



Version 2015-06-12

## **COST Action FA1302 (Action 10 Dec 2013 – Action 9 Dec 2017)**

### **Large-scale methane measurements on individual ruminants for genetic evaluations**

## **PROGRESS REPORT 1 (10 Dec 2013 – 24 July 2015)**

**This report is submitted by the MC Chair on behalf of the Management Committee and is validated by the Scientific Committee of the COST Association.**

**Confidentiality:** the document will be made available to the public via the Action page on the COST website except for Section II.D.

#### **Executive summary of the Progress Report:**

The METHAGENE COST Action has now been active for 18 months. A kick-off meeting was held in Brussels, Belgium, in December 2013, where the Management Committee (MC) and Working Groups (WG) were organized, and the general structure for COST Actions was accepted. This was followed by a startup meeting in Amsterdam, the Netherlands, where the roadmaps for WG 1 and 2 were drafted.

The first Annual Workshop in Granada, Spain, brought together researchers from different countries and different disciplines, including researchers from Australia and New Zealand who came on their own expense because they support the importance of networking. An interactive programme resulted in interesting discussions between nutritionists, physiologists, environmental engineers, breeders and microbiologists on possible reasons for the difference between low- and high-emitting ruminants. The Annual Workshop was followed by the MC meeting, to discuss and decide on the planning and progress of METHAGENE. The next MC meeting is planned for autumn 2015 in Wageningen, the Netherlands.

The core MC has regular Skype meetings every 6 weeks, where action minutes are made to ensure progress in the WGs and the project in general. One Expert meeting has already been held for WG3, and plans are made for Expert meetings of WG1 and 2. At these meetings, core scientific questions are being discussed and future activities are being planned. Resources have been allocated to have more of these in near future.

The research done in methane emission has attracted young scientists. A successful Training School on “Methane physiology for geneticists” was held in Dummerstorf, Germany, with lectures from within the consortium. The next Training School is planned in September 2015 in Poznan, Poland, on handling large scale methane data. These young scientists have, so far, also been on 10 short-term scientific missions between member countries.

Soon after the startup of the project a project homepage, an official homepage, a open mailing group and a project mailing group was functioning. Information on all activities are made available on the project homepage and distributed through social media (i.e. Ttwitter). Also a flyer has been created to be distributed at the next EAAP conference in Warsaw 2015.

METHAGENE has also been active at other meetings. The consortium was active at the World Conference on Genetics Applied to Animal Production (WCGALP) in Vancouver, Canada, in August 2014, at a joint meeting with Animal Selection, Genetics and Genomics network from the Global Research Alliance. METHAGENE was active as well in the joint networks meeting in Reading, UK, in June 2015 and will be co-organizing a session on “Climate smart cattle farming and breeding” together with the FP7 project RuminOmics at the EAAP conference in Warsaw in September 2015.

Several activities are currently ongoing and therefore many joint scientific publications are anticipated in near future. So far 4 publications have been achieved through the network together with 3 international grant applications.

The success of the METHAGENE network is that it unites researchers from across Europe to work on new solutions in breeding for low-emitting ruminants.



COST is supported by  
the EU Framework Programme  
Horizon 2020

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**Summary assessment of Progress Review by Action Rapporteur:**

(The COST Action METHAGENE tackles a topic of high relevance for European society; the contribution of ruminant livestock production to greenhouse gases, and in particular methane. Ruminants have an important role to play in global food security as they can convert grass and other high-cellulose feedstuffs into human-edible protein. However, a by-product of this is the production of enteric methane, a potent greenhouse gas.

