CIRI by ifip

International Research Innovation Center for the Pig and Pork Industry

The CIRI pig farm

Pig Farming

Feeding strategy & nutrition

Building design, Fit-out & Facilities

Environment

Animal welfare

Reproduction

Animal health

Technical-economic analyses

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Pig farming division

Ongoing evolution of pig farms

Pig farms are constantly evolving and reorganizing.

Driven by fluctuating production costs, increasingly specialized food trades, a mounting pressure on environmental aspects, shifts in social acceptability, and the need to recompliance and meet new regulations.

IFIP produces **technical–economic reference and decision support tools** needed to contribute to these changes, to help make these developments a reality.

- Re-engineer technical pathways: **optimize feeding strategy, animal welfare, health factors, quality of working conditions,**
  re-adapting farm buildings to an array of fast-changing production-standard specifications, etc.
- **Manage effluent streams** according to the farm's context and configuration.
- **Reduce environmental impacts** (water, soil, air) by integrating new dimensions (energy autonomy, greenhouse gas emissions, ...).
- Mobilize the expertise needed to implement complementary sub-operations, such as **on-farm feed production or biogas production...**

Reducing production costs by optimized technical practices

International competition forces efforts to reduce production costs by implementing all possible technical process and route factors

feeding strategies **reproductive performance** **biosafety code**

IFIP provides technical data tested out in real-scale settings enabling farm operations to move **from a diagnosis of the farm's situation to setting up economically-efficient solutions.**

Experimental trials carried out on experimental or commercial farms provide high quality data which serve to quantify the technical and economic rationale for adopting research-pipeline or supplier-proposed innovations.

Improving environmental footprint

IFIP develops tools and references used to assess and improve the environmental footprint of pig farms:

- **reducing flows of water, air and ground pollutants**
- **optimizing effluent management processes,**
- **saving or even producing energy,**
- **value-streaming various food–farming industry coproducts**
- **improving the adequacy between nutrient requirements and supplies**
- **formulating low crude protein diets**

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Experimental facilities of the Romillé pig research farm

Quarantine, Service and Gestation units

Focus	Measurements and analyses		Material and indicators
REPRODUCTION	Gilt's body weight gain	routinized	Weight measurement
	Quality of artificial insemination (AI)	routinized	Scoring od vulval discharge
	Reproductive performances	routinized	Technical sow herd management indicators: weaning to estrus intervals, fertility, litter size
	Monitoring on culled sows at the slaughterhouse	custom-scheduled	Slaughterhouse data, including seizures
	Puberty	custom-scheduled	Visual observation, ultrasound, hormone assays
	Sows in heat, gestation monitoring, ovarian/uterine disorders	custom-scheduled	Ultrasound
	Sow behaviour patterns during the AI week	custom-scheduled	Video recording (coming into estrus), direct observation (intensity and length of estrus)
	Urinary infection, hormone assays, etc.	custom-scheduled	Blood, urine, saliva samples: physiological markers of health/stress...
HEALTH	Microbiota and parasitism	custom-scheduled	Faecal and blood sampling
	Sow immunity assessment	custom-scheduled	Markers in blood, saliva...
	Body-temperature monitoring	custom-scheduled	Thermometers or other technologies (e.g. infrared, etc.)
	Efficiency of cleaning-disinfecting protocols	custom-scheduled	Observations, lab analyses
	Sow diseases and mortality rates	custom-scheduled	Clinical outcomes, necropsy
ANIMAL WELFARE	Sow behaviour	custom-scheduled	Video recording / Direct observation (on activity patterns, postures, ...)
	Cleanliness of sows	custom-scheduled	Observation
AMBIENT CONDITIONS	Temperature, humidity...	routinized	Smart/IoT sensors
	Indoor lighting	custom-scheduled	Light level
	Sound level	custom-scheduled	Sound level
MANAGEMENT	Bodyweight through gestation	mixed	Manual or digital (smart) scale
	back-fat and back-muscle thickness	mixed	Ultrasound: Back-fat thickness and back-muscle thickness of the sows through gestation
	Time per task	custom-scheduled	Stopwatch: time per task
FEED & WATER	Individualized feeding	routinized	Weight-checks on amount of feed dispensed
	Conformity of an animal feed	routinized	Sampling and profiling of chemical parameters: dry matter content, total nitrogen content
	Intake dynamics: feeding/watering patterns	mixed	Individualized tracking with automatic feed dispensers and smart drinkers
	Breakdown of actual feed consumption (ingested and refused)	mixed	Controlled feed dry-out and weigh-out (ingested and refused)
	Representative feed samples	custom-scheduled	Sampling and profiling of feed chemical parameters: dry matter content, total nitrogen content, etc.
ENVIRONMENT	Manure composition	custom-scheduled	Lab analyses

Measurements and analyses: custom-scheduled routinized

List is non-exhaustive - Experimental protocols validated per-trial by the institutional animal care and use committee

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Experimental capacity of the Romillé pig research farm (NW France)

