CODEEFABAR
the commitment to responsible breeding

Species Specific Template
Code EFABAR
CATTLE

Code EFABAR 2020

Company: ANAFIBJ – Italian Holstein, Brown and Jersey Breeders Association

CATTLE

1. Impact and structure of breeding in the EU cattle industry

Breeding Companies are in most cases small and medium size enterprises (SME) and often organized as co-operatives. Enormous genetic progress has been obtained in cattle breeding during the last 40 years due to reproduction biotechnologies and selection programs. The use of Artificial Insemination (AI) in the dairy industry speeded up this genetic progress tremendously. The massive use of frozen semen facilitates the transportation of genetic material - and business - across national borders. Often BCs do not only have domestic customers but also international clients with substantial distribution of genetic material to other countries. Differences in breeding objectives are to some degree a way to distinguish companies from each other. The bovine genetic market for the cattle farmers is huge, due to the availability of genetic material of different origin.

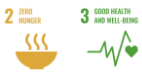
Since 2008 genomic breeding values are available for major dairy breeds. This paradigm shift in dairy cattle breeding has improved the rate of genetic improvement. It has lowered the age of used sires and donors, has given health traits an increased progress and has enlarged the number of sires of sons used in individual breeding programs. The introduction of "genomic" breeding programs has led to an increasing focus on female selection compared to "traditional" breeding programs did and resulting in programs for genomic (DNA) testing of large numbers of heifers.

In the cattle breeding sector, the competition between different companies is fierce. In every country and at many farms, semen from different companies may be used for AI. The market is international and the customers need to compare information from several different countries. For this reason, it is important that estimation of international breeding values is as complete as possible and is covering all the important traits. During the last years, a comparison of genetic material from several countries has been made available through INTERBULL's estimates of international breeding values for both "traditional" (based on progeny testing) and "genomic" (based on DNA testing) breeding. In September 2016 INTERBULL estimates breeding values for milk production, conformation, direct longevity, calving traits, workability and udder health. INTERBEEF has started to estimate international comparable breeding values for beef cattle, starting with Adjusted Weaning Weight. In addition, in the EuroGenomics consortium several breeding companies from different European countries (Scandinavia, France, Germany, Spain, Poland, the Netherlands and Flanders) work together in sharing the bull reference populations and thereby increasing reliability of genomic breeding values. They also work together in harmonisation of different traits, so the information collected in the different countries can be used more efficiently, thereby leading to higher reliabilities for those traits end more efficient selection.

In the Rotterdam Declaration, between Food and Agricultural Organization of the United Nations (FAO) and International Dairy Federation, the important role of the global dairy sector is recognized for achieving the Sustainable Development Goals (SDGs).

In FAO's "Global Dairy Sector: Facts"; it is stated that the linkages between the dairy sector, people and the planet are multiple and all-encompassing. Investments that promote a sustainable development of the livestock industry can contribute to achieve several SDGs, including:

No poverty (Goal 1): The dairy sector directly and indirectly supports the livelihoods of 150 million farmers, including the poor ones. It also generates employment opportunities along the value chain, which does not only represent a major pathway out of poverty, but also contributes to full and productive employment and decent work for all (Goal 8) and to reduce inequality (Goal 10).



End hunger and achieve food security (Goal 2) and contribute to healthy lives (Goal 3), because of the importance of milk in the provision of energy, protein and micronutrients and through investments that reduce the negative impact of the dairy industry on public health.

Achieve gender equality (Goal 5), because of the key role that women play in the dairy sector.

Promote sustainable consumption and production patterns (Goal 12), combat climate change (Goal 13), protect and restore terrestrial ecosystems including biodiversity (Goal 15) and sustainable management of water and sanitation (Goal 6) through the adoption of best practices, many of which have been proved effectively in different contexts.

