



Dairy for development

Strategy and guidance for applicants



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1. Introduction

Jersey is a 45-square-mile island, close to the French coast, with a population of 107,000 (2018). As a 'Crown Dependency' it is not part of the United Kingdom or the European Union, but is a self-governing jurisdiction with its own history and traditions, its own government (the States of Jersey) and its own laws. Jersey Overseas Aid (JOA) is the Island's official, taxpayer-funded relief and development agency.

JOA is driven by a clear mission: to translate the generosity, skills and compassion of the people of Jersey into effective assistance for the world's neediest people. However, as a relatively small national development donor, Jersey must work extremely hard to ensure that its aid is effective. It also needs to maintain the consent and goodwill of the Islanders who pay for it. JOA believes that one of the best ways of ensuring that its programming delivers the best value for money in a way that resonates with people from Jersey is to specialise in areas of development programming where the Island already has a comparative advantage. Therefore, JOA's strategic priorities mirror the island's many areas of expertise: dairy and agriculture, financial services, and environmental conservation.

Leveraging Jersey's Unique Position

Despite its small size, Jersey is a globally-recognised centre for agricultural expertise. The Island's two most famous agricultural exports, the Jersey cow (and its dairy products), and the Jersey Royal new potato, are well known internationally. The Jersey cow is a particular source of local pride and affection, with Jersey milk revered for its high quality and nutrient content, and the cow itself highly valued for its genetic traits which include productivity (despite small stature), ease of care, and resilient nature. Jersey cattle have been exported internationally since the 1700s, with the first recorded sale into Africa, to the Western Cape region of South Africa, occurring in 1877. The Jersey is now the second most populous breed of dairy cow globally, found in over 100 countries.

There is significant local expertise in dairying and the Jersey breed. The Royal Jersey Agricultural and Horticultural Society (RJAHS), established in 1833, is an independent not-for-profit organisation representing agricultural and horticultural interests on the Island and internationally. One of the key functions played by the Society since its formation has been the establishment and maintenance of a register of purebred Jersey Island cattle (the Jersey Herd Book), and later the liaison with international Jersey breed associations and public/private bodies involved in the export of Jersey Island cattle and genetics.

More recently, the work of the RJAHS has expanded into developing countries: Since 2004, the Society has supported the Government of Rwanda with technical assistance and semen export which in subsequent years has evolved into a full-scale 'Dairy for Development' project at national level. JOA has directly supported the RJAHS' work in Rwanda since 2017 and subsequently began four equivalent projects, in Malawi (2018), Ethiopia (2020), Nepal (2022) and Zambia (2023), in partnership with global technical partners and specialised local NGOs. The RJAHS maintains a network of public and private sector contacts in the global dairy industry, and representatives of the Society are internationally respected authorities in the area of Jersey cattle breeding and genetics. As both an implementing partner and provider of technical expertise, partnership between JOA and the RJAHS has been fundamental in the development of a coherent dairy strategy and the Society will continue to play a coordinating and technical advisory role as our global portfolio of dairy initiatives grows.

Recent JOA-supported scientific research has provided weight to an increasing volume of evidence that supports the Jersey breed's value in improving incomes and food security for resource poor smallholder dairy farmers and their families in developing economies. There are several genetic qualities of the breed which are of benefit in low-resource contexts including ease of calving, small body weight, heat tolerance and disease resistance, as well as increased efficiency in terms of milk production relative to feed requirements, which provide an advantage over other commonly exported breeds such as the Holstein-Friesian. Jersey cattle, and more specifically their primary breed characteristics, therefore have a potentially significant role in developing dairy industries which are expected to emerge to meet growing market demand in developing countries in coming decades. Fertility and productivity benefits in Jersey-infused genetics stand to benefit smallholders' yields and incomes, and crucially a high feed conversion ratio both lowers the relative feed inputs required to produce the same quantity of milk and reduces the intensity of Greenhouse Gas (GHG) emissions. Jersey's position as a centre of expertise in Jersey cattle breeding, and dairy industry development more broadly, provides a significant resource for delivering impact further afield.

2. Rationale – why dairy?

JOA's mission is to alleviate poverty and improve the livelihoods of people in developing countries. As populations increase and demand for food and sources of livelihoods increase in tandem, livestock and specifically dairy will play a huge role in meeting these needs throughout much of Sub-Saharan Africa and South Asia. Globally, over 130 million dairy farms with over 360 million dairy cows produce almost 800 million tonnes of milk per year¹. Over 6 billion people worldwide regularly consume milk or dairy products² and global demand for fresh dairy products is expected to increase by over 2% annually over the next decade³. In particular, demand for milk and 'value added' products are set to grow in proportion to income as developing countries advance from low to middle income status, and as populations urbanise. By 2030, it is estimated that 67% of global demand for dairy products will come from developing or emerging economies⁴.

Dairy has the potential to be transformational in economies reliant on small-scale agriculture, and has been widely demonstrated to generate a significant impact on household incomes, food and economic security, and job creation⁵. Keeping dairy cows can generate high margins by area of land and provide a more stable cash flow in comparison with many food crops, making dairy farming attractive for farmers vulnerable to external shocks and with limited access to land. Cattle can be fed on non-competitive⁶ (with humans) feed, and dairying is also labour intensive, not least in twice daily milking, so it suits populated rural areas where labour is relatively abundant compared to land holdings. Keeping dairy cattle also provides a source of organic fertiliser for crop production, and increasing the need to transport and process milk can create additional jobs in the local economy.

For resource-poor populations, the health benefits are equally important. Increasing dairy consumption can improve diets for populations reliant on grain and tuber staples, providing essential nutrients including protein, fat and various micro-nutrients. In countries with high prevalence of childhood stunting and relatively low consumption rates of dairy products, increasing consumption of

¹ FAO (Food and Agriculture Organization) (2018)

² Andeweg, K. et al. (2020). *Dairy for nutrition, employment and sustainability. An action agenda for the Dutch contribution to dairy development in Africa and Asia*. Position paper. Netherlands Food Partnership.

³ OECD (Organisation for Economic Cooperation and Development)/FAO (2017) *OECD-FAO Agricultural Outlook*

⁴ Andeweg, K. et al. (2020).

⁵ FAO, GDP and IFCN (2018) *Dairy Development's Impact on Poverty Reduction*

⁶ Approximately 86% of livestock feed intake globally consists of resources not edible by humans (FAO 2020).

dairy (as part of a balanced diet) can have a substantial impact on health outcomes⁷ and food security. While overconsumption of nutrient-dense animal sourced protein in the West has some drawbacks for health and sustainability, in much of the world, especially the poorest populations, people consume no or very small amounts of livestock-derived foods and have little choice over what to feed themselves and their families⁸. Malnutrition and undernutrition are significant contributors to infant mortality and poor health outcomes which can have long lasting consequences - consumption of insufficient quantity and diversity of key micronutrients in diets in early stages of a child's life, and by adult women during breastfeeding, can lead to stunted growth, which is associated with impaired cognitive ability and reduced school and economic life performance. Associations between undernutrition and infections can also create a potentially lethal cycle of worsening illness and deteriorating nutritional status⁹. Livestock-derived foods contain both micronutrients and essential amino acids and proteins and can be a highly efficient way of fulfilling this need. Though other foodstuffs can fulfil the same needs, such diverse foodstuffs are often unavailable or unaffordable to the poor¹⁰.