The lactation unit

Focus	Measurements and analyses		Material and indicators
REPRODUCTION	Monitoring on farrowing (free-ranging, in farrowing crates, lift-floor balance stall, etc.)		Observations, grading, interventions, farrowing progression data
	Physiological health/stress		Markers in blood, urine, saliva, faeces (hormones, microbiota, antibodies, pathogens)
	Outcomes of deliveries		Placenta sampling/weigh-out
	Udder health		Observations before and after milk let-down
	Quantity and quality of colostrum, chemical composition of the milk		Piglet weight at first suckle and at 24h since birth, colostrum and milk analysis
HEALTH	Body-temperature monitoring		Thermometers or other technologies (e.g. infrared, etc.)
	Urinary infections		Urine sampling and analysis
	Sow diseases and mortality rates		Clinical outcomes, autopsy/cause of death
ANIMAL WELFARE	Sow behaviour		Video recording, direct observation
	Studies on nesting behaviour		Use of different materials, sow behaviour
	Studies on temparory confinement in farrowing room (when, for how long, with or without lift-floor system)		Impact on sow behaviour, farmer workload, farrowing outcomes...
AMBIENT CONDITIONS	In-facility air conditions (temperature, ventilation, etc.)		Loggers: temperature (sensor probe), aeration rates (fan-unit logger)
FEED & WATER	Feed delivery		Monitoring on individualized feed stations, volume-framed standard calibration
	Conformity of an animal feed		Sampling and profiling of chemical parameters (storage at 4°C or -20°C for lab analysis, dummy rations)
	Computation of intakes and individualized tracking		Amount of feed dispensed per sow per individualized feed station, weigh-out of refusals and (drying oven) dry-matter content
	Weight of lactating sows		Sow weight checks at entry to the farrowing unit, on the day after farrowing, on the day of weaning
	Back-fat thickness and back-muscle thickness		Back-fat thickness and back-muscle thickness during lactation, ultrasound, linear array probe
	Intestinal transit		Observations, faecal scoring and faecal dry matter content (by sampling>homogenizing>drying)
ENVIRONMENT	Gas concentrations (NH_3, CH_4, N_2O, CO_2)		Computations of gas emissions (flowrate measurement) via photoacoustic IR analyser coupled to a 6-channel sampler (continuous or semi-continuous measurements) or diffuser tube (regular spot measurements)
	Particulate concentrations (TSP, PM_{10}, $PM_{2.5}$,PM_1)		Calculation of emission streams (flow measurements) based on particle concentration analyzer readings (Grimm optical particle counter) or particulate mass sensors (for TSP)

Measurements and analyses: custom-scheduled routinized

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Experimental capacity of the Romillé pig research farm (NW France)

At the 'suckling piglet' phase

Thématique	Measurements and analyses		Material and indicators
REPRODUCTION	Neonatal characteristics of the piglets		Birth weight, numbers of born alive, stillborn (true/false : ultrasound method), mummies, and deaths before suckling
	Vitality of newborns		Time from birth to first suckle (video recording)
	Piglet body temperature		Thermometer (internal/skin-surface probes)
HEALTH	Diseases and mortality rates		Clinical outcomes, autopsy/cause of death
	Pig health status		Markers in blood (microbiota, antibodies, pathogens, etc.).
	Faeces and diarrhoea		Faecal score and dry-matter content (observation, analyses)
	Visible lesions on the piglets		Aggressiveness, arthritis, lameness, wounds
ANIMAL WELFARE	Stress		Plasma cortisol
	Behaviour		Piglet suckling rhythm, exploring the stall/pen, interaction with the sow and the piglets... (video recording)
	Intensity of piglet screams		Sound level meter
	Cleanliness of nests and piglets		Score
AMBIENT CONDITIONS	Nest temperatures		Infrared sensor
	Light intensity in farrowing houses/stalls		Light level meter
PRACTICE	Identification from birth to the slaughterhouse		Electronic swine ID tagging
	Piglet growth gain and sow milk production		Weight at birth and at weaning
	Stunted and underweight piglets		Indicators of stunted intra uterine growth retardation (form of the skull and hooves, X-ray scans, etc.)
	Time invested per task		Stopwatched (care delivery, etc.)
	Quality of care (reheating, teeth, cord/navel, etc.)		Sound level meter, stopwatch, ethogram, video recording, scoring/grading
FEED & WATER	Feed consumption		Feed weigh-out
	Water use		Water meters
ENVIRONMENT	Gas concentrations (NH_3, CH_4, N_2O, CO_2)		Photoacoustic IR analyser coupled with a 6- channel sampler
	Particulate concentrations (TSP, PM_{10}, $PM_{2.5}$,PM_1)		Grimm optical particle counter or particulate mass filters

Measurements and analyses: custom-scheduled routinized

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Experimental capacity of the Romillé pig research farm (NW France)

At the 'post-weaning' phase

Focus	Measurements and analyses	Moyens et indicateurs
ANIMAL WELFARE	Use of manipulable materials	Video recording / direct observation of use,deterioration (before/after weighing)...
	Piglet behaviour	Video recording / direct observation
	Welfare indicators	BEEP welfare assessment, blood / saliva markers
	Quality of the pig housing	Animal and floor cleanliness
HEALTH	Diseases and mortality rates	Clinical outcomes, observations/autopsies
	Faeces and diarrhoea	Faecal scores and dry-matter contents (dry-out)
	Visible lesions on the piglets	Arthritis, lameness, wounds, tail status
	Physiological health (microbiota, antibodies, pathogens)	Markers in blood, saliva, faeces, etc.
AMBIENT CONDITIONS	In-facility ambient conditions	Airflow rate, temperature measured by USB-ready or WiFi-connected sensors
	Airwashing	Air-washer unit water consumption via metering readings
PRACTICE	Individualized pig growth profiling	Weigh-out of all pigs at the start, middle and end of post-weaning
	Bone density, ash content and phosphorus content	X-rays scans of the feet/metacarpal bones, lab-based assays
FEED & WATER	Characterization and conformity of an animal feed	Feed composition (lab analysis): samples taken and stored at 4°C or -20°C for analysis of dry matter content, total nitrogen content, and chemical parameters
	Breakdown of feed consumption via the automatic feeder or self-feeder system (intakes and refusals)	Manual weigh-out of feeder-fed feed dispensed, aspiration of feed left uneaten, oven dry-out and measurement of dry-matter content
	Individualized water intake	Water intakes measured by smart drinkers and stall-by-stall water metering
	Computation of feed conversion ratios	Amount of feed ingested, pig weights, removal of animals found dead (date, number and weight)
	Digestibility of raw feed materials	Monitoring feed-material-related markers
ENVIRONMENT	In-facility gas concentrations (NH_3, CH_4, N_2O, CO_2)	Photoacoustic IR analyser coupled with a 6- channel sampler
	Particulate concentrations (TSP, PM_{10}, $PM_{2.5}$,PM_1)	Analyzer readings (Grimm optical particle counter) or particulate mass sensors (for TSP)
	Odours	Sampling in accordance with european standard - Dynamic olfactometry measures achieved by reference laboratory
	Manure composition	Frequent measure of volume linked to sampling - analyses achieved by reference laboratory