METHAGENE is a highly important network which seeks to mutualize expertise in the domains of the rumen fermentation biology and methane measurement methodologies. It also aims to use this expertise to allow methane data from the large variety of research units across Europe and beyond to be mutualized, thereby permitting genetic evaluation of host animals for methane production. The project has now been running for 1.5 years, and includes participants from 21 countries. In that time it has shown a strong degree of networking activity, which has attracted not only METHAGENE members but also other participants from as far afield as New Zealand and Australia. This is a clear sign of the strategic and scientific importance of this Action. As well as the first Annual Workshop in Granada, Spain, the Action has also been active at other scientific meetings: the World Conference on Genetics Applied to Animal Production (WCGALP) in Vancouver, Canada, in August 2014, at a joint meeting with Animal Selection, Genetics and Genomics network from the Global Research Alliance, as well in the joint networks meeting in Reading, UK, in June 2015 and a session on “Climate smart cattle farming and breeding” together with the FP7 project RuminOmics at the EAAP conference in Warsaw in September 2015.

The network has, for the most part, been successful in breaking down disciplinary barriers, promoting useful exchanges between nutritionists, physiologists, environmental engineers, breeders and micro-biologists. It has also created a good visibility, both via the satellite type meetings associated with other conferences and via the internet with an official homepage, and an open mailing group providing information on all activities. It has established an operational management committee that is driving the Action agenda forward in a satisfactory manner.

It has also demonstrated good success in mobilizing young researchers having already carried out 10 short-term scientific missions between member countries. It has also held one young scientist training school on “Methane physiology for geneticists” held in Dummerstorf, Germany, and a second training school planned.

Four publications have been achieved through the network together with 3 international grant applications. This includes a prestigious Management Board Invited Review in the international journal *Animal*.

<b>Action Rapporteur</b>	Nicolas Friggens Affiliation: INRA Country: France Telephone: 0144081767 Email address: Nicolas.friggens@agroparistech.fr
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**Validation by Scientific Committee**

This report was validated by the Scientific Committee on: <insert date of SC validation>

## I. Progress Report

### I.A. COST Action Profile

#### Objective/ Aim

The main objective of the Action is to reduce environmental footprints of animal-derived food using methane mitigation strategies through animal breeding. The Action aims at harmonising large-scale methane measurements using different techniques; agreeing on identified easy to record proxies for methane emissions for genetic evaluations; and on approaches for incorporating methane emissions in breeding strategies

#### Details

MoU: 016/13 Start of Action: 10 Dec 2013  
 CSO approval date: 16 May 2013 End of Action: 9 Dec 2017

#### COST Member Countries and Cooperating State having accepted the MoU

Parties							
Country	Date	Country	Date	Country	Date	Country	Date
Austria	20/06/2013	Belgium	23/07/2013	Denmark	03/06/2013	Finland	18/06/2013
France	05/07/2013	Germany	17/06/2013	Ireland	22/07/2013	Italy	29/08/2013
Lithuania	18/11/2013	Netherlands	20/06/2013	Norway	23/08/2013	Poland	24/06/2013
Portugal	17/09/2013	Slovakia	13/10/2014	Slovenia	25/08/2013	Spain	27/06/2013
Sweden	02/09/2013	Switzerland	03/07/2013	Turkey	13/05/2014	United Kingdom	30/05/2013
fYR Macedonia	11/12/2013						

Total: 21

Intentions to Accept the MoU

0

#### Other participants:

Institution Name	Country
FAO	Rome, Italy
ICAR	Rome, Italy

#### Contacts

##### Chair/ Vice Chair

Position	Name	Contact details	Country	Date of PhD:	Gender
Chair:	Yvette de Haas	Wageningen UR – Animal Breeding and Genomics Centre; Building 107; 6700 AH Wageningen. + 31.317.480505 <a href="mailto:Yvette.deHaas@wur.nl">Yvette.deHaas@wur.nl</a>	NL	Oct 2003	F
Vice Chair:	Jan Lassen	Aarhus University – Center for Quantitative Genetics and Genomics; Blichers Allé 20; 8830 Tjele. +45.87.157936 <a href="mailto:jan.lassen@mbg.au.dk">jan.lassen@mbg.au.dk</a>	DK	May 2007	M

### Working Group Leaders

WG#	WG Title	WG Leader	Country	Date of PhD:	Gender	Number of participants
1	Methane determining factors	Björn Kuhla	D	1999	M	66
2	Comparison and calibration of measurements	Phil Garnsworthy	UK	1980	M	85
3	Proxies for methane emission	Enyew Negussie	FI	1999	M	64
4	Benefit for producers	Eileen Wall	UK	2001	F	61
5	Knowledge and management exchange	Marjolein Neuteboom	NL	-	F	10