Strengthening the dairy sector to meet development challenges, however, risks creating negative impacts if sustainability is not a key consideration in our strategy. In recent decades, advances in dairy practices and technology have led to increased production efficiency in developed industries with larger but fewer herds. However, production and efficiency increases have primarily been seen in middle to high income countries in Asia, South and Central America, and Europe, with Sub-Saharan Africa in particular lagging behind¹¹. Significant barriers remain to smallholder farmers for improving their livelihoods including low technical capacity, poor or inappropriate cattle genetics, lack of access to inputs and services, and lack of connections to markets and networks such as producer associations. Our aim is to strengthen dairy systems in developing countries so that they work for the benefit of vulnerable people on low incomes whilst at the same time developing into commercial industries that are both economically and environmentally sustainable. This can be primarily achieved by improving efficiency of production, and suitability of dairying practices, and (in the long-term) reducing the number of cattle required to produce the same outputs. This requires a focused long-term approach with coordinated effort and a clear strategic rationale, as outlined in this strategy document.

However, the wider socio-economic benefits of dairying should not be understated – raising livestock is, in many parts of the developing world, one of few viable sources of employment, income, and household nutrition. Social and economic wellbeing and security are as critical to sustainability as environmental protection¹², and each element is mutually dependent on the other. The benefits of dairying in improving resilience of smallholder farmers are significant, particularly in comparison with other livelihoods such as seasonal crop-based agriculture. Dairying can provide: a daily (or at least much more consistent) income stream; a free source of organic fertiliser both for fodder crops and for other crops; a household source of animal-source protein which can be expensive or in short supply in rural areas, potentially reducing the health burden of undernutrition; assets with a significant cash value as a safety net in time of need; and a steady labour requirement on a day-to-day basis rather than fluctuating significantly during the year.

Dairy for Development also offers complementarity with our other thematic areas – financial inclusion and conservation livelihoods. Strengthening agricultural value chains by improving access to financial services is a significant focus in our financial inclusion strategy, of particular relevance to dairy

⁷ FAO (2013) *Milk and Dairy Products in Human Nutrition*

⁸ www.ilri.org/news/livestock-enhanced-diets-first-1000-days-life-pathways-better-futures-low-income-countries

⁹ Delia, G. et al. ILRI/LSHTM/Chatham House (2018) *The influence of livestock derived foods on nutrition during the first 1,000 days of life*. ILRI Research Report 44. Nairobi, Kenya.

¹⁰ ILRI (2018)

¹¹ FAO/ Global Dairy Platform (2019) *Climate Change and the Global Dairy Cattle Sector: The Role of the Dairy Sector in a Low-Carbon Future*

¹² ILRI (2018)

enterprises where access to services such as credit/loans, and livestock insurance is a significant factor in improving farmers' livelihoods. A conservation livelihoods and climate-smart approach is also vital to the sustainability of growth of the dairy sector as a significant contributor to GHG (Greenhouse Gas) emissions and natural resource use.

3. Implementation modalities

JOA's investments in Dairy for Development are broad and diverse, and we are committed to fund the most impactful, innovative, and appropriate interventions. The primary modality for this is through multi-year grants for charitable and not-for-profit organisations, although we are exploring how to leverage private capital into smallholder dairy through an impact investment model. Development of dairy systems involves a range of organisations from NGOs (Non-Governmental Organisations) and CSOs (Civil Society Organisations) to the private sector, government institutions and academic research bodies. We also strongly promote collaboration with other donor and privately funded initiatives in the Dairy for Development sphere in order to maximise the reach and impact of our investments.

We work closely with the RJAHS in designing, reviewing, coordinating and quality-controlling our entire Dairy for Development Portfolio. The RJAHS act as both as a delivery partner, implementing country-focused dairy projects in Rwanda, Ethiopia and Malawi, and as a technical partner, leading cross-cutting regional and international initiatives (some of which are outlined below) and providing strategic and technical guidance to the direction of our grant-funded work.

JOA does not accept unsolicited proposals and works primarily through restricted funding 'windows', inviting pre-selected organisations to participate in a rigorous selection process for new projects. JOA's funding does not exclude organisations based on their registration type and is open to joint proposals or bids from consortia if there is adequate justification for each participating organisation. Private sector partners are welcomed within proposals as key actors in market systems development and potential sources of valuable technical knowledge and capability. However, it is expected that applicants make clear in their proposals how investment will directly reach the intended beneficiaries (i.e. low-income smallholder farmers and their families) and how any potential issues of conflict of interest will be mitigated.

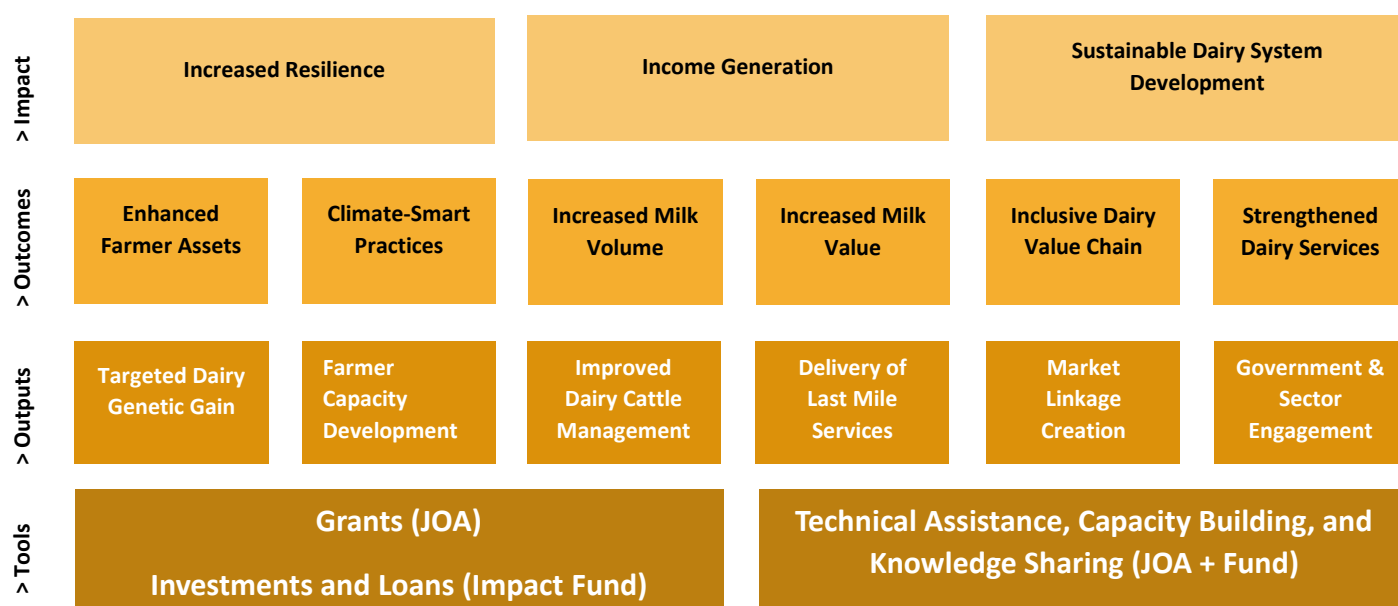
We currently focus support on six targeted countries - Rwanda, Malawi, Ethiopia, Sierra Leone, Zambia and Nepal. Our general approach is to fund projects in these locations only to ensure maximum complementarity with our existing portfolio and avoid overstretching resources. Proposals which combine Dairy for Development with Conservation Livelihoods and/or Financial Inclusion elements are welcomed but should clearly explain the rationale behind each component and complementarity between the different thematic areas within the project, and alignment with the relevant JOA strategy and thematic guidance, without diluting the primary impacts in dairy. Proposals focused specifically on Dairy for Development should consider the strategic guidance for JOA's other two key themes and ensure that activities do not contradict the inherent aims of the other two parallel investment areas.