Measurements and analyses: custom-scheduled routinized

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Experimental capacity of the Romillé pig research farm (NW France)

At the 'fattening' phase

Focus	Measurements and analyses		Material and indicators
ANIMAL WELFARE	Use of manipulable materials	custom	Video recording/direct observation of use,deterioration (before/after weighing)...
	Piglet behaviour	custom	Video recording/Direct observation
	Welfare indicators	custom	BEEP welfare assessment, blood/saliva markers
	Quality of the pig housing	custom	Animal and floor cleanliness
HEALTH STANDARDS	Diseases and mortality rates	custom	Clinical outcomes, observations/necropsy
	Faeces and diarrhoea	custom	Faecal scores and dry-matter contents (dry-out)
	Visible lesions on the piglets	custom	Arthritis, lameness, wounds, tail status
	Physiological health (microbiota, antibodies, pathogens)	custom	Markers in blood, saliva, faeces, etc.
	Respiratory monitoring	custom	Lung lesion score, observation at the slaughterhouse
	Signs of chronic atrophic rhinitis	routinized	Lesion evaluation (score) at the slaughterhouse or snout X-rays
AMBIENT CONDITIONS	Airwashing	custom	Air-washer unit water consumption
	In-facility ambient conditions	routinized	Temperatures and airflow rates
	Ventilation system	routinized	Centralized or shed-by-shed ventilation
PRACTICE	Individualized pig growth profiling	routinized	Weight-out of all pigs at the start, middle and end of the grow-finish phase
	Bone composition	custom	P and ash content of the metacarpal bones (lab-based assay), X-rays scans of the feet/metacarpal bones
	Individualized slaughter data	custom	Indicators at the slaughterhouse (carcass quality, sidelining, grading, observations, etc.)
	Body composition of growing pigs	custom	Body-tissue composition of dead or euthanized pigs and carcass by X-ray scanner
FEED & WATER	Pig-by-pig feed intake	routinized	Individualized amounts of feed ingested at the automatic pig feeder
	Pig-by-pig water intake	routinized	Water intakes measured by smart drinkers
	Stall-by-stall water consumption	routinized	Water-metered consumption readings
	Computation of feed conversion ratios	routinized	Amount of feed ingested, pig weights, removal of animals found dead (date, number and weight)
	Conformity of an animal feed	routinized	Samples taken and stored (at 4°C or -20°C) for analysis of dry matter content, total nitrogen content, and chemical parameters
	Breakdown of feed consumption via the automatic feeder or self-feeder system (intakes and refusals)	custom	Manual weigh-out of feeder-fed feed dispensed, aspiration of feed left uneaten, oven dry-out and measurement of dry-matter content, data and weight of pigs found dead
	Chemical-parameter profiling of the feed	custom	Sampling, storage at 4°C or -20°C, dummy rations
	Digestibility of raw feed materials	custom	Monitoring feed-material-related markers
	Performances on liquid-feed diet	custom	Monitoring on wet-fed diet
ENVIRONMENT	Odours	custom	Sampling to EU standards, olfactometry analysis
	Particulate concentrations (TSP, PM_{10}, $PM_{2.5}$,PM_1)	custom	Analyzer readings (Grimm optical particle counter) or particulate mass sensors (for TSP)
	V-shaped scraper system	custom	Quantity and composition of liquid/solid phases
	Wet manure on bedding litter	custom	Quantity and quality: sampling, analyses, volumes
	In-facility gas concentrations (NH_3, CH_4, N_2O, CO_2)	custom	Photoacoustic IR analyser coupled with a 6- channel sampler
	Manure composition	custom	Frequent measure of volume linked to sampling-analyses achieved by reference laboratory

Measurements and analyses: custom-scheduled routinized

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Laurent ALIBERT

Research engineer since 2002
Expert in on-farm feed production systems
Specialist in feed materials and formulations
Substantive support to projects led across southern France
Specialist in organic pork farming systems

Applied research, tests/trials, services

- Author of the AIRFAF bulletin
- Aliment Bio [organic feed] market outlook bulletins
- Regional-scale projects on feed sufficiency.
- Diet trials on organic pig farms
- Substantive input on putting together a feed-on-farm unit registration file
- Feed value of acorn and chestnut for free-range pigs
- Delivering instruction on on-farm feed production and how to use on-farm feedables

Mission brief

- Substantive input on on-farm feed production systems
- AIRFAF network facilitator
- Interventions on diet management practices
- Authoring papers for Techporc and the AIRFAF bulletin
- Support on growing the organic pork market
- Studies on protein-energy and feed sufficiency
- Instructor on swine nutrition and feed formulation
- Substantive support to organizations leading R&D projects on pig operations across southern France


Feed-on-Farm facility


Sow in an organic piggery

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Economy of pig farming and traceability

Alexia AUBRY

Research engineer since 1999
Expert in pig farming economics – identification and traceability
Head of the GT-PORC national technical and economic management database

Applied research, tests/trials, services

- Calculation of the economic impact of changes in breeding practices or performances, and development of decision support tools
- Calculation of economic damage due to a degradation of performances, breeding accidents, sanitary slaughter, etc...
- Training on technical-economic analysis
- Standardization of on-farm data collection processes to develop data-flow interoperability

Mission brief

- Driving GT-PORC system : management of the technical and economic database, benchmarking, methods development
- Technical-economic analyses: farm-level performances, costs, profitability
- Modelling and design of diagnostic approaches and decision support tools for technical support
- Support for French administration on pig identification : drafting of appendices of regulation texts concerning livestock identification and associated equipment; monitoring of pig identification equipment approval tests

