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MULTILATERAL INVESTMENT FUND

**URUGUAY**

**SUSTAINABLE, RESILIENT INFRASTRUCTURE FOR THE DEVELOPMENT  
OF DAIRY PRODUCERS**

**(UR-T1174)**

**DONORS MEMORANDUM**

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**SUSTAINABLE, RESILIENT INFRASTRUCTURE FOR  
THE DEVELOPMENT OF DAIRY PRODUCERS  
(UR-T1174)**

**PROJECT SUMMARY**

Excessive rains, water deficits, and severe thermal stress due to heat, which primarily occurs from October through March, are increasingly affecting output for the approximately 3,600 Uruguayan dairy producers, 2,000 of whom belong to the Cooperativa Nacional de Productores de Leche [National Dairy Producers' Cooperative] (CONAPROLE). One of the main concerns of the producers is how to counteract the adverse impact of excessive rainfall, which turns the interior roads used by cattle into mud, and of the heat waves, which affect the welfare of the cows in their confinement areas. These factors have negative consequences on health (lameness, mastitis, etc.), production (less milk due to lower food consumption and cows removed from the milking herd), and labor efficiency (longer and more complex routines). A lack of long-term financing and narrow profit margins make it even more difficult to make the required investments in infrastructure, including interior roads and the use of new resilient materials, channeling and drainage of excess water, shaded waiting stations, and improvements in the feeding stations.

To solve this situation, this project will help the Uruguayan dairy production ecosystem to adapt its productive infrastructure to a changing productive context affected by climate change and by export-driven regulatory and competitiveness requirements. In an initial phase, the project would reach an estimated 300 dairy producers in Uruguay, who will receive specialized advice on how to adapt their dairy production infrastructure to the climatic, production, and regulatory requirements. It is expected that some 70 producers will carry out infrastructure investments over the course of the project and that CONAPROLE will subsequently scale the project to all of its member producers (close to 2,000). To this end, the project will be supplemented by expected availability of long-term financing, either through IDB Invest or, for smaller-scale investments, through other lines of credit provided by Banco de la República Oriental del Uruguay (BROU) and other local lenders, including PROLECO, CONAPROLE's credit union.

In addition, by the end of the project, an estimated 1,200 Uruguayan dairy producers (more than 40% of all the country's producers) will have been sensitized to the importance of adapting dairy infrastructure to climate change to ensure cattle comfort and health, minimizing disease and boosting productive competitiveness. Furthermore, some 300 people in the country's dairy production chain will have been exposed to knowledge and cutting-edge technologies for optimizing the productive infrastructure in light of the local climatic environment and global regulatory and competitive requirements.

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## **ABBREVIATIONS**

BROU	Banco de la República Oriental del Uruguay
CONAPROLE	Cooperativa Nacional de Productores de Leche [National Dairy Producers' Cooperative]
Gg	Gigagrams
INALE	Instituto Nacional de Leche [National Dairy Institute]
MGAP	Ministry of Livestock, Agriculture, and Fisheries
mm	Millimeters
PROLECO	Financial institution owned by CONAPROLE member producers

**EXECUTIVE SUMMARY**

**URUGUAY**

**SUSTAINABLE, RESILIENT INFRASTRUCTURE FOR THE DEVELOPMENT  
OF DAIRY PRODUCERS  
(UR-T1174)**

<b>Country and geographic location:</b>	Uruguay, nationwide.		
<b>Executing agency:</b>	Cooperativa Nacional de Productores de Leche [National Dairy Producers' Association] (CONAPROLE)		
<b>Focus area:</b>	Climate-smart agriculture		
<b>Coordination with other donors/Bank operations:</b>	This project has been coordinated with: (i) IDB Invest, which is in the process of approving a CONAPROLE financing operation; (ii) the Climate Change and Sustainability Division and its role in support of the Climate Change Directorate of the Ministry of Housing, Land-use Planning, and Environment; and (iii) the Environment, Rural Development, and Risk Management Division (RND), particularly the Rural Productive Development Program and the Program to Strengthen the National Environment Directorate.		
<b>Project beneficiaries:</b>	The project will benefit 300 dairy producers who will receive personalized advisory services, 70 of whom will carry out infrastructure investments. In addition, 1,200 additional individuals who work in the dairy chain will be sensitized, and at least 120 sensitized advisors and 20 sensitized contractors, suppliers, and lenders will receive training.		
<b>Financing:</b>	Technical cooperation:	US\$850,000	
	<b>Total MIF contribution:</b>	<b>US\$850,000</b>	<b>22%</b>
	Counterpart:	US\$830,000	21%
	Cofinancing (companies)	US\$2,220,000	57%
	<b>Total budget:</b>	<b>US\$3,900,000</b>	<b>100%</b>
<b>Execution and disbursement period:</b>	48 months for execution and disbursements.		
<b>Special contractual conditions:</b>	The following will be conditions precedent to the first disbursement: (i) evidence that the project team has been assembled; and (ii) presentation of an annual work plan to the Bank's satisfaction.		
<b>Environmental and social impact review:</b>	This was classified as a Category "B" operation (moderate risk) on 31 May in accordance with the requirements of the Bank's Environment and Safeguards Compliance Policy (OP-703). The representative diagnostic assessment of dairy farms will include an environmental and occupational health analysis.		
<b>Unit with disbursement responsibility:</b>	Country Office in Uruguay (COF/CUR).		