4. Strategic Approach – Key thematic lenses

JOA's Dairy for Development Theory of Change

JOA's overarching approach to Dairy for Development is guided by the below Theory of Change, which outlines Tools, Outputs, Outcomes and intended Impacts:

Figure 1: JOA Dairy for Development Theory of Change



At the *impact* level we are targeting:

- **Increased Resilience** – Project beneficiaries gain increased resilience to external economic and climate shocks.
- **Income Generation** – Beneficiaries generate increased and more stable incomes, contributing (in the long term) to poverty reduction.
- **Sustainable Dairy System Development** – Dairy systems are developed which are sustainable and inclusive, and which contribute to economic development and food security at a national level.

We will look to achieve these broad impacts through achieving the following *outcomes*:

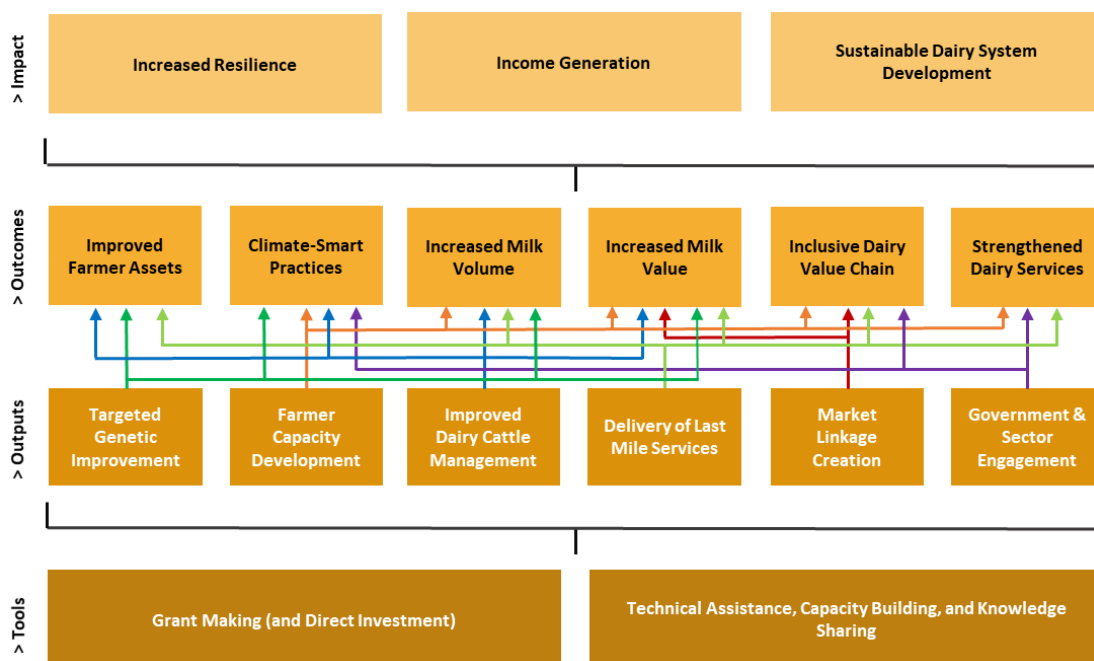
- **Enhanced Farmer Assets** – Farmers gain improved assets in the form of higher genetic quality, more productive, more valuable, and more resilient animals, with increased income potential from the dairy enterprise as a whole.
- **Climate-Smart Practices** – Farmers and the value chains in which they engage are supported to adopt climate smart practices which reduce emissions and environmental degradation.
- **Increased Milk Volume** – Farmers can produce higher volumes of milk to fulfil local demand and improve their incomes and household food security / nutrition.
- **Increased Milk Value** – Farmers can obtain a higher and more stable price for their milk through improved milk quality and improved market linkages.
- **Inclusive Dairy Value Chain** – Dairy value chains are supported to develop in a manner that benefits resource poor smallholders, women and youth.
- **Strengthened Dairy Services** – Service availability and capacity of service providers is strengthened to support farmers to be commercially viable.

We have broadly categorised our *outputs*, the measures by which we will achieve these *impacts* and *outcomes*, into three themes: Enabling environment, farmer level interventions, and market systems - inputs and outputs (see further detail on each under *Outputs* section below):

- **Enabling environment**
 - *Targeted Dairy Genetic Gain*
 - *Government & Sector Engagement*
- **Farmer level interventions**
 - *Farmer Capacity Development*
 - *Improved Dairy Cattle Management*
- **Market systems - inputs and outputs**
 - *Delivery of Last Mile Services*
 - *Market Linkage Creation*

All of these areas are intrinsically linked and form essential parts of a sustainable dairy system (see figure 2 below).

Figure 2: Dairy for Development Theory of Change showing impact channels



There are also several cross-cutting themes which we will prioritise in our funding streams:

5. Climate change and environment

There are multiple climate considerations in the dairy sector. A major one is the impact of dairying itself on GHG (greenhouse gas) emissions. While developed dairy industries have made significant reductions in emission intensity (broadly, volume of GHG emissions relative to milk output) in recent years, developing economies lag behind significantly in terms of emission intensity, which has far reaching environmental implications. Smaller and less productive herds, much more prevalent in emerging dairy industries in Sub-Saharan Africa and South Asia than elsewhere, are the least emission-efficient globally.

Figure 3¹³ outlines the skewed relationship between productivity and GHG emissions in developing countries.

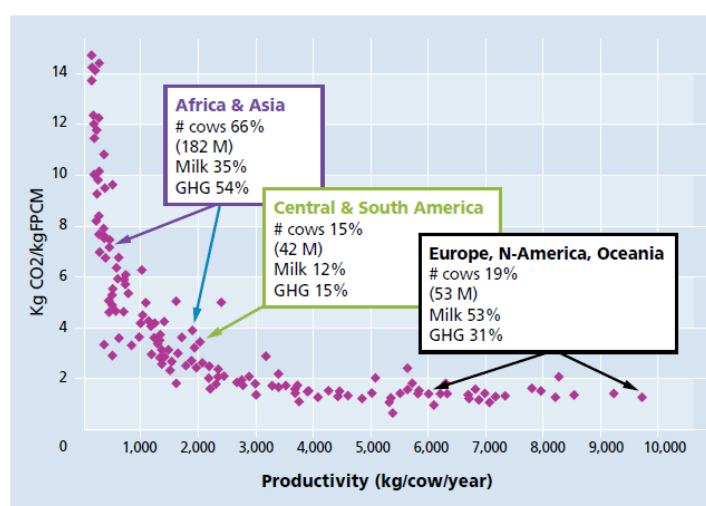


Figure 3: Graph showing GHG emission intensity relative to productivity with comparisons by

Production systems with a higher milk production per cow have a lower emission intensity, whereas with lower production volumes cows are using nutrient intake for body maintenance rather than milk production. The contrast is significant; the population of approximately 182 million cows in Africa and Asia (66% of cows in the world) contribute 35% of world milk production but account for 56% of global GHG emissions from cattle. It is neither feasible or appropriate to target a huge reduction in emission intensity and increase in efficiency, to the point where cattle belonging to large number of smallholder farmers in developing countries are yielding 5,000 kg+ a year. However, the graph above highlights that an increase in efficiency to approximately 2-3,000 kg of production per cow per year can drastically reduce emission intensity, to the point where emissions per kg of production are broadly in line with those observed in industrialised dairy systems.