Coordinating ID-tag approval tests

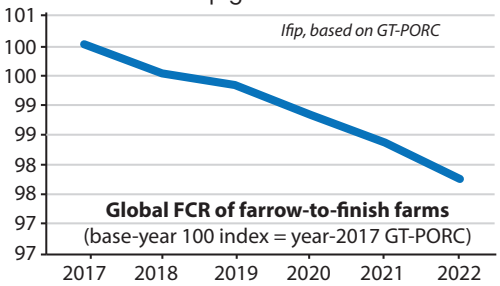
Tools for technical-economic management

SIM'Alter by ifip

Portail de gestion des élevages de porcs by ifip GT-DIRECT

POR SIM by ifip

Technical performances of pig farms



GTPORC

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Reproduction

Sylviane BOULOT

PhD-level research engineer at the IFIP since 1996
Expert in pig reproduction

Applied research, tests/trials, services

- Research into farm-practices: reproduction and farrowing in standard and free-housing farms
- Testing out new solutions (tools or treatments): estrus cycling, insemination, farrowing, lactation…
- Applied engineering for new tools: ultrasound, urine sampling, saliva analysis, camera capture/infrared thermometers, video capture…
- Design of audit tools: infertility, farrowing-unit losses (PertMat on the GT-Direct web platform)
- Pig-farm audits and advisory services: reproduction, pre-weaning survival
- 'Reproduction' training modules in multiple formats: face-to-face, distance learning, on-farm practicals
- Talks and keynotes at seminars, webinars, conferences

Mission brief

- Project officer for pig reproduction studies (gilts, sows, boars) with special orientation in insemination, fertility, farrowing, newborn survival and sow herd welfare and longevity
- Performing experimental-facility and on-farm field trials
- Technology tracking, roll-up reports, expert assessments
- Applied engineering for innovative new diagnostics and audit tools
- Delivering scientific and technical communications in France and abroad
- Delivering training to technicians, veterinarians and pig-farm operators

Practice training on wireless ultrasound and new applications

Tools for improving farrowing/nursery-unit survival

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Pig farming technic

Virginie BRÉGÈRE

Back-office assistant since 2019

Remit

- Back-office assistant to the Pig farming technique and Economics divisions
- Branch-office assistant
- Engineering consultancy (Abcis)

Mission brief

- Reception desk (phonecalls and walk-ins)
- Admin and back-office assistantship
- Business assistantship
- Branch-office assistantship
- Events organization
- Office contracts management
- Preparing and coordinating training delivery
- Recording economic data
- Public procurement management

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Animal health

Isabelle CORRÉGÉ

Doctor of Veterinary Medicine (DVM)
Expert in pig health and Biosecurity on pig farms and during pig transport

Research areas and expertise

- Epidemiology
- ASF prevention measures
- Biosecurity on pig farms and during pig transport
- Cleaning–disinfection
- Pig farm management practice
- Food safety: Salmonella
- medication reduction
- Health and biosecurity audits
- health surveillance on genetic farms

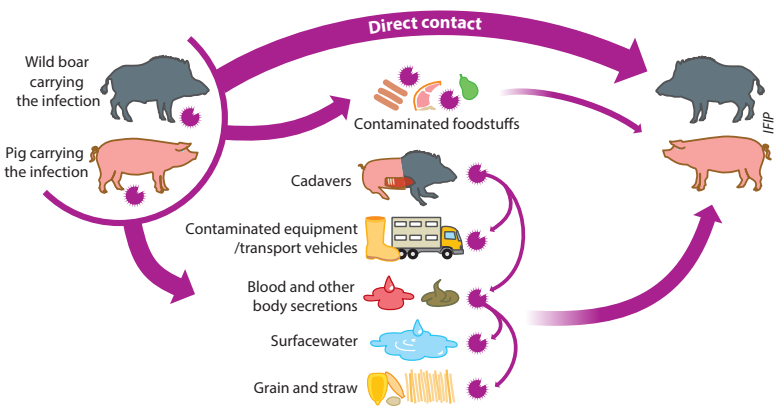
Mission brief

- advice on swine farm health
- trials on farms and on experimental farm
- training on pig health and biosecurity
- technical sheets and good practices guides
- Instructional design of e-learning modules
- Lead for ifip websites Biosecurity and ActionAntibio
- Design of audit tools
- Technical expert for ANSP and ASP

Health and biosecurity audits

ActionAntibio website content

Vectors of ASF



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Animal welfare

Valérie COURBOULAY

Research engineer since 1989
Expert in animal welfare at farm level

Applied research, tests/trials, services

- Rhaporc project: training material about human animal relationship
- Evaluation of alternatives to surgical castration, including pain relief. CASTRABEA website
- On-farm welfare audits: BEEP – Schip (french version)
- Monitoring whole-tail pig farm trials
- Solbi project: characterization of sounds associated to tail biting process
- Comparison of farrowing stalls

Mission brief

- Evaluation of the impact of farm housing and management on pig welfare
- Expertise in animal walfare
- Development of welfare assessment tools
- Trainer of animal welfare advisors
- Coordinating the Welfare unit at the IFIP–Romillé experimental pig research farm
- Member of the French Reference Center for Animal Welfare


Sow in a free-farrowing stall system


Whole tail pig tracking device


Evaluation of the human-animal relationship

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Environment science

Sandrine ESPAGNOL

Research engineer in environmental science since 2002
Specialist in environmental performance assessment on pig farms
Lead facilitator of the livestock–environment (now 'MAELE') joint technological research network

Applied research, tests/trials, services

- Performing environmental diagnostics on pig farms
- Roll-up analysis on life cycle assessments (LCA)
- Expert support on 'GEEP' environmental performance diagnostics
- Mode-by-mode breakdown of farm-to-environment flows on pig farms
- Gas-emissions measurements on pig slurry storage
- Building and populating databases
- Building decision support tools
- Education and training on the environmental impacts of pig farms

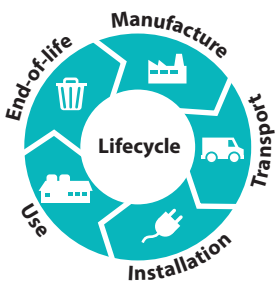
Mission brief

- Studies on the environmental impacts of pig farms at multiple scales (from individual pig units up to farm, operation, value chain, and regional territory)
- Producing benchmark references on the current (Agribalyse data) and future environmental performances of pig farms
- Development of environmental assessment methods and method delivery tools ('GEEP')
- Formalizing benchmark references on gas emissions from effluent storage
- Outreach interventions and training delivery
- Facilitation of a French national joint research network ('RMT') on livestock–environment intersections
- Coordination of multiple-contributor books (Élevages et environnement / Quae &Educagri, Pratiques d'élevages et environnement / Quae)