## I. THE PROBLEM

### A. Description of the problem

- 1.1 **Summary of the problem: infrastructure, climate change, and productivity.** Excessive rains, water deficits, and severe thermal stress due to heat as a result of climate change are increasingly impacting dairy output in Uruguay, largely because infrastructure ill-suited to the open-air system affects cattle health. Specifically, excessive rainfall turns the internal roads used by cattle into mud, giving rise to foot and udder injuries and disease. In addition, the intense heat waves stress the animals in their unshaded confinement areas. These and other infrastructure problems have a negative impact on productivity (for example, less milk due to lower food consumption and the need to remove sick cows from the milking herd) and on labor efficiency (longer and more complex routines).
- 1.2 **Context: the dairy sector.** Uruguay has been a milk exporting country since 1942, charting a path of continuous growth that led the country to exceed US\$100 million in exports in the 1990s and reach a historic peak of US\$924 million in 2013. In 2014, foreign sales totaled US\$830 million.<sup>1</sup> In all, 70% of the milk and byproduct output is exported to more than 60 markets (INALE, 2012), positioning Uruguay as the world's seventh-largest milk exporter. The availability of quality raw material in growing quantities has been a prerequisite for advancing toward production and commercial strategies that can promote competitiveness.
- 1.3 As of the most recent (2014) agricultural census, 3,600 producers operate in the country and 77% ship their production for industrial processing. The main actor is the National Dairy Producers' Cooperative (CONAPROLE), which has about 2,000 member producers. The surface area used for primary dairy production totals 762,000 hectares, with an average area per producer of approximately 210 hectares. This average conceals a certain inequality in land distribution by product, since 50% of producers operate on less than 100 hectares. Approximately 80% of dairy farms are family enterprises in which women and men share the production work. According to CONAPROLE, 54% of the dairy farms that work with the cooperative have a woman owner or associate or a woman beneficiary or user of the cooperative's services.
- 1.4 **Productivity and labor.** According to data from the National Dairy Institute (INALE 2015), productivity yielded an average of 4,000 liters per hectare of dairy surface area. Recent decades have shown significant growth: 7% between 2007 and 2014, attributable to the introduction of new technologies that have improved productivity per cow and per hectare. The most important move was optimizing the management of fodder resources and animal feed through greater use of concentrated supplements and grains.<sup>2</sup> The same period saw a considerable increase in the stocking rate per hectare, with most producers exceeding one livestock unit per hectare (CONAPROLE, 2018). This growth has also been

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<sup>1</sup> Data from Uruguay XXI, 2015.

<sup>2</sup> *El sector lechero uruguayo. Contribuciones de las políticas públicas y la institucionalidad sectorial a su desarrollo.* Fida Mercosur/CLAEH. Viera, Bengoa, Bagnato, and Arboleya (2014).

uneven across producers: 20% of total producers recorded growth of more than 13% of milk production for the period.

- 1.5 The dairy sector is one of the most labor-intensive. Approximately 14,500 people are associated with dairy activities; they primarily include family workers as well as close to 6,500 wage earners. This sector remains among the few in which families still reside in the business premises.
- 1.6 **Climate change challenges.** Uruguay has been moving toward an increasingly intensive use of land, resources, and technologies in dairy production, giving rise to new challenges. One of these is the sustainability of natural resources and compliance with regulations in this area, as in the case of effluent management.<sup>3</sup> Another challenge is that, since production takes place outdoors year-round, it is subject to climate conditions and fluctuations. UN Climate Change points out that, over the last 30 years, Uruguay has witnessed a change in annual precipitation toward higher volumes, confirming a general upward trend over the last century. An analysis of cumulative rainfall from 1980 to date shows that, since 2001, rainfall has increased throughout the country and particularly along the coast.
- 1.7 Annual temperatures have also trended upward. An analysis of the 1980-2014 historical data series for Uruguay's average annual temperature shows a value of 17.8 degrees centigrade, with 2014 as one of the warmest years. Uruguay is particularly sensitive to extreme events, such as droughts, floods, cold and heat waves, tornadoes, hailstorms, frosts, heavy rains, and severe storms. The El Niño phenomenon is also evident in the country, mainly in the spring and fall, increasing the likelihood of heavier rainfall than has historically been the case for those times of year. At the same time, in years in which La Niña predominates, the country suffers from long and intense droughts. The interaction of these natural threats with social exposure and vulnerability has multiple impacts on the country's population, infrastructure, ecosystems, and biodiversity, and especially on its agricultural sector. Extreme events such as the 2008 drought or the 2014 floods brought about economic losses. More recently, additional extreme events have been recorded: in 2015, Uruguay had no rain for seven months, from January through July. This drought, considered the longest in recent times, resulted in production complications and large-scale economic losses. Faced with this water shortage, the Ministry of Livestock, Agriculture, and Fisheries (MGAP) declared an agricultural emergency from 5 May to 15 August 2015 covering 40% of the national territory. In the early months of 2018, a lack of rainfall gave rise to the country's worst drought conditions since 2008/2009. Losses in the agricultural sector were estimated at approximately US\$500 million, making this the most expensive disaster in Uruguay's history.<sup>4</sup>
- 1.8 According to the National Climate Change Response System (2016), Uruguay suffers heavily from the consequences of climate variability. Characterized in the past by having evenly distributed rainfall throughout the year (1,200-1,400 mm) and a temperate climate, Uruguay has in recent years experienced significant