In this way, targeting large scale improved efficiency of smallholders stands to significantly reduce GHG emission intensity with a relatively modest increase in production efficiency, which is possible to achieve through improved management and genetics without massive increase in inputs or intensive management. Although emission intensity globally is in decline due to improved practices, the projected overall increase in the production volume of the livestock sector is set to increase total emissions in the short to medium term. However, the emission intensity reduction (or improved efficiency) approach is generally accepted as the most feasible strategy for reducing the environmental impact of this projected growth in the sector¹⁴. Increasing the adoption of appropriate practices, technologies and animal genetics can all play a part in reducing the intensity of emissions and increasing efficiency of production.

¹³ Andeweg, K. et al. (2020). *Dairy for nutrition, employment and sustainability. An action agenda for the Dutch contribution to dairy development in Africa and Asia*. Position paper. Netherlands Food Partnership.

¹⁴ FAO/ Global Dairy Platform (2019) *Climate Change and the Global Dairy Cattle Sector: The Role of the Dairy Sector in a Low-Carbon Future*

Our focus on smallholders and on Jersey genetics, as well as benefiting the poorer members of society, offers several environmental benefits. The Jersey breed's small size and feed intake relative to productive output is a significant advantage for farmers with limited resources, and the productive efficiency and small stature of Jerseys and Jersey-cross animals both reduces GHG emissions relative to production and the relative feed and water requirements to produce decent volumes of milk. Interventions to improve the environmental sustainability of dairying should be contextually appropriate, bearing in mind that much of the technical literature in this area has been informed by and developed for dairy producers in developed industries. Though there may be productive efficiency gains in larger, more intensive systems, smallholders are usually well-placed to benefit from relatively straightforward interventions in practices and technology to improve their efficiency and reduce their environmental impact on their immediate surroundings. For example, supporting farmers to grow their own higher-quality fodder crops and utilise their animals' manure as organic fertiliser can have both direct and indirect benefits for reduction in emission intensity.

Another consideration is the impact of climate change, and the corresponding increase in extreme weather events and fluctuations in resource availability, on the sustainability and resilience of the dairy value chain. In rural communities in much of the developing world, cattle are one of the few means for achieving savings and provide a traditional safety net that helps to spread and manage risk, redistribute wealth from wealthy urban to poorer rural areas, and increase resilience to household shocks¹⁵. Unlike assets such as land, livestock are usually easily transferable and in demand even in times of need and can act as an income-generating safety net both in terms of the cash value of animals themselves and their offspring, but also their dairy products. Improving the productivity and longevity of cattle through genetic, management and health interventions stands to increase this asset value of animals to their owners, and improving farmers' knowledge and access to services in these areas increases the likelihood of their assets and income streams surviving external shocks.

6. Tackling gender inequalities in dairying

Dairy sector development has the potential to address gender gaps in incomes and access to services and resources. Around 80 million women globally are engaged to some extent in dairy farming¹⁶, around 25% of global dairy cows are directly owned or managed by women, and the proportion of the dairy labour force made up by women is also significant (in East Africa for example it is estimated at 70%¹⁷). It is therefore essential that gender dynamics are factored into the design of approaches to strengthen the dairy sector in an equitable way. Women face barriers to improving their level of productivity and incomes relative to male counterparts. These vary by context but can include sociocultural norms, reduced access to finance, fewer labour and land rights, and increased domestic and childcare labour expectations.

These gender-based inequalities in access to and control of productive and financial resources inhibit agricultural productivity, reduce food security, and increase the vulnerability of women farmers to shocks¹⁸. Dairy development interventions with a focus on empowering women farmers have been shown to improve women's incomes and influence over household expenditure, which in turn boost their social and economic capital¹⁹. Although expansion of dairy enterprises can have a knock-on effect of increasing household labour expectations of women (which are already often high and combined

¹⁵ International Livestock Research Institute (ILRI) (2019) *The Story of Cattle in Africa: Why Diversity Matters*

¹⁶ FAO / Global Dairy Platform (2019)

¹⁷ Andeweg, K. et al. (2020)

¹⁸ UN Women, UNDP, UNEP, and the World Bank Group (2015). *The Cost of the Gender Gap in Agricultural Productivity in Malawi, Tanzania, and Uganda*.

¹⁹ FAO, GDP and IFCN (2018) *Dairy Development's Impact on Poverty Reduction*

with domestic chores and childcare), by supporting women farmers with better access to services and inputs, more efficient technologies and practices, and improving incomes, this impact can be mitigated.

7. Use of data and knowledge sharing

The sharing of knowledge and learning within and between organisations is a key driver of improving the success and sustainability of overseas aid in general, and dairy interventions in particular. Donors have a key role to play in ensuring that they encourage (and fund) grantees to gather and disseminate knowledge which will assist others in pursuit of similar goals. We will try to foster a culture of openness and curiosity, and encourage grantees to learn from mistakes. JOA will also promote opportunities for grantees to exchange information, and itself participate in forums and events which bring together other development actors. We will ensure that partners are adequately resourced to learn from their activities (as a guideline we suggest that at least 5% of project budgets is dedicated to Monitoring, Evaluation and Learning) and where relevant we encourage partners to conduct research which can improve their effectiveness. We also work collaboratively with partners from the inception of a new project to agree on targets and measurement, and with the RJA&HS have developed a suite of standardised dairy-specific indicators which we encourage grantees to adopt to enable learning and comparison across our portfolio of interventions.

Particularly of relevance to Dairy for Development is the formalisation of data management processes for extension service delivery and animal data recording (including genetics, productivity and health traits). Additionally, reliable data about farmer- and cooperative-level milk sales not only improves the targeting of assistance but can improve access to appropriate credit products. The digitisation of data systems improves the quality and volume of data which can be collected and the ease with which data can be compared and shared for wider use, and the recent expansion of mobile network coverage and smartphone penetration into even remote rural areas provides considerable opportunities in this sphere. We currently fund several initiatives in this area, including the creation of a dairy profit index for smallholder farmers and the creation of Rwanda's first national cattle database, and we strongly encourage projects which strengthen data collection and management systems.