Addressing a gradient of scales of analysis, from pig unit up to regional territory

The GAIA-system educational resource for re-engineering the food system at regional-territory scale (the MAELE joint technological research network

Life cycle assessment



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Didier GAUDRÉ

Research engineer since 2002
Expert in pig and piglet nutrition
Specialist in feed materials and formulation

Applied research, tests/trials, services

- Feed market trends mensual reports
- Feed formulation software (Porfal, SimFAF)
- Nutritive value assessment of coproducts from agrofood industry
- Trials on post-weaning diet feeds formulated without soybean and with added insect meal
- Review of protein-resources in pigs and future prospects
- Feed-additive trialling services
- Studies on environmentally-sustainable feeds
- Completion of a model for studying mycotoxins based on urinary excretion
- Alfalfa meal and boar-taint risk

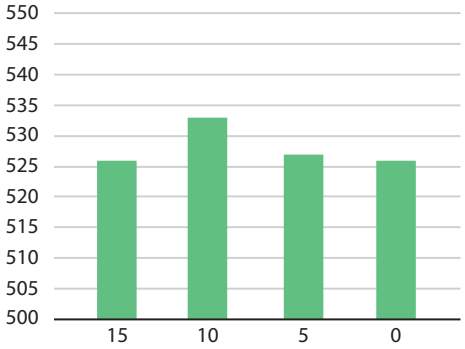
Mission brief

- Technical support on pig nutrition
- Nutrition trials on pigs and piglets
- Training/Outreach assignments on pig nutrition
- Auditing diet management practice
- Technical support on feed formulation
- Tracking raw feeds market commodity prices
- Authoring Techporc and JRP swine research papers
- Feed contaminants
- Diet and boat-taint risk
- Environmental impacts of pig feeds
- Facilitator for feed focus groups

Batching for a wean-phase trial

Storage hanger housing 36 feed silos

Growth rate (g/d) charted by rate (%) of soybean meal in the post-weaning-phase ration



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Pig farming technic

Eric GAULT

Instructor–technician since 2005

Spheres of expertise

- Animal welfare and protection measures in transport and at the slaughterhouse
- Animal handling practice
- Biosafe washdown stations
- Solid insider knowledge on livestock operations and slaughterhouses

Mission brief

- Training on the regulations governing in-slaughterhouse animal welfare measures for pigs, cattle, and sheep/goats. Securing the operator-level and officer-level Certificate of Competency in animal welfare measures
- Training on the regulations governing in-transport animal welfare measures for pigs, cattle, and sheep/goats. Securing the driver-level and hauler-level Certificate of Competency in animal welfare measures
- Training on handling swine and cattle, applying good practice, and working safely
- Performs transport biosafety audits on washdown stations for trucks hauling live animals
- Setting up and performing slaughterhouse and on-farm field trials
- X-ray imaging and image processing

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Pig farming technic

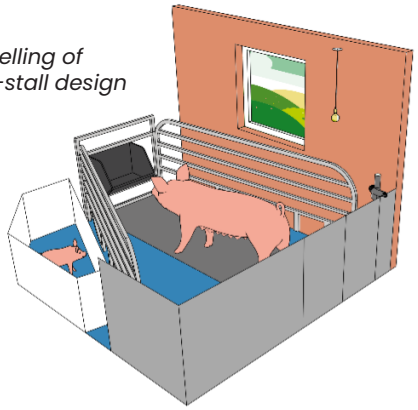
Loréna GIRRE

Experiment-program technician
since 2018
Digital learning designer

Mission brief

- Practical support to research engineers putting together studies for the pig farming technique, porkmeat and charcuterie divisions: logistics (scheduling, procurement orders); applying key protocols (sampling, measurements, etc.); collecting and formatting data
- Design and delivery of e-learning modules

3D modelling of a farrowing-stall design



Setting up and supervising experimental-facility and on-farm field trials

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Environment science

Nadine GUINGAND

Research engineer since 1992
Expert in air quality (NH3, GHG, PM, odours) in pig facilities -

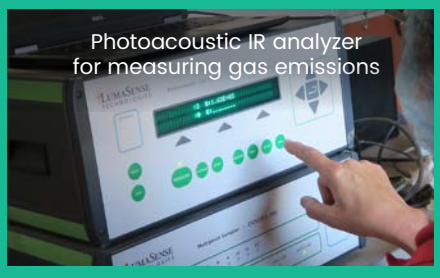
Applied research, tests/trials, services

- Design of a database on emissions factors for gases (NH_3, N_2O, CH_4 and CO_2) particulate matter in building air (ELFE)
- Experimental trials on the effect of temperature on gaseous emissions
- Trials on different manure cooling systems in growing-finishing units
- Trials on additives reducing gas and odours emitted by pig housing
- Investigations on bioscrubbing techniques adapted to new and existing buildings
- Trials on worker and pig exposure
- Implicated in the review of the last BREF(2017) and the list of BAT (Best Available Technique) - Support for the pig sector to be compliant with French and EU regulations.

