stakeholder capacity-building. Smallholder producers' decision-making capacity was strengthened at local, regional and national levels. By reinforcing the autonomy of producer organizations, the project allowed them to increase their influence on the development process and obtain easier access to markets and a more equitable distribution of benefits. The project also promoted new forms of partnership between producer organizations and market operators. Almost 320 contracts for production marketing were signed among them, thus facilitating the marketing of production surplus with planned dates and profitable prices.

The project financed 333 microprojects for agriculture and poultry production (222 per cent of the initial target). These microprojects improved agricultural practices by providing better access to inputs, equipment, certified seeds and fertilizers; they encouraged an increase in cultivated lands and yields (175 per cent and 244 per cent of the initial yearly targets, respectively), thus resulting in a surplus in production.

Finally, with regard to poultry rearing mainly headed by women, PAFA (i) promoted a model of improved village poultry farming; (ii) promoted the consumption of local poultry rather than imported birds; and (iii) set up a cooperative service platform for stakeholders. The village poultry farming model was successful thanks to its holistic approach, which included (i) technical training adapted to the needs and timetable of beneficiaries, particularly women; (ii) local technical monitoring and full vaccination; (iii) construction of improved chicken coops with local materials; (iv) the breeding of hens of local breed that are adapted to the conditions and can be reared in semi-freedom; and (v) the manufacture of food by the beneficiaries on the basis of local ingredients. Even though no initial targets were set on poultry rearing, positive results were noted, with an increase in average animal numbers from 10 to 40-60 per farm.

Impact

The Project Completion Report Validation (PCRv) and the Impact Assessment Report, both completed in 2018, clearly affirmed that PAFA had achieved the overarching goal of increasing the agricultural productivity and incomes of targeted beneficiaries while improving their food and nutrition security.

PAFA was successful in boosting the production capabilities of participating households as well as in encouraging them to diversify away from groundnut production, which had traditionally dominated the region. Consequently, PAFA resulted in higher crop income, higher livestock income and higher overall gross income. The value chain approach and the new partnerships between producer organizations and market operators helped to achieve an increase in beneficiaries'

incomes of between 41 per cent and 133 per cent, depending on the value chain, compared with the baseline. The increased purchase of agricultural equipment, inputs and means of transport showed also that household asset ownership had improved. Moreover, after project completion, 71 per cent of the beneficiaries had access to sanitary facilities compared with 14 per cent at baseline; 29 per cent had access to electricity compared with 24 per cent at baseline, and 95 per cent owned phones compared with 78 per cent at baseline.

The project, by promoting good agricultural practices and high-quality inputs, such as seeds, fertilizers and phosphate, helped in achieving an increase in household agricultural yields (175 per cent) and production (more than 100 per cent). At completion, only 4 per cent of households experienced a food scarcity period compared with 70 per cent at baseline, while chronic child malnutrition was registered at 22 per cent compared with 38 per cent at baseline.

Village poultry farming has greatly contributed to the increase in income of the most vulnerable households, to a reduction in malnutrition among children from birth to 5 years and to a marked improvement in their living conditions. The village poultry farming model also favoured high levels of participation from women and young people in various activities. The number of women supported by the project was 207 per cent of the initial target, and local sport associations were supported in reaching out to young people.



Venezuela: improving living conditions in semi-arid zones through sustainable rural development

Key facts

Project name	Sustainable Rural Development Project for the Semi-Arid Zones of Falcon and Lara States (Phase II)
Dates	2003-2013
Financing	IFAD, Global Environmental Facility, Corporación Andina de Fomento, the national government and beneficiaries
Targeting	Poor men, women and children from small farming and wage-worker families settled in 28 micro-watersheds located in the semi-arid zones of Falcon and Lara states (50,000 people).
Programme objective	Specific objectives included (i) the economic and political empowerment of the social and economic organizations of poor rural communities in semi-arid zones; (ii) the rehabilitation and conservation of natural resources in semi-arid zones; (iii) the transformation of agricultural and non-agricultural subsistence production into a market-oriented and sustainable business; and (iv) greater access for poor rural communities in semi-arid zones to rural financial services, as well as to formal state and national financial services.