8. Achieving the Sustainable Development Goals (SDGs)

The primary globally-recognised initiative for sustainability in dairying, the Dairy Sustainability Framework²⁰, demonstrates numerous areas of overlap between dairy sector development and achieving the UN SDGs²¹. The areas in which dairy can contribute to the SDGs include the following in particular:

- SDG 1 on eradicating poverty: Reducing people living below the poverty line by increasing incomes and improving people's resilience.
- SDG 2 on ending hunger, achieving food security and promoting sustainable agriculture: Targeting food insecurity and undernourishment, increasing volume of production and income of small-scale food producers, improving the sustainability and productivity of agriculture, promoting government investment in food production, and reducing food price volatility.

²⁰ <https://dairysustainabilityframework.org/>

²¹ RaboResearch - Food and Agribusiness Advisory (2016) *Dairy and the Sustainable Development Goals: The Dairy Sector's Contributions and Opportunities*.

- SDG 3 on good health and wellbeing: Supporting good health and resistance to disease through improved infant and child nutrition
- SDG 5 on achieving gender equality and economic empowerment of women: Strengthening women's access to economic resources and ownership of land.
- SDG 8 on promoting economic growth and jobs: Supporting economic growth and productivity, creating jobs, resource efficiency in consumption and production, increasing employment of women and youth.
- SDG 9 on supporting industry, innovation, and infrastructure: Increasing the role of small-scale industries in production, supporting research and development in industry.
- SDG 10 on reducing inequality: Increasing incomes of people living in bottom income percentiles, and helping to transfer wealth from richer urban areas to poorer rural ones.
- SDG 12 on responsible consumption and production: Promoting techniques and technologies to reduce natural resource consumption, reducing waste, and reducing food loss along the supply chain.
- SDG 13 on climate action: Strengthening resilience to climate related hazards, improving education and awareness on climate change mitigation

In addition, there is complementarity with, SDG 15 (life on land) in promoting sustainable resource use and reducing environmental degradation, and SDG 17 (partnerships for the goals) in promoting cooperation and knowledge sharing between sectors in Dairy for Development.

9. Outputs

Our overarching logic and strategy behind each output is outlined below:

9.1 Targeted Dairy Genetic Gain (enabling environment)

One of JOA's key leverage points in Dairy for Development is local expertise in delivery of appropriate dairy genetic gain. Genetic gain is a permanent lift in the potential productivity of the animal. It is well documented that breeding indigenous cattle to exotic (e.g. Holstein-Friesian or Jersey) dramatically increases the potential milk yield. The JOA Dairy for Development strategy believes the Jersey breed is most suited to be the 'exotic' breed of choice and we will strongly favour the inclusion of a Jersey breed element in grant projects. The desirable traits offered by the Jersey cow relative to other breeds, which include earlier reproductive age and ease of calving, greater milk quality and productive efficiency, are well known internationally. Jerseys are also more heat tolerant and disease resistant than many other pure dairy breeds. A distinct comparative advantage of the Jersey in resource-poor contexts is feed conversion efficiency - crucially, the smaller size and feed requirements (relative to other 'exotic' breeds such as Holstein-Friesian, Brown Swiss and Fleckvieh) significantly reduce the carbon footprint created to produce the same quantity of milk and reduce costs to the farmer. These traits are of potentially huge value for many smallholder farmers in the tropics, where feed availability is often the primary constraining factor for improved production.

The optimum genotype depends strongly on the environment, which varies between different systems and different geographies. The vast majority of smallholder dairy farming systems in JOA focus countries are unsuitable for 100% exotic 'pure' dairy breed animals. Despite this, there is a pervasive perception among some stakeholders in emerging dairy industries that 'bigger = better'. This has led to investment in importing purebred dairy cattle such as Holstein-Friesians, high-producing in their native environments, into countries where conditions have largely led to low productivity and poor rates of survival. Pure Jerseys, though more heat tolerant and disease resistant than other 'exotics', are not immune to these problems. Indigenous African breeds, largely of *Bos*

indicus (Zebu) type, are lower-producing but retain important characteristics of disease resistance and efficiency despite scarcity of resources. Crossbreeding of exotic pure breeds with indigenous cattle has been carried out for decades but requires continued investment in scientific research to ensure maintenance of appropriate diversity, and development of sustainable breeding systems to facilitate genetic gains at scale. It requires a significant volume of data, and engagement of a variety of stakeholders who may at times have conflicting priorities. JOA currently supports research into the optimum genetic profile of dairy cattle for smallholder farmers in specific systems being carried out by the RJAHS and the Centre for Tropical Livestock Genetics and Health (CTLGH) and will encourage coordination of research with other projects, including the Gates Foundation-funded African Dairy Genetic Gains (ADGG) project led by the International Livestock Research Institute (ILRI). Genetic gains, targeted appropriately, are a long-term permanent shift with large potential income return on investment.

Reliable supply of appropriate genetics is a key constraint to dairy sector development across the JOA focus countries and a key element of our overall strategy. There are various breeding methods for selective breeding including natural service, embryo transfer and In Vitro Fertilization (IVF), but the primary method of mass genetic improvement is Artificial Insemination (AI). AI has been widely demonstrated as a low-cost solution to improve cattle genetics even in smallholder settings, and AI services using established national semen distribution systems (usually government-run) exist throughout the JOA focus countries, though at varying levels of efficiency. Private providers of genetics are also active but are primarily focused on a minority of large (in relative terms) commercial dairy farmers, with smallholder farmers on low incomes priced out of the market²². Our genetic improvement strategy focuses on strengthening both public and private genetics services, improving the efficiency, capacity and reach of public services as well as longer-term demand-side efforts to develop the market for private services and drive down costs through economies of scale (see Output 4 *Last Mile Delivery of Services* below).

We aim to further support the dissemination of appropriate genetics through the establishment of the Jersey Gene Bank, a facility for providing cost-price, high-quality Jersey semen to dairy projects with a potential development impact. The intention is that the Gene Bank would operate both within and outside of JOA Dairy for Development grant projects, with the potential for expansion to other geographies and projects where there is a complementarity with our wider strategy. With provision of semen a cost-effective way of supporting genetic gains at a wide scale, this offers a potential avenue for JOA to expand our impact with relatively low cost and resource requirements, expanding our influence in the global dairy sphere. Inherent in this vision is the intention in the medium to long term to support the establishment of viable dairy genetic resource centres, hosted within and locally managed in the Africa region. The first candidate for this work is Songa Farm in Rwanda.

10. Farmer Capacity Development and Training (farmer level)

At the farmer level, we will support programmes which aim to strengthen the reach and quality of farmer capacity development activities in an equitable way, building skills and knowledge to support farmers to improve their productivity and efficiency, build resilience, and integrate into formal markets. While there is a wealth of training material already in use in developing country contexts, much of the training on offer suffers from common problems. These include: inappropriate theoretical level (either too low a theoretical basis, or the opposite with a focus on western dairy practices of little relevance in smallholder systems); a lack of practical and skills-based training; single-issue focused

²² USAID Feed the Future (2020). *The Enabling Environment for Animal Source Food Market System Success: Assessing Factors That Support Competitive, Inclusive, Resilient, Nutrition-Sensitive Systems*

training that narrows focus to one or two aspects of dairy production or processing rather than all steps of the chain; and a limited focus on entrepreneurship and business skills²³.