Mission brief

- Methodology engineering
- Performing experimental-facility and on-farm field trials
- Establishing emissions factors for gas, odours and PM for different technical itineraries
- Assessment of practices and techniques to improve building air quality
- Substantive input and expertise on building air quality
- Design of simulation tools for modelling ammonia and particulate concentrations
- Training delivery to livestock farmers and technicians
- Outreach to the pig sector and institutional stakeholders
- Delivering scientific and technical communications in France and abroad
- Participation in national and European taskforces

Manure cooling system



Photoacoustic IR analyzer for measuring gas emissions

Guidance document "Good environmental farming practices

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Pig farming technic

Anne HEMONIC

Veterinarian at Ifip since 2007
Expert in pig health
Head of Pig Farming department since 2020

Applied research, trials, services

- Numerous experiences in project management, studies and services in the field of animal health experience leading projects, studies and services in the field of animal health (monitoring of antibiotic use, biosafety, management of dosing pumps, early detection of diseases, biofilm in pipework, etc.).
- Supervision of R&D activities at Ifip's experimental pig station (a 200-sow farrow-to-finish farm) in connexion with the site manager and livestock technicians

Mission brief

- In charge of managing the Pig Farming Department, a team consisting of twenty scientific and technical experts on various subjects related to pig farming: nutrition, animal welfare, animal health, reproduction, environmental management of farms, building and equipment engineering, technical and economic management, organic pig production...
- Member of Ifip Executive Committee and various steering bodies: Ifip's Board and Scientific Council, representation with Public Authorities, research institutes, other technical institutes, agricultural development partners, etc.

Monitoring of piglets health in farrowing units

Part of the organizational committee for the 'Journées de la Recherche Porcine' swine research forum

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Animal health

Gwendoline HERVÉ

Pig farm veterinarian since 2015
and with the Ifip since 2021

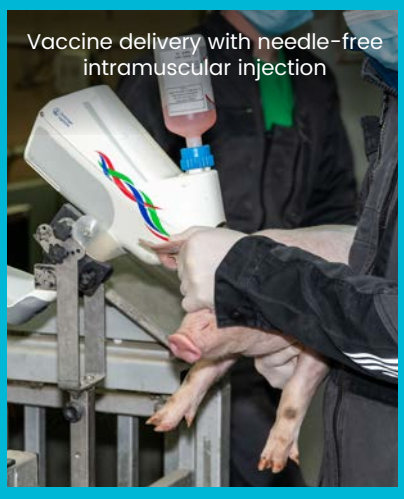
Applied research, trials, services

- Vaccine programme engineering
- Early screening of respiratory disease
- Medication reduction
- Biosecurity on pig farms
- Epidemiological monitoring

Mission brief

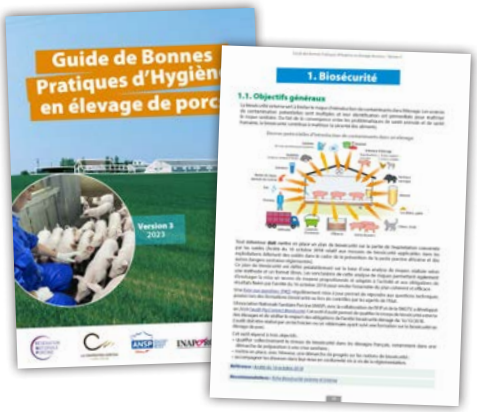
- Advice on swine farm health
- Support on instructional design for e-learning modules
- Delivering training on biosecurity, animal health and welfare
- Authoring papers and pieces for the trade press

Monitoring animal health



Vaccine delivery with needle-free intramuscular injection

New version of the guide to good hygiene practice for pig farmers



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Environment science

Pascal LEVASSEUR

Research engineer since 1994
Specialist in slurry and manure management
Expert in anaerobic digestion

Applied research, tests/trials, services

- Economic impacts of ecology-conscious facilities and practices
- Economic analysis of anaerobic digester system projects
- Quantification of pig-farm effluent streams (composition, on-farm storage capacities, mass balance, methanogenic potential, sampling-scheme methods)
- Studies on the human safety of pig manure (heavy metals, antibiotics)
- Training and hands-on support on completing the Bilan Réel Simplifié [simplified record of pig-manure effluent output]
- Updating the pig-manure reference data
- Trialling slurry and digestate treatment processes

Mission brief

- Analyses of pig-farm effluent management routes: storage, land application, treatment, human safety, on-farm waste-to-value and waste-to-energy
- Methodology for quantifying nutrient flows from feed to plots
- Outreach to the profession and institutional stakeholders
- Training and performance of experimental-facility and on-farm field trials

Slurry pit roofed over to form a methane harvesting system (passive anaerobic digestion)

Monitoring the effects of holding slurry streams in 10m³ on-farm storage tanks

Producing educational brochures on anaerobic digestion and characteristics of animal-waste effluent streams

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Pig farming technic

Delphine LOISEAU

Experiment-program technician since 1999
Specialist in imaging: welfare analysis, tomography analysis, and more
Substantive technical input to engineers at the Pig farming technique, Porkmeat & Charcuterie, and Genetics divisions.

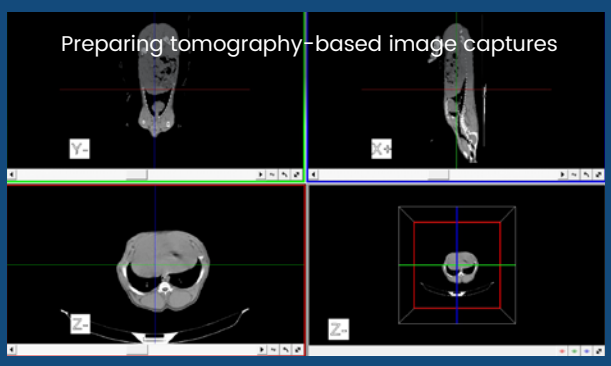
Applied research, trials, services

- Processing and analyzing video capture for trials on frequency of use of toys for environmental enrichment
- Scoring image captures of sow positions in the farrowing unit for the Genetics division
- Data retrieval and reformatting for environmental trials on in-building ambient conditions
- Inaporc Panel surveys
- Mining tomography-based image workflows for diet and genetics value for the Porkmeat and Charcuterie division
- Scoring image captures on piglet maturity for the Genetics division
- Bibliography scanning for environment and building science
- Updating the datasheets for the 'Ligéral' pooled-population regional-heritage pig-breed herdbooks database
- Updating the 'Porfal' feed formulation software

Mission brief

- Processing and analyzing video capture: welfare studies, genetics studies, hardware trials
- Mining tomography-based image workflows
- Preparing files
- Ensuring continued serviceability of facility hardware and data retrieval
- Conducting surveys by phone
- Updating files ready for analysis
- Bibliographic databasing
- Substantive technical input to research engineers from the Pig farming technique, Porkmeat and charcuterie, and Genetics divisions.