### Other positions if applicable (STSM Coordinator, WG Vice Leader, Task Force Leader...)

Position	Name	Country	Date of PhD:	Gender
STSM Coordinator	Marcin Pszczola	PL	2013	M
WG1 – Vice leader	David Yanez	ES	2003	M
WG2 – Vice leader	Eva Lewis	IRL	2004	F
WG3 – Vice leader	Filippo Biscarini	IT	2010	M
WG4 – Vice leader	Nicolas Gengler	BE	1996	M

**Action website:** [www.methagene.eu](http://www.methagene.eu)

## I.B. Progress with MoU objectives and deliverables and additional outputs

### MoU objectives

MoU objective	Achieved Yes/ Partially/ No	Evidence of (partial) achievement including hyperlink to enable assessment of the achievement <sup>1</sup> . Justification if full achievement is not foreseen
Animal- and herd-level factors contributing to variation among animals in methane production, distinguishing between true influences and those attributable to methodology; appropriate units of measurements (e.g., grams per unit output or per unit input) and the use of common units that allow data and interpretation of the data to be compatible within and between populations	Partially	<p>The roadmap for this objective was worked out with the full consortium at the start-up meeting in Amsterdam.  <a href="http://www.methagene.eu/meetings/start_up_meeting.html">http://www.methagene.eu/meetings/start_up_meeting.html</a>            (roadmap WG1) Password: amsterdam</p> <p>An inventory was sent out to the consortium by email and in the Forum on the website (Username + Password both: MGforum). The inventory is now listed as output of WG1 on the website  <a href="http://www.methagene.eu/workinggroups.html">http://www.methagene.eu/workinggroups.html</a></p> <p>A good discussion was held at the Workshop in Granada in November 2014 based on presentations of consortium members.  <a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a>            Password: granada</p> <p>The next step is to write a report to finalize WG1 that covers the main outcomes and conclusions. This will then be added to the website (aimed in Oct 2015)</p>
Established protocols for calibration, comparison, harmonisation and merging large-scale methane measurement using from different techniques and measuring strategies for individual animal methane emissions	Partially	<p>The roadmap for this objective was worked out with the full consortium at the start-up meeting in Amsterdam.  <a href="http://www.methagene.eu/meetings/start_up_meeting.html">http://www.methagene.eu/meetings/start_up_meeting.html</a>            (ppt Working group 2)</p> <p>A presentation was held at the Workshop in Granada in November 2014, followed by a discussion with the entire consortium.  <a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a>            (see photos of break-out sessions) Password: granada</p> <p>After the Workshop an email was sent to the full consortium asking for member that performed simultaneous measurements with 2 equipments. This list is as output of WG2 on the website  <a href="http://www.methagene.eu/workinggroups.html">http://www.methagene.eu/workinggroups.html</a></p> <p>The next step is to arrange an Expert meeting in Nottingham to share experiences and to discuss the first draft of the protocol together (aimed in Oct 2015)</p>
Identified easy to record and inexpensive indicator traits for methane emissions from ruminants (e.g., milk fatty acid profiles, mid-infrared spectra of milk samples, and others), without sacrificing accuracy, to be used for genetic evaluations	Partially	<p>The roadmap for this objective was worked out with the full consortium at the workshop in Granada.  <a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a>            (see ppt on WG3) Password: granada</p> <p>An Expert meeting was held in Catania in April 2015. 9 experts were invited, and presented on Day 1 possible proxies based on their expertise. On Day 2 the way to proceed was discussed. Next step: writing a review on “The future of large-scale indirect measurement for methane emissions : added value from combining proxies”</p> <p>The minutes and presentations can be found at:  <a href="http://www.methagene.eu/meetings/catania2015.html">http://www.methagene.eu/meetings/catania2015.html</a>            Password: catania</p>

<sup>1</sup> The links to the outputs and deliverables will be used by the Action Rapporteur in assessing the progress.