Farmer capacity development and training activities can mitigate these issues in a number of ways. Contextual relevance and suitability for the target audience is key. Training materials developed for commercial dairy farmers in developed countries are of little value to a smallholder farmer owning one or two cows in rural sub-Saharan Africa. There is much existing material which can be made use of or adapted but it should be appropriate to the environment and the needs of the target audience. In addition, training interventions should focus on the wider aspects of dairy production beyond simply the farm level to support participation in formal markets. Training topics may be wide-ranging or specific to the context and aims of an individual project, but at the farmer level may include such topics as: improved dairy cattle management (see '*Improved Dairy Cattle Management*' below); milk hygiene and quality assurance; and business skills and financial literacy (see '*Market Linkage Creation*' below).

As well as the content of any training, modes of delivery are also important. Training should be in local languages where possible and delivered in engaging and participatory formats. Trainers should take into account group dynamics and characteristics such as gender and language/ethnicity in design of materials and training sessions. For example, smaller and more gender-balanced (or even gender-specific) groups may encourage greater participation in group training sessions. While time and resource intensive, practical hands-on training for farmers is ideally used in tandem with theoretical materials. Grantees are encouraged to make use of digital training platforms where appropriate, which balance knowledge with practical skills.

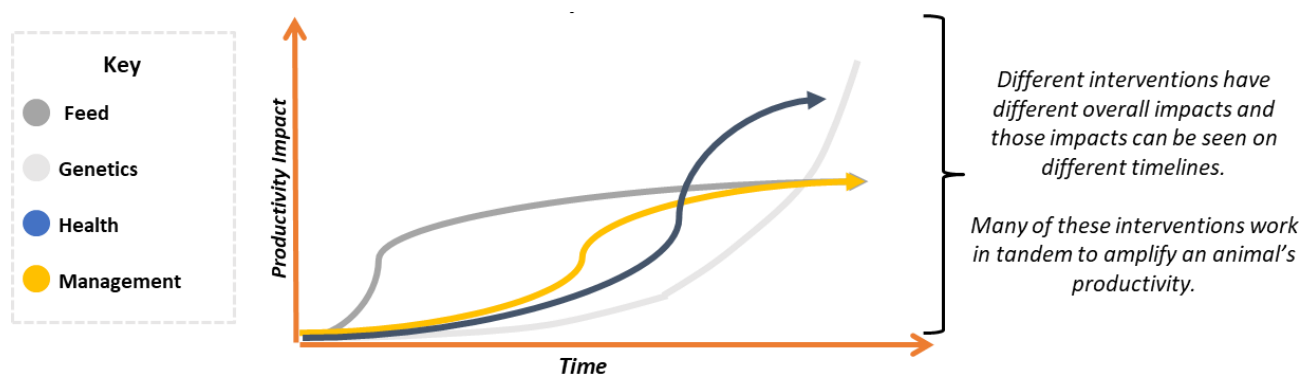
10.2 Improved Dairy Cattle Management (farmer level)

Improved dairy cattle management is key to achieving improved milk production, increased milk value, and adoption of climate-smart practices, which are in turn prerequisites for long-term gains in income generation, increased resilience, and market system development. Interventions should focus on equipping farmers with the knowledge, technologies and resources to enact changes in a number of areas, as outlined in figure 4 below²⁴ which illustrates the relative productivity impact over time of different interventions. Feed, genetics, health, and management interventions can improve the productivity of an animal, but intervention in one or two areas in isolation will only generate limited impact. They are all essential 'pieces of the puzzle' which, addressed in combination, will over different timelines contribute to improved productivity over an animal's life. Interventions to improve productivity should therefore target, as far as possible, all four areas over a staged approach, which can be addressed in a number of ways including farmer and extension worker capacity building, improved technologies and availability of inputs, and policy engagement.

Figure 4: Dairy intervention productivity impacts over time

²³ Andeweg, K. et al. (2020)

²⁴ Adapted from BMGF/ILRI (2009) *Targeting Strategic Investment in Livestock Development as a Vehicle for Rural Livelihoods*.



Appropriate feeding (or more specifically nutrition) is essential for improving productivity and can also support improved fertility (increasing conception rates) and health. Feed availability and feed quality is the primary constraint to improved productivity for many smallholder farmers – a result of many factors including low-producing and climate-vulnerable fodder production practices, fluctuations in feed availability and prices, and limited knowledge of appropriate nutrition. Improving fodder production knowledge and practices, and strengthening the enabling environment to help smallholder farmers access the necessary feed, is essential. Alongside volume of feed, nutritional composition of feed and availability of water are also important concerns which may be overlooked or neglected.

Improved animal management, including basic animal husbandry and an increased focus on welfare²⁵, also contributes to improved health and productivity. Strengthening animal management includes not only nutrition and welfare but appropriate breeding practices to increase fertility and reduce inter-calving intervals. Poor fertility costs farmers by increasing the interval between calvings, meaning fewer calves are born in the year, and at best higher early lactation yields are replaced by lower late lactation yields, while at worst cows are dry and not contributing any income. Successfully reducing calving intervals and improving fertility requires a combined effort to improve animal health and nutrition as well as good fertility management.

While motivation for individual farmers to improve animal health and management practices is likely to be based on cost/profit gains, it is also recognised that improved efficiency through strengthened animal health and management is one of the key drivers of reducing GHG emissions from dairying²⁶, not just in developed industries but also in smallholder contexts²⁷. Aside from improved efficiency, there are much wider environmental sustainability gains to be made from improved management including reduced competition for and degradation of land through improved feed production and feeding practices, and reduction in pollution through manure management and nutrient recycling. The Dairy Sustainability Framework²⁸ provides detailed guidance on key criteria and mechanisms for long-term sectoral sustainability as well as links to wider donor-funded frameworks and guidance for addressing and measuring these criteria.

Genetic gains, in tandem with interventions already listed, will generate the most significant productivity impact but it will take much more time for a productivity payoff to be observed. The interventions in these different areas which are appropriate and practical will vary greatly with context, but projects should target these in combination as far as possible. Even modest gains in productivity, animal health and fertility stand to significantly benefit farmers on the lowest incomes and increase their resilience.

²⁵ Dairy Sustainability Framework (2018) Global Criteria: Animal Care. *Dairy Animals are treated with care, and are free from hunger and thirst, discomfort, pain, injury and disease, fear and distress, and can engage with relatively normal patterns of animal behaviour.*

²⁶ FAO/ Global Dairy Platform (2019) *Climate Change and the Global Dairy Cattle Sector*

²⁷ Global Dairy Platform / Dairy Sustainability Framework (2020) *Dairy Cattle Health and Greenhouse Gas Emissions Pilot Study: Chile, Kenya and the UK*

²⁸ <https://dairysustainabilityframework.org/dsf-membership/global-criteria/>

11. Last-Mile Delivery of Services (Market Systems, inputs and outputs)

To develop a sustainable and inclusive dairy system, it is vital that the resources and capacity exists to provide last-mile services in areas including genetics, animal healthcare, farmer training, and farm inputs (e.g. health products, feed products, and fodder production inputs such as fertiliser). A key focus is improving the systems and quality for training and retaining both private and government animal health and extension workers, and improving their ability to reach the largest number of farmers, including smallholders at the base of the value chain. In line with our cross-cutting focus areas, the use of data and strengthening of data management systems to support service delivery and results monitoring is also encouraged.