Processing and analyzing video capture: frequency of use of toys for environmental enrichment


Preparing tomography-based image captures

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Animal welfare

Alexandre POISSONNET

Research engineer since 2015
Specialist in animal behaviour
Expert in animal welfare and health indicators—livestock

Applied research, tests/trials, services

- Experimental trials on various types of environment enrichments
- 'BEEP' on-farm pig welfare standards audit
- Characterization of sow vocalization patterns in the farrowing house
- Characterization of phenotypic markers of sow and piglet health
- Welfare assessment in organic farming
- Training on digitizing pig medication records
- Instructor for BEEP audits, PigLow pig welfare standards, and qualified animal welfare officer training

Mission brief

- Evaluation of on-farm pig welfare conditions and practices: housing and pig care interventions
- Expertise on animal welfare
- Instructor to animal welfare referent


Dehydrated alfalfa dispenser system

Video-based behaviour monitoring

Pig medication records go digital

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Nathalie QUINIOU

Agro Eng., PhD research engineer
Project manager since 1996
Holds accreditation to supervise research
Expert in sow and pig nutrition

Applied research, tests/trials, services

- Dietary guidelines (energy, amino acids) adapted to sex, breed and physiological stage
- Mitigating the impact of climate change on pigs and sows through nutritional solutions
- Designing precision feeding strategies to improve the mutliperformances of pigs and gestating sows
- Evaluation of new ingredients in sow diets
- Impact of sow nutrition on piglet quality and performance

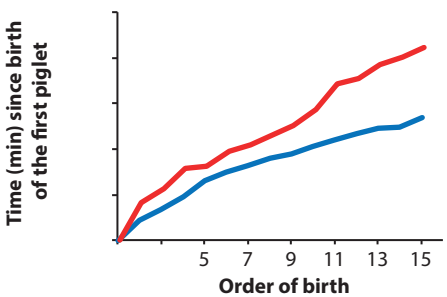
Mission brief

- Leading research on the adaptation of nutritional strategies to advances in growth potential of pigs and prolificacy of sows and to farm-system conditions
- Feeding management of the CIRI herd
- Substantive input on re-engineering diets for intact boars and hyperprolific sows and to devise and design low-protein feeds
- Training on the InraPorc® software
- Coorganizer of the 'Journées de la Recherche Porcine' research meeting
- Reviewer of international scientific papers and research programs


Looking at how diet practices translate into performances


Characterization of growth performances

Effect of the diet on the farrowing process



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Pig farming technic

Romain RICHARD

Technician for the Pig farming technique division since 2009 tasked with monitoring experimental-facility and on-farm field trials.

Applied research, trials, services

- Diet
- Building/Facilities
- Welfare
- Environment
- Identification
- Reproduction
- Health standards

Mission brief

- Setting up experimental-facility trials
- Fitting and monitoring instrumentation: video cameras, gas analyzers, ambient condition sensors)
- Sampling (blood, urine, faecal matter, slurry, saliva, etc.)
- Measuring pig body condition and behaviour
- Tagging and tracking pigs from birth to slaughter.
- On-farm surveys and real-world trials
- Lead coordinator for an IFIP pig farmers network

Behavioural analysis

Analyzer of pig-emitted gases

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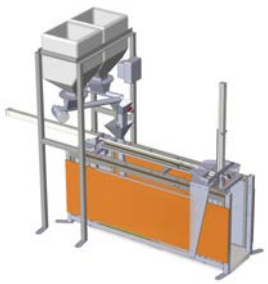
Building design, Fit-out & Facilities

Yvonnick ROUSSELIERE

Research engineer since 2014
Specialist in farm buildings and equipments
Substantive input on the development of new pig-operation solutions: decision support tools, sensors, loggers, and so on

Applied research, tests/trials, services

- Layout engineering and outreach support to pig farmers on build projects
- Design, testing and validation of equipment, sensors and/or loggers in real-farm conditions
- Study on new generations of multicriteria-performance buildings (environment, welfare, husbandry practice, health, economics, work, etc.)
- Training on control of ambient conditions and building layout engineering
- Performing on-farm ventilation audits



Mission brief

- Studies on water and energy savings, buildings and building costs, precision livestock farming and/or accommodating spatial enrichments
- Development of interactive and education tools and media to support knowledge transfer and mobilization
- Advisory services on drafting layout plans or developing sensors
- Substantive technical outreach to the pork-sector community (farmers, technicians, tutors, etc.)
- Training facilitation
- Authoring science papers for congresses but also articles in professionnal press

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Environment science

Annie SOULIER

Research engineer since 2020
Specialist in carbon footprint
Technical support on Geep tool

Applied research, tests/trials, services

- Construction of the method behind a project for a 'low-carbon pork' label
- Simulation of low carbon scenarios
- Updating the 'GEEP' pig-farm environmental performance assessment tool
- Performing 'GEEP' environmental performance diagnostics
- Delivering training on using the 'GEEP' tool
- Presentation on techniques for reducing the environmental impact of pig farms
- Substantive input on updating technical brochures and educational literature
- Supporting projects implementing for climate change adaptation (Climate Farm Demo and Climate Smart Advisors)

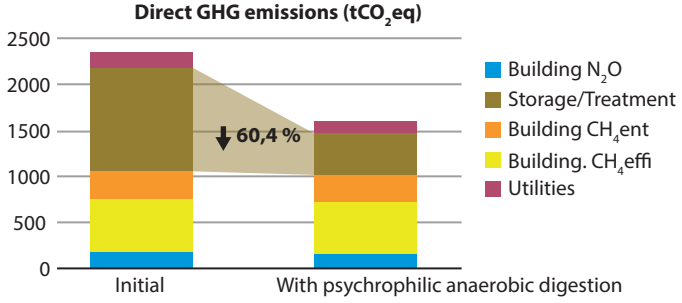
Mission brief

- Scientific and technical support for the development of environmental assessment methods and tools for pig farms
- Geep network management
- Intervention and training
- Writing scientific and technical articles
- Production of educational resources