Approaches, necessary information and tools for EU countries for incorporating methane emissions in national breeding strategies while simultaneously taking cognisance of other animal performance characteristics	Not yet	<p>Some first thoughts have been presented by E. Wall at the Joint Animal Meeting, July 13, 2014 in Orlando, US (<a href="http://www.jtmtg.org/JAM/2015/abstracts/280.pdf">http://www.jtmtg.org/JAM/2015/abstracts/280.pdf</a>)</p> <p>WG4 is scheduled for Year 3 and 4. A first start will be made at the next Annual Workshop on October 7-8, 2015 in Wageningen, the Netherlands. The programme of this Workshop shows the allocated time for all WGs (<a href="http://www.methagene.eu/meetings/wageningen2015.html">http://www.methagene.eu/meetings/wageningen2015.html</a>)</p>
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## MoU deliverables

MoU deliverable (up to M18)	Level of progress <sup>1</sup>	Evidence of (partial) delivery achievement including hyperlink to enable assessment of the delivery <sup>1</sup> . Justification if full achievement is not forseen
Kick off meeting	Done	<a href="http://www.methagene.eu/meetings/kick-off-meeting.html">http://www.methagene.eu/meetings/kick-off-meeting.html</a> (Dec 10, 2013 – Brussels) <a href="http://www.methagene.eu/meetings/start_up_meeting.html">http://www.methagene.eu/meetings/start_up_meeting.html</a> (May 8, 2014 – Amsterdam)
Official webpage operational	Done	<a href="http://www.methagene.eu">www.methagene.eu</a>
Project webpage operational	Done	See forum on <a href="http://www.methagene.eu">www.methagene.eu</a> Username and Password both: MGforum
Open mail group operational	Done	No hyperlink – a group in address book of Chair
Project mail group operational	Done	No hyperlink – a group in address book of Chair
Management Committee meeting 1 held	Done	- Physical meeting with full MC on November 7 2014 <a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a> Password: granada - Core MC meetings through Skype every 6 weeks (agenda + documents + minutes on DropBox)
Working Group meetings held	Done	<a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a> (November 5-7, 2014) Password: granada
Competitive call STSMs held	Done	Successfull calls have been set out. 10 STSMs are currently successfully finished, 2 are currently at their mission. Reports can be found at the website: <a href="http://www.methagene.eu/reports.html">http://www.methagene.eu/reports.html</a>
Workshop 1 held	Done	<a href="http://www.methagene.eu/meetings/granada2014.html">http://www.methagene.eu/meetings/granada2014.html</a> (November 5-7, 2014) Password: granada
Training school 1 held	Done	<a href="http://www.methagene.eu/meetings/dummerstorf2014.html">http://www.methagene.eu/meetings/dummerstorf2014.html</a> (Sept 30 - Oct 2, 2014) Password: dummerstorf
Management Committee meeting 2 held	Planned for Oct 9	- MC meeting is announced on the website <a href="http://www.methagene.eu/meetings/wageningen2015.html">http://www.methagene.eu/meetings/wageningen2015.html</a> - Core MC meetings through Skype every 6 weeks (agenda + documents + minutes on DropBox)
Working Group meetings held	Done for WG3	<a href="http://www.methagene.eu/meetings/catania2015.html">http://www.methagene.eu/meetings/catania2015.html</a> (April 23-24, 2015) Password: catania

## Co-authored publications and FP7/ H2020 proposals

The co-authored publications and FP7/ H2020 proposals/ projects resulting from the Action are listed on the page following the “Additional outputs and achievements” section



### Additional outputs and achievements

Please describe any other outputs and achievements that have resulted or are in progress, focusing in particular on those that contribute to the COST mission of “COST enables break-through scientific developments leading to new concepts and products and thereby contributes to strengthen Europe’s research and innovation capacities.”