While genetics and AI services exist in some form or another even in the least developed dairy industries, the availability of AI services is not a guarantee of uptake. Poor conception rates due to supply chain issues or poor AI technician technique may put farmers off any additional cost or effort involved in AI, even in areas where services are readily available. It is therefore critical that interventions to improve breeding services consider the long-term efforts necessary to maintain the infrastructure and service provider capacity required to sustain an effective breeding system. A key constraint is the supply of genetic material, but another is infrastructure, which can be supported by ensuring long-term mechanisms for funding and maintenance of Liquid Nitrogen production and supplies of consumables. In the case of service provider capacity, this can include planning for regular repeat ‘refresher’ trainings and competency checks, and the wider work on market creation / government engagement to ensure that incentives for technicians remain when project funding ends. A commercially-viable model for the delivery of wider services such as animal health extension support is also important to avoid generating reliance on free or subsidised services. Supporting participation in producer associations/cooperatives can increase the affordability of these services (see 5. *Market Linkage Creation* below).

12. Market Linkage Creation (Market systems, inputs and outputs)

While demand for dairy products is expected to increase in developing economies, market dynamics are highly variable by context. Informal markets still dominate in much of Sub-Saharan Africa and South Asia (estimated at up to 80% in some cases), and products sold through formal markets are generally higher in cost and consumed by a relatively affluent portion of the population²⁹. Improving the supply of locally-produced milk is a sustainable way of lowering this cost to domestic consumers and encouraging consumption among lower income groups.

Selling milk entirely on the informal market leaves producers more vulnerable to fluctuations in milk prices and demand. A core element in realising the potential of dairy in emerging economies is linking the smallholders producing small volumes of milk to farmer-allied processors that can support them with the challenges they face at the base of the supply chain to help fulfil the demand for milk products at scale in the wider population. Processors that have invested in long-life milk processing plants and have more continuous demand for milk ensure the route to market is clearly defined for both input and output markets. Smallholders producing relatively small volumes of milk are more able to engage in formal markets through economies of scale, and therefore a realistic assessment of potential milk supply is vital in planning any market orientated approach, particularly one focused on formal

²⁹ USAID Feed the Future (2020). *The Enabling Environment for Animal Source Food Market System Success: Assessing Factors That Support Competitive, Inclusive, Resilient, Nutrition-Sensitive Systems*

channels. Processors are also able to better monitor and control milk quality, which is a vital element in market participation for smallholders. Ensuring quality of milk at all steps of the supply chain is also essential not only for farmers' livelihoods (often milk is turned away for insufficient quality) but for maintaining the nutritional value. It is therefore vital that this forms an element of farmer capacity building and training (see above).

A common approach to linking farmers to bulk markets is to encourage farmer participation in producers' associations or cooperatives. Formal associations may be better equipped to provide members with services such as access to finance, extension support and farm inputs, and strengthen their negotiating power with private sector actors such as processors. Models for ownership and operating structures of producers' associations vary but have been widely shown as an effective model which balances inclusivity with a business-orientated approach³⁰. Particular attention should be paid to ensuring that youth and (particularly) women farmers are offered equal access to cooperative membership to ensure that they can reap benefits (i.e. the income generated and the services offered) from their membership that is equivalent to their labour contribution towards dairy enterprises. Encouraging participation of these underrepresented groups in leadership roles can improve power balances, and women or youth acting as extension workers or lead farmers can act as role models.

Increasing farmers' productivity will not lead to an increase in income unless the market linkages exist for them to sell their dairy products. Linking farmers to markets as a source of income generation therefore fundamentally underpins the long-term strategy for Dairy for Development. In the short term, increasing and stabilising incomes can contribute to reducing poverty, improving food security and increasing resilience to external shocks. In the longer term, generating a steady income and providing the means for farmers to eventually invest their own money³¹ in improved inputs (e.g. feed, health products), equipment (e.g. cattle housing), and services (such as AI, veterinary care) contributes to growth of a self-sustaining dairy sector. Investing in capacity building to encourage farmers to see these investments as worth making and strengthening the enabling environment to enable them to do so are also essential elements in this. Therefore, we will support Dairy for Development projects with a commercially viable long-term vision in the development of a sustainable dairy system. We also intend to leverage private capital from Jersey and elsewhere to invest in market actors which serve smallholder dairy farmers, where huge potential for economic growth and financial returns exists alongside the potential to deliver measurable social and environmental impact.

13. Government and Sector Engagement (enabling environment)

Proposals should clearly outline how project activities will be coordinated with relevant national and/or local government bodies and should demonstrate how the approach is aligned with relevant government strategies, policies or plans for the dairy/livestock sector and agriculture more broadly. The majority of the current JOA focus countries have an existing industry of smallholder dairy farming (though with varied systems and at varied stages of development) and government policies that are principally in favour of the development of dairy as a sector. In some cases, Jersey already has a strong relationship with government actors in dairy, but in all instances grantees should take advantage of the fact that Jersey is a national donor, with bilateral relations with its target countries. These relationships are important to us, and good coordination is essential from a political point of view as well as from the perspective of national ownership and aid effectiveness.

Examples of key government bodies likely to be of relevance include:

³⁰ Andeweg, K. et al. (2020)

³¹ Research suggests farmers earning at least 25% of household income from dairy are 'business-orientated' and more likely to display interest in investing in improved practices and technologies (FAO (2019) *Developing Sustainable Value Chains for Small-Scale Livestock Producers*).

- Ministry/Department of Agriculture or equivalent
- Sub-divisions within Department / Ministry of Agriculture with a specific mandate for livestock and/or dairy
- Bodies responsible for livestock registration and data management. These may be separate to or embedded within wider government bodies and may operate in partnership with non-government organisations such as academic institutions.
- Bodies responsible for dairy extension services such as AI, veterinary services etc. These may be separate to, aligned with, or operate in parallel to private providers of the same services.
- Bodies associated with animal health and welfare, conservation, the environment, and natural resources. Most governments have in place specific environmental policies and emission reductions strategies as relates to their commitment to the Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC). Climate elements in project designs should take host government policies in this area into account.

Engagement with wider stakeholders and coordination with parallel investments in dairy and agriculture is essential. Proposals should also outline how activities will be coordinated with or complement those of relevant stakeholders including the private sector (e.g. agro-enterprises and processing companies, service and product suppliers) and NGOs (both local and international). Other important stakeholders include academic institutions (both local and international) particularly for projects with a major research component, key global, national and regional industry bodies such as breed associations, and other key bilateral and multilateral donor-funded projects which should be considered and consulted where appropriate.

Dairy for Development projects should encourage the sharing of data with external stakeholders and the coordination of formal data management systems and processes. Where appropriate, projects may involve a policy engagement component, working with government at local, regional, or even national level to influence government investments and strategies in the dairy sector and promote an improved enabling environment including formalisation or revision of policies and regulations. JOA supports cross-cutting initiatives in regional dairy sector engagement and encourage proposals which include coordination with these initiatives, some current examples of which are outlined below.

Annexe 1: Recent cross-cutting JOA Dairy for Development initiatives

The African Jersey Forum

The African Jersey Forum (AJF) is a platform for stakeholders in Africa with an interest in the Jersey breed to share knowledge, learn, and to network with others. Inspired by existing regional platforms including the European Jersey Forum and Latin America Jersey Forum, the AJF is intended to serve a dual purpose. Firstly, to provide educational and promotional resources for various audiences (including farmers, researchers and policymakers) related to the Jersey breed, and dairy development more broadly, throughout Africa and the tropics in general. Secondly, to bring together national Jersey breed associations as they begin to emerge on the continent.