The linkages between the dairy industry, people and the planet are however complex and multifaceted. Collective and concerted action through multi-stakeholder processes and integrated approaches are therefore needed for formulating and implementing sustainable investments and policies, consistently with Goal 17 (Partnerships for the Goals).

2. Introduction

Give a brief description of the governance policy of the Breeding Company (BC) regarding the societal challenges as mentioned in the Code EFABAR General Document. Besides the 6 pillars of the Code EFABAR, take also Food Security into consideration.

ANAFIBJ is the Italian Holstein, Brown and Jersey Breeders no profit Association. The Association, through Ministry of Agriculture, Food and Forestry Policy assignment, manages the Italian Holstein and Jersey Herbooks: the main tools for the application of the genetic programs. Italian Holstein and Jersey genetic programs have the purpose to technically direct the selection and genetic improvement, as well as the promotion and enhancement of breeds. ANAFIBJ has historically taken into account the Guiding Principles of the present Code into its genetic programs (also called breeding program). The selection of highly productive and robust animals, resilient to disease or environmental factors (e.g., heat stress) has increased the Italian self-sufficiency rate of milk and dairy products. Italy is also the European Country with the highest number of PDO products. ANAFIBJ acknowledge the breeding of animals that can produce specific high-quality products and has developed a specific genetic index for cheese-making in long seasoning hard paste cheeses. The Association promotes an economic, environmental and social sustainable development not only implemented through the selective program, but also through the management of the resources of its activity.

3. SUSTAINABILITY

A. Food Safety and Public Health

Breeding Element	Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No	If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?
Reduction of antimicrobial usage by selecting more disease resistant and robust animals.	Yes, indirectly, only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	Udder Health Index (MST) was estimated using all the available information from single test-day Somatic Cell Count data of each animal. New traits have been identified directly correlated with the "real mastitis" breeding objective. Data are combined together in an aggregate selection index to exhibit animals more resilient to clinical mastitis.
Meat quality (related to food safety and public health) (for instance by minimizing the spreading of diseases).	No.	ANAFIBJ doesn't plan to address this element in its breeding program because Holstein and Jersey are dairy breeds.
Milk quality (related to food safety and public health) (e.g. by minimizing the spreading of diseases)	Yes, directly, both for Italian Holstein and Jersey population (only bulls).	Somatic cells are strictly related to quality and healthiness of dairy products. Somatic Cells genetic index (SCS) was estimated to exhibit animals with low concentration of somatic cells in milk. In addition, only for Holstein also the "udder health index (MST) has been implemented since 2017.

Management Element	Yes/No	If yes, give a short explanation If no, explain why not?
Has the BC a biosecurity policy on its own premises (to avoid spreading zoonoses) and is it implemented?	Yes.	A sanitary protocol is set up and implemented for young bull's candidates to artificial insemination (AI) in Italy and entering into the Genetic Center. This health protocol is necessary to provide healthy animals to AI supply chain. Controlled diseases all have also the venereal route as transmission. Young bulls must come from herds unharmed for Tuberculosis, Enzootic Bovine Leucosis (LBE) and Brucellosis. Young bulls must be tested within 28 days before its introduction into the Genetic Center Quarantine Barn for: -negative virologic BVD test; -negative intradermal tuberculin test; -negative serological test for LBE; -negative serological test for Brucellosis;

		-negative serological test for IBR (immunoenzymatic and seroneutralization); Young bulls must also: -come from herds where no contagious diseases are present and not subject to veterinary police measures; - not show any symptoms of infectious skin diseases or clinical signs of diseases at the day of loading. Young bulls arrive at the Genetic Center in an authorised, washed and disinfected vehicle.
Has the BC an antimicrobial policy on its own premises and is it implemented?	Yes.	Vaccination plans are preferred over antimicrobial treatments. Antimicrobial treatments are carried out only if necessary. No antimicrobial treatments such as prophylaxis or metaphylaxis are performed.
Has the BC, as part of their biosecurity processes, procedures to reduce the potential risk of contamination from staff and equipment?	Yes.	A strict cleaning and sanitizing procedure is performed when young bulls leave the Quarantine Barn or the Genetic Center. All visitors of the Genetic Center must be registered and they are provided with specific disposable clothing. All vehicles passing through the Genetic Center are disinfected before entry.