The sustainable development challenge

When the IFAD project was being designed in 2002, Venezuela was experiencing continuous population growth, reaching 23.06 million inhabitants.

The agricultural sector generated about 5 per cent of gross domestic product and met 40 per cent of the domestic demand for agricultural products. Most agricultural production today is still located in arid and semi-arid areas, highly vulnerable to cyclical variations in weather conditions.

When the project was designed there were several environmental issues affecting Venezuela, mostly caused by poor management practices and the exploitation of resources. Among others, deforestation represented a severe problem, and it was triggered by (i) increased demand for food, which prompted the expansion of the agricultural frontier at the expense of forested areas; (ii) the use of poor agricultural practices such as extensive goat exploitation, use of agrochemicals and indiscriminate exploitation of cocuy (*Agave cocui*); and (iii) a loss of soil productivity because of inappropriate management caused by pottery, coal production and woodwork, which in turn led to soil erosion and desertification. Pollution has been another severe environmental problem affecting the country in recent decades. The oil industry is the main source of Venezuela's income, but it has always been the greatest source of pollution, owing to oil spills at sea and oil waste disposal in freshwater bodies. Chemicals and biocides from industry had also contributed to soil contamination, damaging soil quality and leaving it unusable.

IFAD action

The Sustainable Rural Development Project for the Semi-arid Zones of Falcon and Lara States Phase II (PROSALAFI II) was designed in 2003, based on the lessons learned from PROSALAFI I. The overall goal of PROSALAFI II was to improve living conditions in semi-arid zones of Lara and Falcon states by means of social and economic development with environmental sustainability and gender equity.

The PROSALAFI II project was carried out at a time of great political and social transformation, promoted through the ideology of Bolivarian socialism by the then president Hugo Chávez Frías, including the promotion of local people's power. The project promoted smallholders' empowerment through a number of training activities in decision-making, in information management and in institutional articulation. Medium- and long-term strategic development plans within communities were also prepared to support the government's decentralization process at community level. Young people were targeted through job skills training to develop their expertise in marketing and trade and to help them to learn how to engage in local production activity.

PROSALAFI II improved water and vegetation management and conservation. Thanks to the construction and rehabilitation of water storage infrastructures, called



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“lagunas” (water reservoirs), and house water collection systems for garden irrigation, water retention capacity increased in the semi-arid territory, positively impacting production and productivity.

The project significantly increased the income-generation capacity of the beneficiary population and transformed the agricultural and non-agricultural subsistence production system of the beneficiaries into a market-oriented, sustainable microentrepreneurial production system. Local production development was strongly promoted. Technology transfer activities were intensively supported, aiming to improve traditional practices in goat management; increase cultivation in semi-arid areas through the spread of microirrigation systems to optimize the management of scarce water resources; and improve the processing of the agave plant to produce cocuy, a liqueur similar to tequila, declared part of the ancestral and cultural heritage of Venezuela. Moreover, micromanagement training programmes and specialized agricultural and non-agricultural field support services were provided.

The project strongly enhanced the production model for small ruminants (mostly goats), a key sector for the livelihoods of the target population, inherited from the Spanish colonists who imported goats from the Canary Islands. With the support of the project, small ruminant farmers organized themselves into family cooperatives. These received training, technical assistance through periodic monitoring field visits, and financial support aimed at improving the conditions for goat farming and at the transformation of primary products (milk and meat).

The project developed a plan to improve goat and sheep breeding and to ensure that all cooperatives achieve a better level of production capacity, according to their improved skills, financial possibilities and will. This plan included the establishment of (i) small ruminant genetic improvement practices; (ii) silvo-pastoral areas cultivated as food plots and forage; (iii) rotational grazing systems with fenced paddocks for semi-stable breeding models for small ruminants; (iv) the definition of treatment (especially for internal parasites) and immunization schedules; (v) technical and financial support to improve folds for sheep and goats; (vi) technical support for selection and breeding of herds of goats and sheep; and (vii) technical support for improving milking practices, handling and processing milk for higher quality, and the security and diversification of dairy products (e.g. dulce de leche and cheese).