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<sup>3</sup> The 2017 Biennial Update Report on Uruguay prioritizes the implementation of zero liquid discharge technologies and/or the use of good practices for effluent treatment and/or nutrient recovery and minimization of methane emissions by dairy farms and other intensive animal production facilities.

<sup>4</sup> [News article in Diario El Espectador on the effects of the drought on agriculture.](#)



- changes in its climate patterns. For example, in 2014, more than 400 mm of rain (almost one third of the annual precipitation) fell in only 10 days in January,<sup>5</sup> and this past summer temperatures exceeded the historical averages by more than 4 degrees centigrade from November to April, coupled with significant water deficits. These changes have an impact on dairy production.
- 1.9 This climate variability affects Uruguay, giving rise to: (i) droughts that impact the agricultural sector and lead to energy cost overruns; (ii) floods that impact public health and create population displacements as well as damage to production and infrastructure; (iii) extreme coastal events that result in erosion, changes in the coastal dynamics, infrastructure damage, and adverse effects on tourism activities; (iv) heavy storms that produce infrastructure damage and put the population at risk; (v) heat waves that affect human and animal health; and (vi) heat waves combined with droughts that restrict the supply of drinking water.
- 1.10 **Impact of climate change on the dairy sector.** Based on the country's 2014 inventory, the agriculture, forestry, and other land-uses sector accounts for 45% of national emissions, through two main activities: (i) enteric fermentation, with methane (CH<sub>4</sub>) quantification equivalent to 696.5 gigagrams (Gg); and (ii) soil management, with nitrous oxide (N<sub>2</sub>O) contributing 28.9 Gg.<sup>6</sup> For example, in 2008, energy cost overruns due to drought amounted to 1.4% of GDP. Estimates of losses in the agricultural sector as a result of this phenomenon (2008-2009 drought) are as high as 2.9% of the 2009 GDP. Similarly, increasingly frequent floods create losses not only in the agricultural sector but in infrastructure as well. Thus, in the summer of 2014 (January-February two month-period), rainfall exceeded the monthly averages by 150% to 350%, triggering a health, road, and agricultural emergency. As a result, 1% of the public expenditure had to be used to repair portions of the affected roads, deploy agricultural emergency funds, and implement other economic support measures to assist various impacted sectors. Over the course of 2015, the water deficit had a particularly strong impact on the agricultural sector, leading to significant economic losses. The same year, 5% to 15% of the total population of the Salto, Paysandú, and Artigas departments was displaced as a result of the floods that affected these departments. In addition, homes and urban infrastructure sustained significant losses, and the more seriously affected individuals suffered psychosocial impacts.<sup>7</sup>
- 1.11 In this context, a dialogue on dairy sector adaptation for the climate change and climate variability adaptation plan was launched in April 2017 to address the effects of climate change. Led by the MGAP, participants included dairy producers, researchers, academics, and private- and public-sector technical experts. These dialogue sessions identified three climatic events that affect dairy production in Uruguay: water excess, water deficits, and heat waves (these threats also having

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<sup>5</sup> Source: Instituto Nacional de Meteorología [National Meteorology Institute].

<sup>6</sup> According to the Fifth Assessment Report prepared by the Intergovernmental Panel on Climate Change, the global warming potential (GWP) is not directly related to a temperature limit, such as the target of 2°C (Manne and Richels, 2001; Shine et al., 2007; Manning and Reisinger, 2011; Smith et al., 2012; Tol et al., 2012; Tanaka et al., 2013), while some economic indicators and physical metrics of final effects, such as the global temperature potential (GTP), may be more appropriate for this purpose.

<sup>7</sup> Text of Uruguay 2016 National Communication.

been identified in Uruguay's Fourth National Communication, 2016). One of the concerns voiced by CONAPROLE member producers is the absence of tools to counteract the effects of excessive rainfall.