B. Product Quality

Breeding Element	**Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No**	**If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?**
Carcass and meat quality (nutritious value) -Dairy cattle -Beef cattle	No.	ANAFIBJ doesn't plan to address this element in its breeding programs because Holstein and Jersey are dairy breeds.
Milk quality (fat, protein and lactose) (for instance nutritious value).	Yes, directly, both for Italian Holstein and Jersey population (only bulls).	Protein and fat (percent and yield) indexes have been historically taken into account and even today are weighted in the selection indexes (Italian Holstein: PFT, IES, ICS-PR; Jersey: IQJ).
Somatic Cell Count (SCC) (related to product quality)	Yes, directly, both for Italian Holstein and Jersey population (only bulls).	Somatic Cells are negative correlated with dairy yield. Somatic Cells genetic index (SCS) was estimated to exhibit animals with low concentration of somatic cells in milk.
Specific products for specific consumers (for instance Beta-casein A2A2).	Yes, directly, both for Italian Holstein and Jersey population.	Allelic variants of milk proteins (k-casein, β-casein and β-lactoglobulin) are available for all genotyped animals.

C. Genetic Diversity

Breeding Element	**Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No**	**If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?**
Genetic diversity within commercial breeds.	Yes, directly, only for Italian Holstein population.	Breeders have tools and services to manage genetic diversity and inbreeding level in their herds.
Conservation of genes of commercial breeds (in situ or ex situ).	Yes, directly, both for Italian Holstein and Jersey population.	Genotypes or semen doses of bulls and genotyped females are stored.
Cross breeding (programs)	No.	The ANAFIBJ plan to introduce this approach into its breeding program in the near future as it would be interesting to better understand the potential of crossbreeding in terms of inbreeding, heterosis, animal longevity and health.
Conservation of genes of rare and threatened breeds.	No.	Italian Holstein and Jersey populations are not threatened.
Provision of mating programs for farmers to control inbreeding.	Yes, directly, for Italian Holstein population and Italian Jersey population	The mating plan is a paid voluntary service available to breeders and to artificial insemination (AI) stud.

Management Element	**Yes/No**	**If yes, give a short explanation If no, explain why not?**
Does the BC have or contribute to a gene bank for commercial breeds?	Yes, directly, both for Italian Holstein and Jersey population.	Genotypes or semen doses of bulls and genotyped females are stored.
Does the BC contribute to the conservation of genes of rare and threatened breeds?	No.	Italian Holstein and Jersey populations are not threatened.

D. Resource Efficiency

Breeding Element	**Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No**	**If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?**
Longevity in general (dairy breeds)	Yes, directly, only for Italian Holstein population. For Jersey breed we just started a project to introduce longevity index in the near future.	A genetic index for functional longevity was estimated for Italian Holstein. Functional longevity index is also weighted in selection indexes (PFT, IES, ICS-PR). ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Fertility (maternal and paternal)	Yes, directly, only for Italian Holstein population. For Jersey breed we just started a project and this new index will be introduced in the near future.	Genetic indexes of male and female fertility were estimated for Italian Holstein animals. Fertility index is also weighted in selection indexes (PFT, IES, ICS-PR).

		ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Survival of young animals - at birth - at rearing - until slaughter	No.	For the survival of young animals at birth the Calving Aggregate Index (IPA) will be estimated. It will be a combination of the three estimated breeding values related to calving: Calving ease, Stillbirth and Gestation length. This new aggregate selection index will enhance genetic gain and provide a more efficient tool for decision making at farm level. For the survival of young animals at rearing and until slaughter there are no enough reliable data to assess this trait in Italian Holstein and/or Jersey population. HH1, HH2, HH3, HH5, HH0, HCD and CVM haplotypes are available for Italian Holstein genotyped animals. Specific gene tests for HCD, CVM and BRACHYSPINA are also available too.
Growth rate	No.	To date, there are not enough reliable data available to assess this trait in the Italian Holstein and/or Jersey population. ANAFIBJ is collecting data about weight of animals.
Feed efficiency - general - energy efficiency - protein efficiency	Yes, indirectly, only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	A predicted feed efficiency index (pFE) was estimated for Italian Holstein animals. In addition, ANAFIBJ is working on direct collection of these data with cooperation with other Italian universities and international institutions. ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Water efficiency	No.	To date, there are not enough reliable data available to assess this trait in Italian Holstein and/or Jersey population. ANAFIBJ is collecting data of water intake trough the installation of specific equipments at the Genetic Center.

Management Element	**Yes/No**	**If yes, give a short explanation If no, explain why not?**
Has the BC a resource efficiency policy on its own premises and is it implemented?	Yes	Resources are implemented and managed with quality and efficiency policy certified by ISO 9001:2015 standard.
Has the BC procedures for processing of or reuse of residual products?	Yes	Manure produced by young bulls at the Genetic Center are stored, then buried in land in compliance with the Nitrates Directive (91/676/EEC).

E. Environment

Breeding Element	Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No	If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?
Reduction N and P emission (consider the reusability of these elements in the manure)	No.	To date, there are not enough reliable data available to assess this trait in Italian Holstein and/or Jersey population.
Reduction Green House Gas (esp. CH_4) emission	No.	ANAFIBJ is aware that is possible to set up a genetic and genomic selection for environmental sustainability. The Association is collecting data on CH_4 and CO_2 emissions on young bulls at the Genetic Centre using different equipments.
Reduction NH_3 emission	No.	To date, there are not enough reliable data available to assess this trait in Italian Holstein and/or Jersey population, but we are implementing a new index based on ratio between Protein and Mun (Milk urea nitrogen) for Italian Holstein.
Adaptation to climate change	Yes, directly, only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	ANAFIBJ has estimated the Heat Tolerance (IHT) index. This index aims to identify animals more resilient to high temperature and with less milk production losses. ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.

Management Element	Yes/No	If yes, give a short explanation If no, explain why not?
Has the BC an environment policy on its own premises and is it implemented?	Yes.	Chemical flies control treatments have been replaced with biological flies control protocol.
Has the BC has a policy to reduce carbon footprint?	Yes.	Cars with internal combustion engines were replaced with hybrid and electric cars. Local goods and services providers are preferred.

F. Animal Health and Welfare

Breeding Element	**Has the BC implemented this element in its breeding program, directly or indirectly? Yes/No**	**If yes, how has the BC implemented this element in its breeding program? If no, does the BC plan to address this element in its breeding program in the next 3 years? If no, why not?**
Mastitis and other udder health issues	Yes, directly only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	A genetic index for udder health (MST) was estimated for Italian Holstein animals. This index exhibit for animals more resistant to clinical mastitis. ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Metabolic diseases (e.g. ketosis, etc.)	No.	A ketosis resistance genetic index for Italian Holstein is planned in the next years.
Fertility disturbance (e.g., metritis, retained placenta, cysts, etc.)	No.	To date, there are not enough reliable data available to assess this trait in Italian Holstein and/or Jersey population. HH4 fertility haplotype is available for Italian Holstein genotyped animals. JH1 fertility haplotype is available for Italian Jersey genotyped animals.
Calving ease	Yes, directly only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	A genetic index for Calving difficulties (DFP) is estimated for the Italian Holstein. This index considers both calving ease of the bull and calving ease referred to the cow. The calving ease of the cow is also weighted in selection index IES. ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Feet and leg conformation	Yes, only for Italian Holstein population. To date, for Jersey breed there is not a sufficiently large population to carry out a genomic and genetic evaluation for this trait.	A genetic index for feet and legs (IAP) is estimated for Italian Holstein based on data from morphological evaluations. Feet and leg conformation is also weighted in the selection indexes for Holstein (PFT). ANAFIBJ is working to find genotypes exchange agreements for Jersey breed.
Udder conformation (related to animal welfare)	Yes, directly both for Italian Holstein and Jersey populations (only for bulls).	A genetic index for udder conformation (ICM) is estimated for Italian Holstein. The ICM is a composite index aimed to select functional udder. Udder conformation is also weighted in the Italian Holstein selection index (PFT). Fore attachment strength, ligament and udder depth indexes were estimated for Jersey bulls.