The AJF website acts as a platform for sharing a variety of content including scientific articles and reports, news and insights. Our intention is that, over time, the forum will develop an extensive library of resources and a network of users throughout the region, promoting the Jersey breed both as a pure breed and in crossbreeding, and in and providing useful information to farmers and others involved in nascent dairy industries across Africa. As industry associations and specifically Jersey breed associations become more formalised in the region, it is intended that the AJF will serve a similar membership and networking function to parallel regional and international bodies. The AJF will also host annual or biannual regional learning events following on from the first launch event held in Kigali, Rwanda in 2019 titled: 'Why Dairy? Why Jersey?'. Partners in JOA Dairy for Development programmes (in relevant countries) will be expected to formally engage with the AJF network.

The Jersey Gene Bank

Access to appropriate genetics in developing countries remains largely prohibitively costly for use on a large scale. The Jersey Gene Bank seeks to act as a mechanism by which JOA can provide appropriate genetics in large quantities to its own or other similar dairy for development projects, at or near cost prices, without the large overheads charged by private sector suppliers in developing countries which largely price smallholders out of the market. The Jersey Gene Bank is seen as the bridge for smallholder farmers in particular, not being able to access improved appropriate genetics due to the high cost of supply, and a more commercially-focussed yet sustainable system of supply within the dairy supply chain. Possible mechanisms and resourcing of the Jersey Gene Bank are currently being reviewed, including the possibility of extending gene bank services to non-JOA projects and projects outside of the core JOA focus countries where there is clear impact value in doing so.

Development of Smallholder Dairy Profit Index in Rwanda

Through a consortium of technical and academic partners, JOA has funded field and desk-based research into the development of a smallholder Dairy Profit Index in Rwanda, with a view to its potential adaptation for use in similar contexts in the wider region. Dairy Profit Indices, widely used in developed dairy industries, provide a formalised ranking system for the profitability of cattle based on their key functional and phenotypic traits, as relevant to the specific environment. Based on genomic evaluation of a range of purebred, crossbred and indigenous dairy cattle, a formalised Dairy Profit Index specifically for the smallholder would help guide breeding efforts and genetic gains initiatives in a structured manner. The JOA-supported Rwanda project works in communication with parallel regional initiatives with partners such as ILRI, including the East African Africa Dairy Genetic Gains project.

Annexe 2: Dairy for Development (D4D) Expression of Interest (EOI) Design Guidance

This guidance sets out the minimum design requirements and preferred approaches for JOA D4D projects. It is intended to support partners in preparing Expressions of Interest (EOIs) that align with JOA's strategic objectives while remaining responsive to local contexts.

Design Essentials:

- **A. Target regions**
 - Should demonstrate clear potential for the expansion and professionalisation of bovine dairy production, supported by existing infrastructure.
 - Should include limited overlap with other donor-funded dairy programmes (including JOA-supported initiatives) unless clear complementarity is demonstrated.
- **B. Clear alignment with Government Policy, Regulatory Frameworks and other key sector actors.**
 - Clear understanding of the national policy and regulatory environment.

Proposals should include:

- A summary of relevant government strategies and legislation.
- Demonstration of alignment with national priorities.
- Identification of opportunities to support or strengthen existing policy frameworks, where appropriate.

Clear understanding and due consideration of potential collaboration with other dairy initiatives, NGOs & JOA partners operating within the same region.

- **C. Integration of JOA Cross-Cutting Themes**

Proposals should demonstrate how the intervention will incorporate the following cross-cutting themes, where relevant and appropriate:

- Promoting gender equality and women's participation.
- Creating opportunities for youth engagement.
- Considering disability inclusion and identifying practical opportunities for meaningful participation within the local dairy system.
- Improving environmental sustainability and climate resilience.
- Considering the role of data systems and digital technologies in improving efficiency, transparency and decision-making.

Technical Essentials:

- **1. Promotion of appropriate climate smart and improved dairy genetics, with a Jersey genetics targeted Dairy Genetic Gain Plan considered an essential element***
 - Clear strategy for the promotion and use of Jersey genetics.
 - Appropriate use of sexed or conventional semen, based on local context and project objectives (bull stations can be used as needed).
 - Strengthening service provision through training and ongoing support of Artificial Insemination (AI) technicians and last mile delivery of genetic improvement services.
 - Integration with Government and/or Private Sector service suppliers – not solely project based.
 - Improved record-keeping systems to support breeding, genetic gain tracking and productivity outcomes.

* If your project intends to operate in an area where a robust genetic gain programme is already in place, or has recently been completed, this requirement may be omitted, provided a clear rationale is given explaining why other constraints to dairy productivity or profitability represent a higher priority for intervention.

- **2. Farmer Extension - Improve Animal Productivity and Husbandry**
 - Delivery of structured training sessions focused on key productivity drivers - Either in person and/or through digital resources.
- **3. Strengthening Local Institutions and Service Delivery**
 - Collaboration with farmer groups, cooperatives and local service providers to improve extension systems, strengthen long-term sustainability and reduce transaction costs.
 - Consider the role of Community Animal Health Workers (CAHWs) and their integration with AI technicians and government service providers.

Optional:

The below is a short list of optional suggestions for activities which may be appropriate for a JOA dairy project.

Partners are encouraged not to include every activity listed below in their project design. Instead, they should consider selecting a small number of these options where they would meaningfully enhance the project.

Expressions of Interest (EOIs) will not be penalised for excluding optional activities. However, proposals may be rated more highly where such activities are included with a clear, well-justified, and targeted rationale.

Productivity and farm level improvements

- Support for agricultural inputs (e.g. crop/forage seeds) to improve fodder production and promote sustainable land use.
- Improvements to farm infrastructure (e.g. sheds, storage facilities).
- Support for milk collection systems, including milk collectors.

Value Addition & Market Development

- Promotion and support for value-added dairy products (e.g. butter, yoghurt, cheese), where it is contextually appropriate and a strong rate of return can be demonstrated.
- Consideration of context appropriate milk hygiene and milk component-based pricing to encourage improved milk handling practices.
- Exploration of digital, platform-based or data-driven dairy solutions (including mobile tools, digital marketplaces and AI-enabled services) that improve efficiency, transparency and farmer access to services.
- Strengthening market linkages, including:
 - o Connecting farmers and cooperatives with buyers,
 - o Improving Financial Literacy and access to basic savings and credit services
- Support of dairy-related Micro, Small and Medium Enterprises (MSMEs) and community saving groups.

Sustainability & Innovation

- Environmentally sustainable solutions, such as dairy waste-to-value systems (e.g. biogas digesters).
- Support for targeted independent or university-led research, where it would prove beneficial to the broader dairy sector.
- Capacity strengthening in specialised technical areas (e.g. semen quality, genetics systems).

Social Inclusion & Community Development

- Formation and/or strengthening of existing youth groups to encourage engagement in dairy farming.
- Training on gender equality, joint decision-making, and household dynamics.

Other

- Engagement with the African Jersey Forum (AJF), including a specific budget line of no less than £5,000 for engagement activities.