- 1.12 *Water excess.* Agricultural sector losses due to floods tend to affect mainly infrastructure. In the summer of 2014 (January-February two month-period), rainfall exceeded the monthly averages by 150% to 350%, triggering a health, road, and agricultural emergency. As a result, 1% of the public expenditure had to be used to repair portions of the affected roads and deploy agricultural emergency funds (Third National Communication, 2016). Climate change scenarios estimate that, by 2030, the increase in precipitation will range from +0.10 to +0.20 mm day<sup>-1</sup>. The experience of CONAPROLE producers shows that periods of excessively wet soil affect the general infrastructure of dairy farms, particularly the interior paths used by cattle as well as the cattle confinement, grazing, and rest areas. This has a powerful impact on health and quality/safety (cows with foot diseases, lameness, mastitis, etc.), production (less milk due to lower food consumption), and labor efficiency (longer and more complex routines), reducing overall system productivity and milk quality. This decline in quality also impacts the opportunities for CONAPROLE products to gain access to more sophisticated markets (such as the early childhood food market).
- 1.13 *Water deficit and stress due to high temperatures.* This essentially affects the availability of food and water for troughs. Coupled with the adverse effects of heat stress, it has a significant impact on output performance (liters of milk output) and reproductive performance (pregnancies). In Uruguay, the period of stress conditions spans five months, from October to March. It is worth noting that the agricultural sector's losses due to the 2008-2009 drought were as high as 2.9% of the 2009 GDP.
- 1.14 **Situation of local producers.** According to the diagnostic assessments conducted by the CONAPROLE Producers' Division, more than 90% of the dairy farms that ship milk to the cooperative have inadequate infrastructure, affecting productivity, milk quality and safety, and the sustainability of natural resources. In turn, this impacts the industry's competitiveness in global markets. The vast majority of producers have not made improvements in their infrastructure, and those who have (some producers perform some type of maintenance on interior roads and support areas) did not achieve the desired results.
- 1.15 There are four main reasons for this failure:
  - (i) There is limited awareness of the negative impact of inadequate infrastructure on cattle welfare and on the productivity and profitability metrics of dairy operations.
  - (ii) There is no specialized knowledge available at the regional level. Such knowledge should be provided by multidisciplinary teams consisting of hydraulic, civil, and environmental engineers, agronomists, architects, and other experts in resilient infrastructure issues applicable to agriculture, to support decision-making by dairy producers.
  - (iii) Producers lack access to specialized technical support and objective information that can serve as a basis for decision-making. They make investments according to the best of their knowledge and belief and

based on guidance from the (low-skilled) local suppliers available in their region.

- (iv) There are few providers of specialized services of this type, and they are generally not familiar with advances in dairy infrastructure technology. Medium-sized and large engineering companies lack specific know-how and have no incentives to specialize in the dairy sector, which is comprised of small and geographically dispersed producers.
  - (v) There are no financial instruments in the local market with maturities of more than five years that can match the amortization periods required for the type of investments needed.
- 1.16 In view of this situation, the dialogue on dairy sector adaptation points to a certain degree of consensus that adapting a dairy farm to climate change requires, among other things, investments in infrastructure to cushion the effects of extreme climate events and mitigate potential threats to the sustainability of natural resources, while also requiring adaptation to more intensive production systems.

## **II. THE INNOVATION PROPOSAL**

### **A. Project description**

- 2.1 The objective of the project is to strengthen the dairy industry's resilience and adaptation to the effects of climate change by adapting its infrastructure to the production, environmental, and regulatory context.
- 2.2 The proposed solution is for the small and medium-sized producers throughout the country who belong to the National Dairy Producers' Cooperative (CONAPROLE) to have sustainable<sup>8</sup> and resilient<sup>9</sup> infrastructure. This infrastructure should address specific components of sustainability, such as demand for energy, water use, rainwater management, and drainage, and should perform under conditions requiring resilience, such as water excess and deficits and extreme temperatures.
- 2.3 The infrastructure that will form part of this comprehensive solution includes: interior roads (from the grazing areas to the milking parlor), methods for channeling and drainage of excess water (taking into account the quality of the runoff water and its impact on waterways), shade, water distribution systems, cattle confinement areas, irrigation system, feeding stations and milking parlors, and effluent management systems. The design of infrastructure solutions will consider climate change projections (with a margin of uncertainty) and materials resistance and sustainability criteria and the inclusion of environmental safeguards.

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<sup>8</sup> Infrastructure sustainability is associated with the use of low-environmental impact, preferably local, materials and the provision of efficient services. Sustainability also means maintaining the infrastructure during its useful life, considering the preferences and needs of the population, and abiding by local and international social and environmental sustainability regulations. See [IDB blog on sustainable infrastructure](#).

<sup>9</sup> Infrastructure resilience refers to the use of materials and engineering that protects the cattle, workers, and facilities from floods, drought, extreme heat, extreme cold, and other phenomena associated with climate change. See [IDB blog on infrastructure resilience](#).