Claw health (related to health and welfare)	No.	To date, there are not enough reliable data available to assess this trait in the Italian Holstein population. ANAFIBJ is collecting data related to claw health in collaboration with hoof trimmers.
Disease resistance against specific diseases	No.	The creation of standardised protocols for data collection of claw and metabolic disease is planned for the next years.
Polledness (related to animal welfare)	Yes, directly only for Italian Holstein.	Animals tested for polled are identified and all test results for polled are recorded in our database. To date, Holstein polled bulls authorised to AI are 312 and 5% of matings on Italian Holstein cows are carried out with polled bulls. Information on polled haplotype is also available for all genotyped animals. Specific gene test for polled is also available too.
Monogenic traits/defects	Yes, directly both for Italian Holstein and Jersey population.	All results related to monogenetic traits or haplotypes are recorded in our database. When an animal is genotyped or directly tested for a monogenetic trait, results are displayed on Herdbook official documents.

Management Element	Yes/No	If yes, give a short explanation If no, explain why not?
Has the BC a biosecurity policy on its own premises (to avoid diseases and the spreading of diseases to other premises) and is it implemented?	Yes	A strict cleaning and sanitizing procedure is performed when young bulls leave the Quarantine Barn or the Genetic Centre. All visitors of the Genetic Centre must be registered and are provided with specific disposable clothing. All vehicle passing through the Genetic Centre are disinfected before entry.
Has the BC a welfare policy on its own premises making a reference to the Five Freedoms and is the welfare policy implemented?	Yes	The housing conditions of young bulls at the Genetic Center respect the Five Freedoms and guarantee animal welfare: - they have access to clean, fresh water and a suitable diet; - they have adequate resting areas on straw; - the presence of the veterinarian and the adoption of herd monitoring tools allow to continuously monitor the health and well-being of the animals - ample space available to facilitate social contacts between the bulls - staff works without instilling fear or psychological discomfort to animals.
Has the BC procedures to minimise stress when handling individuals?	Yes	Animals are organized in homogeneous groups by origin and weight. Movements are carried out in groups. After moving, animals have an adequate period of adaptation. No electronic handling devices or nose twists are used.
Has the BC a policy on how to handle its animals prior to and during transport and is it implemented?	Yes	Animals are separated for an appropriate period of time before transport. Animals must travel in washed and disinfected means of transport. Current legislation on transport conditions is respected.
Has the BC a policy in place to periodically train and update its animal care takers on how to manage and handle the animals and is it implemented?	Yes	Operations are supervised by the veterinarian. Staff training is continuous.