The project also increased beneficiaries' access to rural financial services, especially thanks to the creation of rural community credit funds ("cajas rurales"), which were designed to provide collateral to small farmers. Of the total number of participating rural banks, 80 per cent increased their capacity for financial and accounting management. The project supported the existing cajas rurales through training, ongoing assistance and specialized technical support services, and encouraged the expansion of their coverage to include most of the communities in the micro-watersheds.

Impact

According to the project completion report, validated by the Independent Office of Evaluation in 2016, PROSALAFI II effectively met its planned objectives and goals. The project reached out to and benefited nearly 64,000 people, slightly above target; of these, 55 per cent were women.

The project succeeded in increasing households' income and assets, and improved housing constructions and sanitary conditions have also been reported. Families and organizations have been supported in accessing public credit, and rural community credit funds were strengthened.

The project significantly contributed to human resource development in Lara and Falcon states through various types of training, which allowed people to understand the local reality and were instrumental in guiding the necessary actions to promote changes and manage them with the necessary institutional support. This led to strengthened links between local cooperatives with government actors, thus favouring a participatory approach and community-driven local development.

The project succeeded in increasing agricultural production and local productivity by introducing appropriate agricultural techniques, such as improved goat management and cultivation practices in semi-arid areas, which had previously been hindered by the cultural conditioning of the local population, accustomed to considering wild grazing to deliver the best cost-benefit ratio. The project succeeded, through demonstration units, in convincing the beneficiaries of the advantages of

semi-intensive farming, with higher profits and lower risks (e.g. the loss of livestock to rustling, very common in the region). However, a gradual increase in these practices will entail a level of investment that cannot be provided by a single intervention, and for it to be replicated on a large scale heavy investment and continuous support from the public administration will be required.

Finally, the project resulted in a gradual but steady increase in women's participation and empowerment in production processes and organizations, as well as in social, political and family contexts. Of 10,429 people who received technical assistance and training in production activities, commercialization, management and resource-generating activities, 7,107 were women.



Looking ahead

The small livestock subsector has the potential to contribute to mitigating the negative impacts of the COVID-19 pandemic and improving food security, nutrition and livelihoods, especially in the case of vulnerable populations. The movement restrictions imposed on populations to control the spreading of the virus severely affect livestock producers by reducing their access to animal agricultural and veterinary inputs (feed in particular) and services (e.g. vaccination), transport and access to markets, among other requirements.

IFAD recently launched the Rural Poor Stimulus Facility with the aim of improving the food security and resilience of poor rural people by supporting production, market access and employment. About one third of the facility's projects have included the provision of packages to restock affected households with small livestock (poultry and small ruminants), including the provision of emergency feed and procurement of vaccines. These projects have demonstrated that small livestock are particularly suitable for emergency projects thanks to their short production cycles, the low cost of investment in rearing infrastructures, a limited need for land, and the possibility of integrating vegetables and crops into nutrition-dense packages.

Moreover, the preceding case studies demonstrate how IFAD's investments in small livestock development are key to advancing gains on SDG 1, SDG 2 and SDG 5, among other SDGs, as well as on IFAD's mainstreaming priority areas, especially with regard to gender equality, employment, and environment and climate change. As part of the United Nations 2030 Agenda for Sustainable Development, IFAD's strategic vision aims to achieve inclusive and sustainable rural transformation, where extreme poverty is eliminated and every rural family lives in dignity. Improvements to sustainable livestock production, access to livestock products and services and stronger market participation are recognized as key in increasing poor rural people's productive capacities (Strategic Objective 1) and market access (Strategic Objective 2) (IFAD, 2016).

Key lessons from small livestock IFAD-supported projects, in line with the key messages set out at the beginning of this document, include the following (IFAD, 2019):

- Key message 1 states that small livestock contributes to household food and nutrition security. It has indeed been demonstrated that small livestock development projects have a positive impact on household nutrition. Households' dietary diversity increases significantly, as does the consumption of meat and eggs, thanks to an increase in livestock ownership. Moreover, selling livestock products generates income that allows households to purchase other food (fish, vegetables, rice, etc.), thus enhancing food and nutrition security.