- 2.4 To achieve the proposed solution, multidisciplinary teams consisting of civil and environmental engineers, agronomists, and veterinarians will be assembled. Once these teams are in place, a representative diagnostic assessment of a group of dairy farms will be used as a basis to address their infrastructure needs. It will be essential to create technical knowledge of materials and best practices that can be applied to the dairy farms' conditions, are resistant, durable, and cost-effective, and address the challenges faced by these farms in terms of environmental sustainability and resilience to climate change. This will be achieved by turning to international best practices and the research and innovation produced by the National Research System and by local engineering firms and materials suppliers.
- 2.5 In addition, the project will design a multidisciplinary advisory system for dairy producers that is cost-effective and easily scalable. This system will be tested and subsequently made available to a significant number of producers. In terms of access to long-term financing, the project will work in coordination with IDB Invest, BROU, MGAP, CONAPROLE's credit union (PROLECO), and the Agencia Nacional de Desarrollo [National Development Agency] in its capacity as second-tier lender. The project will also work closely on the offer of technical advice to dairy producers, promoting knowledge of resilient and sustainable infrastructure as part of the diagnostic assessments and advisory services.
- 2.6 **Innovation.** The distinguishing feature of this proposal is that it would radically transform a group of rural producers, making them aware of the importance of implementing climate change adaptation plans that can boost their resilience, focusing on an often-overlooked aspect, namely, infrastructure associated with primary production. Another innovative feature of the proposal is that it generates new knowledge through a cross-fertilization of different disciplines and brings dairy producers to sources of knowledge normally inaccessible to them. In addition, this knowledge is supplemented by an offer of financing with repayment terms well-suited to the type of investments dairy producers require. This is also a case of applying resilient infrastructure at the level of mini-production units, which is an area of work the IDB Group has yet to tackle. In this regard, the project is innovative at the regional level, since there is no specialized knowledge of productive infrastructure management for open-air dairy farms or projects focusing on this aspect from which lessons can be learned.
- 2.7 Worth noting is the project's coordination with: (i) IDB Invest, which is in the process of approving a financing operation with CONAPROLE aimed at covering the medium- to long-term financing gap and matching the amortization periods envisaged under the proposed investment solutions; (ii) the Climate Change and Sustainability Division and its role in support of the Climate Change Directorate of the Ministry of Housing, Land-use Planning, and Environment; and (iii) the Environment, Rural Development, and Risk Management Division, particularly the Rural Productive Development Program (2595/OC-UR), which is aimed at promoting the adoption of technologies by family producers, including dairy producers, and the Program to Strengthen the National Environment Directorate (3080/OC-UR), which covers the quality of water and effluents and also encompasses the dairy sector.

**Component I: Generate knowledge on infrastructure in dairy farms  
(MIF: US\$165,740; local counterpart: US\$137,236)**

- 2.8 The objective of this component is to create knowledge on sustainable, resilient infrastructure applicable to small and medium-sized dairy producers. To this end, a multidisciplinary team of experts will be assembled, comprised of civil engineers, geologists, surveyors, veterinarians, and economists, as well as their counterparts at CONAPROLE. Once this team is in place, it will perform a diagnostic assessment of infrastructure availability and needs at approximately 30 representative dairy farms, divided by size and location area. This review will include an environmental and occupational health analysis.
- 2.9 The same team will perform a review of best practices at the local and international levels (particularly practices related to open-air production systems) and conduct study tours to learn from international experience in this field, culminating in studies to identify and measure the negative impacts of infrastructure deficits.
- 2.10 The solutions to some of the identified problems will come from the multidisciplinary technical team in interaction with producers, contractors, and other related agents, as well as from agreements with universities and open innovation processes through innovation competitions. All these solutions must include resilient infrastructure features.
- 2.11 Pilot tests will be performed at approximately five dairy farms to test and assess innovative methods and materials, including aspects such as interior roads, cattle confinement areas, construction techniques, shade, water, effluents, and automation. The dairy farms and test periods will be selected considering various types of dairy farms and climate seasons with a view to extracting the greatest wealth of knowledge.
- 2.12 These diagnostic assessments and proposed solutions will serve as a basis for preparing at least three guides to be used by technical experts and producers. The guides will be accessible in digital form. An application will be developed or adapted to help advisors to collect information on site on a recurrent basis and then compile and analyze it using data analysis<sup>10</sup> and forecasting algorithms for better risk management in the context of infrastructure management.
- 2.13 The following outcomes are expected from this component: (i) 30 dairy farms with a diagnostic assessment of their infrastructure availability and needs; (ii) at least 30 private advisors and CONAPROLE technical experts trained in infrastructure issues; (iii) three technical guides prepared; (iv) five experiences in implementing innovations in the use of resilient infrastructure; and (v) a monitoring system (app) for data collection and processing in operation.
- 2.14 This component will be carried out in coordination with the organizations created by CONAPROLE that are involved in the production process.

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<sup>10</sup> The project will consider using IoT (Internet of Things) technology to generate data on infrastructure resilience.