- A one-day satellite meeting on “Breeding for lower emitting animals” was organised together with the ASGGN attached to the World Conference of Genetics Applied to Livestock Production in Vancouver, Canada <http://www.asggn.org/publications/listing,106,asggn-2014-meeting-vancouver.html>
- Joint Networks Meeting with networks related to the Livestock Research Group of the Global Research Alliance on agricultural greenhouse gases (<http://www.globalresearchalliance.org/research/livestock/activities/networks-and-databases/>) in Reading, UK on June 26<sup>th</sup> 2015. See also: <http://www.methagene.eu/meetings/reading2015.html>
- Co-organiser of session on “Climate smart cattle farming and breeding” at the 66<sup>th</sup> meeting of the European Association of Animal Production (EAAP) in Warsaw, Poland on August 31<sup>st</sup>, 2015 (<http://eaap2015.syskonf.pl/programme>)

**Co-authored publications and FP7/ H2020 proposals**

**Co-authored publications**

Enter in the table below only publications on the topic of the Action, co-authored by at least two Action participants from two different countries participating in the Action and for which the Action networking added value. A **maximum of ten** publications may be entered. If the Action has more than ten such publications the Core Group should select the ten most significant ones to include in the table below.

NO.	Bibliographic data (including: Title, Authors, Title of the periodical or the series, Issue number or volume, Publisher, Year of publication, Relevant pages)	Main author	Number of authors	Action participants listed among the authors (Name, country and role <sup>2</sup> )	WGs involved in publication	Date of submission (must be after Action start date)	Expected date of publication (if not already published)	Persistent link to publicly available version of the paper (if available) or the abstract	Is/Will open access <sup>3</sup> provided to this publication?	Is/ will COST be cited/ acknowledged in the publication?	Are/ will COST funds (be) implicated in this publication	Relevance to H2020 Societal Challenges <sup>4</sup> ?	Is it peer-reviewed?	Was the added value of the Action Networking necessary for the publication	Impact Factor (if applicable)
1	Pickering, Oddy, Basarab, Cammack, Hayes, Hegarty, Lassen, McEwan, Miller, Pinares-Patino, de Haas, 2015. Animal board invited review: genetic possibilities to reduce enteric methane emissions from ruminants. Animal	Pickering	11	Yvette de Haas, NL, Chair Jan Lassen, DK, Vice chair	WG2, WG3, WG4	July 2014	Sept 2015	<a href="http://dx.doi.org/10.1017/S175173111500968">http://dx.doi.org/10.1017/S175173111500968</a>	Yes	Yes	Yes	Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and Bioeconomy	Yes	Yes	1.841
2	Lassen, Garnsworthy, Chagunda, Negussie, Lovendahl, de Haas, 2014. Progress with genetic selection for low methane traits in dairy cows. Journal of Animal Science	Lassen	6	Jan Lassen, DK, Vice chair Phil Garnsworthy, UK, WG leader Mizeck Chagunda, UK, WG member Enyew Negussie, FI, WG leader Peter Lovendahl, DK, WG member Yvette de Haas, NL, Chair	WG1 WG2 WG3 WG4	March 2014	August 2014	<a href="https://asas.org/docs/default-source/wcgalp-proceedings-oral/036_paper_9384_manuscript_600_0.pdf?sfvrsn=2">https://asas.org/docs/default-source/wcgalp-proceedings-oral/036_paper_9384_manuscript_600_0.pdf?sfvrsn=2</a>	Yes	No	No	Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and Bioeconomy	Yes	Yes	-
3	De Haas, Pryce, Berry, Veerkamp, 2014. Genetic and genomic solutions to improve feed efficiency and reduce environmental impact of dairy cattle. Journal of Animal Science	De Haas	4	Yvette de Haas, NL, Chair Donagh Berry, IE, WG member	WG3 WG4	March 2014	August 2014	<a href="https://asas.org/docs/default-source/wcgalp-proceedings-oral/286_paper_10254_manuscript_1264_0.pdf?sfvrsn=2">https://asas.org/docs/default-source/wcgalp-proceedings-oral/286_paper_10254_manuscript_1264_0.pdf?sfvrsn=2</a>	Yes	No	No	Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and Bioeconomy	Yes	Yes	-
4	Berry, Lassen, de Haas, 2015. Residual feed intake and breeding approaches for enteric methane mitigation. pp 273-291 In: Livestock production and climate change. Editors: Malik, Bhatta, Takahashi, Kohn, Prasad. ISBN: 978-1-78064-432-5	Berry	3	Donagh Berry, IE, WG member Jan Lassen, DK, Vice chair Yvette de Haas, NL, Chair	WG3 WG4	June 2014	Feb 2015	<a href="http://www.cabi.org/bookshop/book/9781780644325">http://www.cabi.org/bookshop/book/9781780644325</a> (chapter 18)	No	No	No	Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and Bioeconomy	No	yes	-
5	Vanlierde, Vanroybas, Dehareng, Froidmont, Soyeurt, Lewis, Deighton, Grandl, Kreuzer, Gredler, Dardenne, Gengler, 2015. Innovative Lactation-stage-dependent prediction of methane emissions from milk mid-infrared spectra. Journal of Dairy Science 98: 5740-5747	Gengler	13	Amélie Vanlierde, BE, WG member Marie-Laure Vanroybays, BE, ESR/Trainee Frédéric Dehareng, BE, MC substitute Eric Froidmont, BE, WG member Hélène Soyeurt, BE, WG member Eva Lewis, IE, Vice WG leader Michael Kreuzer, CH, MC Birgit Gredler, CH, MC/Trainee Nicolas Gengler, BE, Vice WG leader	WG3	June 2014	August 2015	<a href="http://www.sciencedirect.com/science/article/pii/S0022030215003537#">http://www.sciencedirect.com/science/article/pii/S0022030215003537#</a>	No	No	No	Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and Bioeconomy	Yes	Yes	1.841