A tool to assess environmental performance of pig farms

Geep by ifip
Gestion Environnementale des Élevages Porcins

Impact of different practices including psychrophilic anaerobic digestion on GHG emissions



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Building design, Fit-out & Facilities

Johan THOMAS

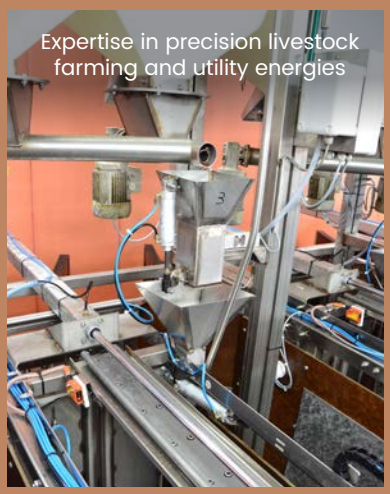
Research engineer since 2020
Specialist in farm buildings and equipment
Substantive input on the development of connected objects and loggers, then management of the data captured

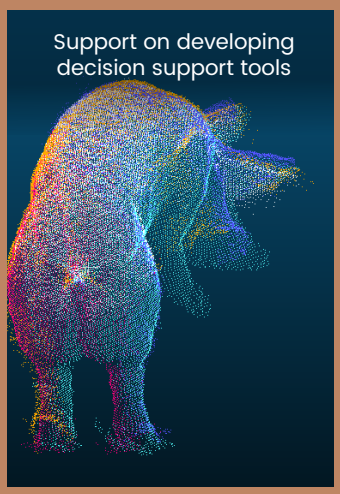
Applied research, tests/trials, services

- Design, testing and validation of equipment, sensors and loggers in real-farm conditions.
- Studies on managing pig-farm data
- Training on control of ambient conditions, utility energy, and building layout engineering
- Advisor on creating decision support tools for pig farmers
- Performing on-farm fresh-air ventilation audits

Mission brief

- Studies on actual water and energy use and potential water and energy savings
- Studies on buildings and equipments for precision livestock farming
- Substantive input on developing and testing dataloggers and decision support tools
- Farm data analysis, and expert in using 'machine learning' methods
- Substantive technical outreach to the pork-sector community (farmers, technicians, tutors, students, etc.)
- Facilitator for training courses and tours at the Romillé experimental pig research farm
- Authoring science papers for congresses but also broader-audience pieces for the trade press


Expertise in precision livestock farming and utility energies


Support on developing decision support tools


Data control and analysis

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Pig farming technic

Nicolas TRINITÉ

IFIP database administrator since 2001
for the Pig farming technique division
for the Economics division
for the Training division

Applied research, trials, services

- Assistance on studies led at Romillé

Mission brief

- Administrator of technical-economic data ('GTE') and technical sow herd management data ('GTTT') for the Pig farming technique division
- Administration of the Lucrèce and DEEP economics databases for the Economics division
- Assistance on enrolments for the Training division
- Maintenance of the IFIP–Le Rheu office electrical systems

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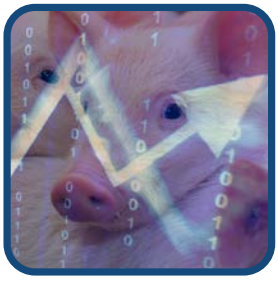
Competitiveness - Profitability - Sustainability
Quality - Food Safety - Innovation

EXPERTISE

REFERENCES

ECONOMIC EVALUATIONS



TECHNICAL SUPPORT

Specific tools and action-sets for each sector audience

- Studies - Experimental research - Surveys polling firms •
- Databases - Statistics tools and computing resources •
- Technical and economic benchmarks - Sector outlet analyses •
- National and worldwide market observatories - Key performance indicators •
- Expertise-sets - Technical and economic business and auditing •
- Pooling competencies - Technical and economic intelligence •
- Tailored interventions - Staff training - Documentation •

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4 fields of activities

Your Partner in Innovation

FRESH MEAT AND PROCESSED PRODUCTS

Technological, safety and nutritional monitoring, from retail to breeding.

- **Technology - Product and process innovation:** animal transport and slaughter processes, characterization of raw materials, tailoring processes, pilot unit testing, expertise in technologies, nutritional value of products;
- **Microbiology - Contaminant epidemiology and predictive microbiology:** characterization of flora and bacteria, optimization of microbiological formulations best practices, hygiene auditing, management of use-by dates, food safety training;
- **Grading carcasses and cuts**;
- **Signs of quality and traceability management.**

PIG FARMING TECHNIQUES

- **To reduce production costs:** pig diseases, One Health and best hygiene practices, biosecurity, animal nutrition (nutritional values of raw feedstuffs, nutritional requirements of the animals), farm building design, equipment and costs, herd management, reproduction, precision farming
- **Sustainability:** prevention of pollution, environmental impact, energy, alternative pig farming, product life cycle, protein alternatives sustainable use of antibiotics...
- **Acceptability of production practices:** odors emission, animal welfare.

ECONOMICS

From farmer supply, to meat consumption…

- **Market trends and forecasts:** price analysis of pork and feedstuffs;
- **Competitiveness:** technical and economic issues, databases, farm performances, production costs;
- **International economic watch**, observatory on production sectors, economic analysis of French and worldwide pork industry.

GENETICS

- **Genetic evaluation** and databases, new phenotyping tools;
- **Genomics** and biotechnology applications;
- **Preservation of local breeds** and biodiversity management.

TO FIND OUT MORE:

- *Place des Marchés (one line economics database), TechPorc in «Réussir Porc», Cahiers de l'IFIP (technical reviews)*
- *Training catalogues*
- *Congresses and technical workshops: Journées de la Recherche Porcine (www.journees-recherche-porcine.com)...*

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Mobilization and impact... the overriding purpose of what we do

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