4. TECHNOLOGIES

A. Breeding Technologies

Element	Is the BC using these breeding technologies in its breeding practices? Yes/No	If yes, give a short explanation. If no, explain why not? Any examples?
Genomics	Yes.	All bulls qualified for artificial insemination (AI) in Italy must have a genomic analysis. ANAFIBJ offers a

		genomic testing service to breeders and to AI stud.
Progeny Testing	Yes.	A young bull whose semen is already in distribution but hasn't daughters is considered "genomic bull". A bull is considered "proven bulls" when it has at least 30 daughters with at least 120 days in milk in 30 herds with reliability greater than 80%.
Gene-editing	No	ANAFIBJ is aware of the potential of gene editing and it could be introduced into its genetic programs in the future.
Transgenesis	No	There are noy reliable scientific evidences and applications regarding the application of this technique in Italian Holstein and Jersey population.
Cisgenesis	No	There are noy reliable scientific evidences and applications regarding the application of this technique in Italian Holstein and Jersey population.
Metabolomics, proteomics, transcriptomics	No	To date, there are not enough reliable data available to assess these tools in Italian Holstein and Jersey population. ANAFIBJ will start to collect data through metagenomic analysis of the rumen fluid, feces and buccal swabs on young bulls at the Genetic Center.

B. Reproduction Technologies

Element	Is the BC using these reproduction technologies in its reproduction practices? Yes/No	If yes, give a short explanation. If no, why not? Any examples?
Artificial Insemination	Yes.	ANAFIBJ does not use directly this reproduction technology. Artificial Insemination, as Natural Insemination, is allowed in the breeding program both for Italian Holstein and Jersey population.
Sexing of semen	Yes.	ANAFIBJ does not use directly this reproduction technology. Sexed semen is allowed in the breeding program both for Italian Holstein and Jersey population.
Embryo production by superovulation stimulation followed by flushing/	Yes.	ANAFIBJ does not use directly this reproduction technology. Embryo production by superovulation stimulation followed by flushing is allowed in the breeding program both for Italian Holstein and Jersey population.
Embryo production by superovulation stimulation followed by ovum pick-up/	Yes.	ANAFIBJ does not use directly this reproduction technology. Embryo production by superovulation stimulation followed by ovum pick-up is allowed in the breeding program both for Italian Holstein and Jersey population.
Embryo transfer (ET) (attention for welfare)	Yes.	ANAFIBJ does not use directly this reproduction technology. Embryo transfer (ET)is allowed in the breeding program both for Italian Holstein and Jersey population.
Cloning (ENCT and SNCT)	No	ANAFIBJ technical commission decided that a subject to be qualified to Artificial Insemination (AI) in Italy must not be a clone and must not have clones among his ancestors. It is also resolved to identify in order to track its dissemination with: "ETN" clone animal "ETC" animals with clones present up to the 3rd generation

C. Monitoring technologies

Element	Is the BC exploring new technologies? Yes/No	If yes, give a short explanation. If no, why not? Any examples?
Exploring new monitoring technologies to improve welfare and robustness	Yes.	Herd monitoring tools are installed on young bulls for welfare and health monitoring at our Genetic Center.

D. Innovation and public perception

Element	Is the BC investing in innovation? Yes/No	If yes, give a short explanation. If no, why not? Any examples?
Does the BC invest in research and development, and/or collaborate with research institutes on traits important to the breeding program?	Yes.	ANAFIBJ has its own Research and Development Office that cooperate with several Italian Universities and international institutions on traits important to its breeding programs.
Does the BC take a proactive approach to adopting new techniques and technologies?	Yes.	Since February 2016, ANAFIBJ has added an imputation process also for genetic deficiencies. Starting from 2018, the Genetic Centre has been equipped with innovative tools for measuring feed intake, water intake and methane emissions on young bulls. New data on monogenetic traits and haplotypes are readily incorporated into the breeding program.
Does the BC take action to engage with society?	Yes.	Many actions have been taken to engage with society: free and open access communication, social content, involvement of all the players in the supply chain from the producer to the consumer at conferences.

5. Certification

We herewith declare that the content of this template expresses the breeding and reproduction policy of the company

Place:
Date:

Name and signature:

European Forum of Farm Animal Breeders (EFFAB)
We herewith state that this template complies with the CODE EFABAR Version 2020

Place: Brussels
Period of validity:

Ana Granados Chapatte, EFFAB, Director