<sup>2</sup> MC Member/ MC Substitute/ MC Observer/ WG Member/ Training School Trainee/ STSM Recipient/ Other Action Participant

<sup>3</sup> Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

<sup>4</sup> H2020 Societal Challenges are "Health, demographic change and wellbeing"; "Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy"; "Secure, clean and efficient energy"; "Smart, green and integrated transport"; "Climate action, environment, resource efficiency and raw materials"; "Europe in a changing world - inclusive, innovative and reflective societies"; "Secure societies - protecting freedom and security of Europe and its citizens"



### FP7/ H2020 Proposals and projects

This table contains FP7/ H2020 proposals/ projects spinning off from Action activities and including in the proposing consortium at least three Action participants from at least three different countries participating in the Action.

NO.	Title	Name and country of main proposer	Number of proposers	Action participants listed among the proposers (Name, country, role <sup>3</sup> in the Action)	Funding agency submitted to	Date submitted	Date results expected	Result	Call identifier	Relevance to H2020 Societal Challenges <sup>4</sup> ?	Was the added value of the Action Networking necessary for the proposal / project?
<b>Projects</b>											
1	RumenStability - Understanding the development and control of stability in the rumen microbiome as a basis for new strategies to reduce methanogenesis	Richard Dewhurst (IE)	8	Björn Kuhla, DE, WG1 leader Jamie Newbold, UK, WG1 member Nico Peiren, BE, WG1 member Diego Morgavi, FR, WG1 member	FACCE-JPI	March 2013	Project started 1/1/2014	Funded / Accepted	Multi-partner Call on Agricultural Greenhouse Gas Research ( <a href="https://www.submission-facejpi.com/lw/resource/datapool/items/item_24/guidelines_for_the_submission_of_the_full_proposal.pdf">https://www.submission-facejpi.com/lw/resource/datapool/items/item_24/guidelines_for_the_submission_of_the_full_proposal.pdf</a> )	Food security, sustainable agriculture and forestry, marine and inland water research, and Bioeconomy + Climate action, environment, resource efficiency and raw materials	It helped but was not necessary
2	Global Network - For the development and maintenance of nutrition-related strategies for mitigation of methane and nitrous oxide emissions from ruminant livestock	Alex Hristov (US)	7	Jan Dijkstra, NL, MC member Björn Kuhla, DE, WG leader Michael Kreuzer, CH, MC member	FACCE-JPI	March 2013	Project started 1/1/2014	Funded/ accepted	FACCE-JPI International call on Mitigation	Food security, sustainable agriculture and forestry, marine and inland water research, and Bioeconomy + Climate action, environment, resource efficiency and raw materials	It helped but was not necessary
3	ResilBreed - Breeding for climate resilience in EU cattle populations	Nicolas Gengler (BE)	7	Eileen Wall, UK, WG4 leader Yvette de Haas, NL, Chair Frederic Dehareng, BE, WG3 member	FACCE-JPI	Sept 2013	Dec 2013	rejected	FACCE-ERA-NET+ on Climate Smart Agriculture	Food security, sustainable agriculture and forestry, marine and inland water research, and Bioeconomy + Climate action, environment, resource efficiency and raw materials	It helped but was not necessary
<b>Proposals</b>											
1	-										