- Key message 2 declares that small livestock contributes to household economic security. It has been proven that small livestock development projects address constraints in animal feeding and nutrition, health, husbandry, breeding and farm management, going beyond the production side and embracing value chain development, for instance by improving processing infrastructures and capacities. This strongly impacts household livestock incomes, thus gradually getting people out of poverty while increasing market access and the accumulation of assets (in particular durable assets, productive assets and livestock assets). Participatory and hands-on learning approaches such as LFFSs can be particularly effective in developing the skills and knowledge of small-scale small livestock producers, thus allowing them to create more efficient and sustainable production systems. LFFSs enable the testing, adaptation and adoption of good agricultural and marketing practices, and allow small livestock producers to make informed decisions through critical analysis regarding their animals and crops, including on planning, marketing, nutrition and savings.
- Key message 3 states that small livestock are gender-sensitive; small livestock creates opportunities for employment for women, especially in relation to processing and rearing of livestock. Small livestock development projects succeed in increasing the empowerment and income of more vulnerable women-headed households. Indeed, a positive impact is found on income and productive assets among women-headed households, and in general women gained significantly higher decision-making power with regard to small ruminants' feed, livestock breeding and crop income earnings.
- Key message 4 declares that small livestock strengthen rural people's resilience to climate change. Small livestock is indeed a way to diversify smallholders' assets and sources of income, and there is also considerable scope for reducing emissions and creating offsets, for instance through productivity improvements and improved pasture management. Recently, circular food systems have been seen as an integrated approach to addressing environmental issues. These food systems make use of animals to unlock biomass, with low opportunity costs for humans, into valuable food, manure and other ecosystem services. Organic matter in plant and animal biomass may also be converted into valuable products such as bioplastics, protein, volatile fatty acids or other chemicals, or used as organic soil fertilizer or as an energy source. Nutrients (both macro- and micronutrients) in waste streams may be recovered and re-used in food production (Oosting et al., [2021]).
- Results from the IFAD10 impact assessment (IFAD, 2019) suggest that a more livestock-focused type of intervention with less diversified development priorities may lead to larger and more positive direct impacts. This is also true for indirect but related indicators such as dietary diversity, which is significantly positive for livestock beneficiaries and driven by higher consumption of livestock products.

For decades, the livestock debate has focused on how to increase production in a sustainable manner; now, the 2030 Agenda has shifted the emphasis from fostering sustainable production per se to enhancing the sector's contribution to the achievement of the SDGs.

Enhancing livestock's contribution to the SDGs will require looking beyond policies and investments specific to livestock and the consideration of some key aspects, including the following:

- In relation to the goal of reducing poverty (SDG 1), small livestock can play a crucial role, especially by increasing rural households' assets and their resilience to shocks. However, to enable the sector to turn its growth into reduced poverty, some variables need to be considered, such as the inclusion of the poor in that growth and the capacity of producers to use their livestock-related assets to generate income (FAO, 2018a).
- Regarding the goal of ending hunger and malnutrition (SDG 2), when designing small livestock interventions, the stronger pressure on ecosystems resulting from an increased demand for livestock products should be considered, as should the risk that small producers will be hindered by the ongoing transformation of the livestock market structure.
- Moreover, to make sure that women benefit from the livestock sector, small livestock interventions should include gender-responsive extension services and participatory training for rural women, such as LFFSs, as well as providing them with improved access to land, resources, markets and financial services.
- Small livestock interventions contribute to protecting and restoring terrestrial ecosystems while combating desertification and land degradation. However, to avoid detrimental effects on biodiversity it is important to promote sustainable management practices, for instance improving feed-use efficiency, animal health and disease prevention.

According to a recent FAO publication (2018a), livestock is crucial to enhancing the agricultural sector's contributions to the SDGs. The report emphasises the importance of removing the barriers keeping poor livestock farmers from accessing productive assets and rural services; allowing ASF prices to better reflect negative externalities; and strengthening livestock organizations, with an emphasis on small-scale producers and their associations and cooperatives. This means that efforts to increase productivity must focus on small-scale producers and that extension services must be more gender-responsive. Small livestock can make a major contribution to the SDGs, especially with regard to food and nutrition security, employment opportunities, gender and youth equality, and environment and climate change; the role of small livestock must therefore be acknowledged and considered when designing livestock projects and investments, as well as food security interventions.

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