**Component II: Transfer knowledge and support decision-making on infrastructure (MIF: US\$475,632; local counterpart US\$208,640)**

- 2.15 The objective of this component is to improve decision-making on investments in infrastructure by dairy producers, narrowing their knowledge gap and optimizing the investments made. To this end, awareness-raising actions will be carried out through content for a project web page within the CONAPROLE website, including audiovisual documentation, in-person workshops, radio and TV appearances, and information-sharing tours aimed at raising awareness of the importance of this issue.
- 2.16 Multidisciplinary technical advisory services<sup>11</sup> will be made available to producers and be cofinanced by the producers based on a matrix to be determined jointly with CONAPROLE.
- 2.17 CONAPROLE's area-specific technical experts, who act as a liaison between the Producers' Division and the dairy producers, will play a decisive role in the process of supporting advisors and producers. The design of the advisory services will take into account the geographic dispersion and size of each production unit to ensure that producers can have access to these services in the short and medium term.
- 2.18 These activities are expected to yield the following outcomes: (i) 1,200 producers sensitized;<sup>12</sup> (ii) 300 producers participating in training activities on sustainable and resilient infrastructure management; and (iii) 300 individual advisory services on productive infrastructure.

**Component III: Strengthen the stakeholders in the infrastructure investment process (MIF: US\$13,000; local counterpart: US\$5,000)**

- 2.19 This component is aimed at strengthening the various interest groups that advise producers in their decision-making process regarding investments in infrastructure. To achieve this objective, there will be training and information-sharing activities for CONAPROLE technical experts, private advisors, and contractors and suppliers.
- 2.20 One of the project's key audiences will be financial institutions, particularly those associated with the development of the sector. To this end, infrastructure awareness-raising and training activities will be conducted as part of this component.
- 2.21 By the end of the project, this component is expected to have the following outcomes: (i) 120 advisors trained in the management of sustainable, resilient dairy farm infrastructure, including both CONAPROLE and private technical experts; (ii) 16 suppliers and contractors who work in the dairy production chain participating in dairy farm infrastructure knowledge-sharing activities organized by the project; and (ii) four financial institutions sensitized, at least two of which are staffed with personnel specialized in dairy infrastructure loans.

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<sup>11</sup> Multidisciplinary advisory services will include construction materials engineers, veterinarians, agricultural engineers, technical experts in dairy products, or others depending on the infrastructure advisory issue involved.

<sup>12</sup> Producers will be considered sensitized if they have had at least two interactions with the program, including having visited the dairy infrastructure web page, having read the disseminated materials on infrastructure, or having participated in awareness-raising activities.

## **B. Project outcomes, measurement, monitoring, and evaluation**

- 2.22 **Expected outcomes.** It is expected that, by the end of the project, a model based on awareness-raising, diagnostic assessment, and multidisciplinary advice aimed at adapting the infrastructure of dairy farms to a new climatic, production, environmental, and regulatory context will have proven effective. The model will be implemented throughout the country and will have an impact on at least 1,500 producers, workers, advisors, and financial institutions through the knowledge generated by the project. In addition, 300 producers will receive personalized advisory services. At least 20% of them are expected to make investments to improve their infrastructure, including effluent management. It is estimated that more than 90% of producers are micro, small, or medium-sized enterprises.
- 2.23 At the same time, the project is expected to improve the quality of milk (measured by the content of somatic cells), boost production (measured by liters/cow) by at least 10%, reduce the discard rate due to foot diseases<sup>13</sup> and mastitis by at least 10%,<sup>14</sup> and cut milking time by at least 10%. Furthermore, 75% of the workers at the targeted dairy farms are expected to report being satisfied with the improvement in their working conditions.
- 2.24 In addition, this project is an opportunity to improve the quality and degree of detail of the information gathered to prepare the country's National Greenhouse Gas Inventory and to measure the reduction in emissions (enteric fermentation) and the reduction in the dairy production's vulnerability to climate change.
- 2.25 **Project monitoring and evaluation.** The project envisages a final evaluation aimed at capturing the improvements in infrastructure in terms of milk quality/safety, labor efficiency, and worker satisfaction. To this end, plans call for: (a) preparation of a baseline from a representative sample of producers; (b) the use of an online platform for monitoring purposes; and (c) surveys and analysis of collected information to identify causes and outcomes, comparing, if possible, the information on producers who received technical assistance with the information on those who did not, and in the group of producers who did receive technical assistance, differentiating those who made investments from those who did not. These data will make it possible to answer the following questions: Who are the producers participating in the program? How are their capacities developed? Who influences their decision-making? How does access to finance affect the adoption of new technologies? With a view to ensuring the replicability of this operation, the project calls for performing a thematic study that describes the phases of the process and the lessons learned and best practices in each.

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<sup>13</sup> Such as laminitis, sole ulcers, hemorrhages, dermatitis, and many diseases commonly associated with foot lesions and infections resulting from ground conditions.