## I.C. Networking

<b>Added value of the Networking</b>
<p><i>Please describe here the added value of the networking, highlighting in particular anything that would not have happened without the Action networking.</i></p> <p>The consortium of METHAGENE consists of experts in many disciplines: animal breeders, animal nutritionists, animal physiologists, rumen microbiologists, bio-informaticians, system biologists, statisticians, gas analysis experts and environmental engineers. Learning from each other, approaching the topic from different angles, interdisciplinarity, speaking each other's language – none of this would have happened without the Action</p> <p>The added value of networking is most visible in Expert meetings, STSMs, Training Schools and spin offs of this network with joint publications or research proposals. A lot of knowledge is shared during the STSM, Training Schools, Expert meetings and the Annual Workshop – people go home with more ideas than they had before, and are able to do their research better than without the Network.</p> <p>The review in progress on “The future of large-scale indirect measurement for methane emissions: added value from combining proxies” would not have been there without the Network.</p> <p>A collaboration agreement on the “prediction of methane emission measured in respiration chambers from milk infrared spectra” has been signed between two members of METHAGENE (BE and DE) in July 2015. A clear spin off of the Action</p> <p>The ideas on comparing measurements with different equipments, would not have been there without the Network</p> <p>The programmes and teachers for the Training Schools would not have been there without the Network, but were highly appreciated by the trainees</p> <p>The open network meetings with other networks (e.g. in Reading UK or at WCGALP, Vancouver, Canada) would not have happened without the Action. For the next GGAA conference in Melbourne another joint network meeting is currently planned. There is a lot of need for these open meetings. This is also shown by the participation on own expenses of an expert from Australia (Phil Vercoe) and one from New Zealand (Suzanne Rowe) in our Workshop in Granada, Spain in November 2014.</p>
<b>Extent of the networking</b>
<p><i>Describe the extent of the networking among the participants in the Action. Were all participants integrated into the networking equally? Were those targeted by COST policies on Inclusiveness Target Countries (ITCs), Early Career Investigators (ECIs)/ Young Researchers, and gender balance fully integrated into the Action networking?</i></p> <p>4 ITCs have signed the MoU of METHAGENE (LT, PO, SK, SL). People from all these countries have all participated in the Annual Workshop that was held in Granada, Spain. ECIs from 2 of these countries had signed up for the first Training School that was held in Dummerstorf, Germany. The upcoming Training School will host 3 of the 4 countries, and is organised by Poland.</p> <p>The gender balance in general is 2:1; i.e., about 1/3 of the participants is female. Especially the young researchers are female, so the balance is slightly moving.</p> <p>Young researchers are becoming more and more aware of this network. We have successful Training Schools and STSMs. On the website we introduced ‘Researcher Profiles’ where we encourage the ECIs to introduce themselves. At the Annual Workshop we invite ECIs to present their work and experiences and give them an active contribution to the programme</p>

## I.D. Impacts

The impacts that have resulted, or might result from the Action are described in the following table.