<sup>14</sup> This universe will be measured in dairy farms for which there are individual records and which make infrastructure investments (estimated at 10%).

### **III. ALIGNMENT WITH THE IDB GROUP, SCALABILITY, AND PROJECT RISKS**

#### **A. Alignment with the IDB Group**

- 3.1 This project forms part of the MIF's climate-smart agriculture pillar, since it tests innovations that facilitate the development of strategies for climate change adaptation and productivity improvement for dairy producers through the implementation of best practices and available technologies.
- 3.2 The project is aligned with the IDB Group's Institutional Strategy, which identifies low productivity and innovation levels as one of the region's challenges, and climate change and environmental stability as a crosscutting issue. It is also aligned with the Bank's country strategy with Uruguay for the 2016-2020 period, which lists boosting productivity and competitiveness by promoting innovation and improving productive infrastructure as one of its objectives.
- 3.3 The project is similarly aligned with the Sustainable Development Goals, particularly the climate action goal, since it promotes more resilient and sustainable economic activity. In addition, it is aligned with the industry, innovation, and infrastructure goal, contributing through an innovative approach aimed at improving producers' infrastructure to the benefit of the country's dairy industry.
- 3.4 Worth noting is the project's coordination with: (i) IDB Invest, which is considering a financing operation with CONAPROLE, through a trust fund that will channel resources to producers to cover the dairy sector's medium- to long-term financing gap and matching the amortization periods required under the proposed investment solutions; (ii) the Climate Change and Sustainability Division and its role in support of the Climate Change Directorate of the Ministry of Housing, Land-use Planning, and Environment; and (iii) the Environment, Rural Development, and Risk Management Division, particularly the Rural Productive Development Program (2595/OC/UR), which is aimed at promoting the adoption of technologies by family producers, including dairy producers, and the Program to Strengthen the National Environment Directorate (3080/OC-UR), which covers the quality of water and effluents and also encompasses the dairy sector.

#### **B. Scalability**

- 3.5 In an initial phase, the project would reach an estimated 300 dairy producers in Uruguay. In a subsequent phase, CONAPROLE is expected to scale the project by offering infrastructure advisory services to the remainder of its member producers (close to 2,000 in total). This will be supplemented by the availability of long-term financing, either through IDB Invest or through other lines of credit provided by BROU that will ensure there are resources for the initial and subsequent phases.
- 3.6 CONAPROLE's links to the National Dairy Institute (INALE) and the Ministry of Livestock, Agriculture, and Fisheries (MGAP) will ensure that the knowledge generated by the project is made available to a greater number of producers, as was the case with operation UR-M1041, "Promotion of Energy Efficient Upgrades and Renewable Energy Use on Small and Medium-sized Dairy Farms." The issue of resilient infrastructure was already identified as a priority in the dialogue on dairy sector adaptation for the climate change and climate variability adaptation plan. At the same time, CONAPROLE will share the knowledge generated under the



project at regional forums such as the Pan-American Dairy Federation. Countries such as Argentina, Chile, Paraguay, and Brazil (in its southern region), which also produce milk in open-air facilities, share this problem and could benefit from the lessons drawn from this project. In addition, the Bank's Climate Change and Sustainability Division, in its interactions with the Climate Change Directorate, will give visibility to this pilot experience, which will serve as an example on issues of adaptation and resilience. Lastly, including specialists from various Bank divisions on the project team is the right path to follow for the project's dissemination and potential scaling.

### **C. Project and institutional risks**

- 3.7 The main identified risk is the **limited supply of adequate financing** in terms of amounts and maturities for investments of this type, which would restrict implementation of the improvements proposed under the project. **Mitigation measure:** Work is being done in coordination with IDB Invest, and further work will be done with the Connectivity, Markets, and Finance Division and its lines of credit with BROU. In addition, at least four financial institutions will be sensitized to the importance of financing infrastructure improvements, and lessons learned on infrastructure investment management will be shared with a view to providing input for the design of credit products for this purpose. Another risk is the limited demand for infrastructure investments due to a lasting decline in global milk prices or to credit history problems resulting from excessive indebtedness in short-term working capital loans, which would restrict the producers' interest in investing in infrastructure improvements. **Consideration:** By virtue of being managed by CONAPROLE, which is the largest buyer and exporter of milk, the project is expected to have a high impact through the CONAPROLE field staff in terms of sensitizing producers to infrastructure issues. This will help producers to make better financial decisions.

## **IV. INSTRUMENT AND PROPOSED BUDGET**

- 4.1 The project has a total cost of US\$3.9 million. Of this, US\$850,000 (22%) will be contributed by the MIF in the form of nonreimbursable technical cooperation resources, and the balance will be contributed by CONAPROLE and cofinanced by small and medium-sized producers.
- 4.2 **Retroactive recognition of counterpart funds.** Counterpart resources may be recognized commencing on 12 September 2017, the project eligibility date, in an amount of up to US\$100,000.

<b>Project category</b>	<b>MIF</b>	<b>Counterpart</b>	<b>Cofinancing</b>	<b>Total</b>
<b>Component 1:</b> Generate knowledge on infrastructure in dairy farms	165,740	136,360	-	302,100
<b>Component 2:</b> Transfer knowledge and support decision-making on infrastructure	475,632	208,640	2,220,000	2,904,272
<b>Component 3:</b> Strengthen the stakeholders in the infrastructure investment process	13,000	5,000	-	18,000
Coordination, monitoring, and evaluation	165,000	480,000		645,000
Audits	16,000	-		16,000
Contingencies	14,628	-		14,628
<b>Grand total</b>	<b>850,000</b>	<b>830,000</b>	<b>2,220,000</b>	<b>3,900,000</b>
<b>% of financing</b>	<b>22%</b>	<b>21%</b>	<b>57%</b>	<b>100%</b>

## **V. EXECUTING AGENCY AND IMPLEMENTATION STRUCTURE**

### **A. Description of the executing agency**

- 5.1 The National Dairy Producers' Cooperative (CONAPROLE) will be the executing agency for this project and will sign the agreement with the Bank. CONAPROLE is the country's leading cooperative in terms of dairy exports. It receives dairy products from approximately 2,000 producers, who account for more than 70% of producers who ship milk for industrial processing. Its mission is to "gather, process, and sell all the milk produced by its members under the highest levels of efficiency with a view to steadily improve their income and quality of life." CONAPROLE's values include dynamism and a focus on innovation, market orientation, and excellence. It has recently completed execution of a technical cooperation operation with the MIF (Promotion of Energy Efficient Upgrades and Renewable Energy Use on Small and Medium-sized Dairy Farms), which, in addition, to its outcomes, has achieved a solution that is sustainable over time that has furthermore been scaled by the Ministry of Industries and Energy. Thus, CONAPROLE has demonstrated its capacity for technical leadership and its continuous search for innovative solutions to reach producers effectively and efficiently, as well as its influence on public policy.
- 5.2 The following are strategic partners in this project: PROLECO, as a financial institution affiliated with CONAPROLE's member producers, and PROLESA, as supplier of equipment, agricultural machinery, and supplies.

### **B. Implementation structure and mechanism**

- 5.3 CONAPROLE will establish an execution unit and the structure needed to implement the project's activities and manage project resources effectively and efficiently. Given the complexity of the operation, the project will be managed by the deputy manager of CONAPROLE's Producers' Division, who will be assigned a project assistant. CONAPROLE staff will be responsible for project administration, monitoring, and evaluation.

- 5.4 The execution unit will be responsible for project operation and administration and for preparing the semiannual reports required by the Bank (semiannual planning and project status reports), indicated in Annex V to this document. The project will also have a management committee comprised of the CONAPROLE Producers' Division manager and a member of the CONAPROLE board of directors. This committee will make binding decisions related to: (a) strategic, operational, and administrative planning for the project; (b) approval of the annual work plans and semiannual status reports; (c) contributions from key project partners; and (d) project scalability, among other matters. In addition, the committee may be authorized to decide on key project staff selection and procurement (such as coordinator, content, and curricular platforms) or on changes to be made to the project with proper Bank approval.

## **VI. FULFILLMENT OF MILESTONES AND SPECIAL FIDUCIARY ARRANGEMENTS**

- 6.1 **Disbursements by results and fiduciary arrangements.** The executing agency will commit to the MIF's standard arrangements relating to results-based disbursements, procurement, and financial management specified in the Technical Files. Project disbursements will be contingent on verification of fulfillment of milestones through the means of verification agreed upon between the execution unit and the MIF. Achievement of the milestones does not release the executing agency from its responsibility for compliance with the logical framework indicators and project objectives.
- 6.2 Under the risk- and performance-based project management modality, the project disbursement amounts will be determined in accordance with the project's estimated liquidity needs for a maximum period of six months. These needs will be agreed upon by the MIF and the executing agency and will reflect the activities and costs programmed in the annual planning exercise. The first disbursement will be contingent on fulfillment of the conditions precedent, and the successive disbursements will be made provided that the following two conditions are met: (i) verification by the MIF that the milestones have been achieved as agreed in the annual planning exercise; and (ii) the executing agency has provided supporting documentation for at least 80% of the cumulative funds advances.
- 6.3 **Procurement.** Procurement of goods and consulting contracts will be governed by the Bank's procurement policies (documents GN-2349-9 and GN-2350-9), in accordance with market practices for the private or business sector acceptable to the Bank.

## **VII. INTELLECTUAL PROPERTY**

- 7.1 **Intellectual property.** The Bank will grant CONAPROLE the rights to use the products and studies developed in the context of the project on a non-exclusive basis, free of charge, and for noncommercial purposes. This will ensure maximum dissemination of the lessons learned from the project among dairy producers in Uruguay and in the region, where CONAPROLE is followed by other dairy cooperatives and companies and has an influential role vis-à-vis public policymakers.