Description of the impact	Type of impact <sup>5</sup>	Timing of impact <sup>6</sup>
Common units and descriptors for large-scale methane emissions and other traits in individual methane measurements in ruminants	Scientific/ Techn.	Foreseen within 2 years

<sup>5</sup> Scientific/ technological, Economic, Societal

<sup>6</sup> Achieved/ Foreseen within 2 years/ Foreseen 2-5 years/ Foreseen 5-10 years/ Foreseen 10+ years

Established protocols for calibration, comparison and merging data from different techniques and measurement strategies which can be used beyond this project in optimally designing future experiments	Scientific/ Techn.	Foreseen within 2 years
Identified indicator traits for methane emissions from ruminants to facilitate cost-effective inclusion of environmental traits in national and EU breeding strategies	Scientific/ Techn.	Foreseen within 2 years
The necessary information and tools for EU countries to include methane emissions in their national breeding strategies	Scientific/ Techn.	Foreseen within 2-5 years
Critical contribution to the objective of the Kyoto protocol to reduce GHG emissions in the long term, with specific targets set for 2020, in order to reduce predicted global warming and reduce environmental footprints of animal-derived food	Societal	Foreseen within 5-10 years

### I.E Dissemination and exploitation of Action results

Describe the Action's dissemination and exploitation approach as well as all activities undertaken to ensure dissemination and exploitation of Action results and the effectiveness of these activities.			
Add description here			
Item/ activity	Target audience	Result	Hyperlink
Active website	Open for everyone	- Blogs from people at STSM - Researcher profiles - Recent publications in field - Other news items (e.g. meetings)	<a href="http://www.methagene.eu">www.methagene.eu</a>
Twitter	Open for everyone; active followers	- Links with other networks - Links with universities & research organisations - Links with NGOs (e.g. FAO) - Links with industry	<a href="http://www.twitter.com/methagene">www.twitter.com/methagene</a>
Contributions to Newsletter of ASGGN	Open for everyone; sent to mail group	- Broader exposure - interconnection with related networks	<a href="http://www.asggn.org/publications.html">http://www.asggn.org/publications.html</a>
Symposium at EAAP	People registered for EAAP	- Linking disciplines - Scientific podium	<a href="https://eaap2015.sykonf.pl/conf-data/eaap2015/files/Warsaw_outline_programme_march_2015_after_abstract_sort.pdf">https://eaap2015.sykonf.pl/conf-data/eaap2015/files/Warsaw_outline_programme_march_2015_after_abstract_sort.pdf</a>

### I.F. Action success(es)

COST regularly communicates the successes of Actions. At this point in time what aspect(s) (outcomes and/ or impacts, rather than activities) of this Action is/ are the most suitable for communication?

Description of the success story	Dimension of the success <ul style="list-style-type: none"> <li>■ Breakthrough: scientific, technological or socioeconomic</li> <li>■ Policy implementation (specify which policy)</li> <li>■ Capacity building</li> </ul>
No breakthrough successes of this Action have yet been achieved	

## II. Management Report

### II.A. Overview of expenditure

Insert below in the yellow cells the summary of figures from the Yearly Financial Reports (YFRs) of completed Grant Periods and an IFR of any incomplete Grant Period (**created on July 8<sup>th</sup> 2015**) – the Totals (non-yellow cells) will automatically sum.

	Grant Period 1	Grant Period 2	Grant Period 3	TOTAL
GP start and end dates	(01/02/2014-01/12/2014)	(01/12/2014-31/12/2015)	(dd/mm/yyyy-dd/mm/yyyy)	
Grant Holder institution	Wageningen UR (NL)	Wageningen UR (NL)	Wageningen UR (NL)	
Meetings	EUR 53,925.92	EUR 70,189.74	EUR -	EUR 124,115.66
Training Schools	EUR 17,588.68	EUR 19,560.00	EUR -	EUR 37,148.68
STSMs	EUR 5,290.00	EUR 16,050.00	EUR -	EUR 21,340.00
Dissemination	EUR 4,500.00	EUR 4,000.00	EUR -	EUR 8,500.00
OERSA <sup>1</sup>	EUR 8.61	EUR -	EUR -	EUR 8.61
Total Scientific Expenditure	EUR 81,313.21	EUR 109,799.74	EUR -	EUR 191,112.95
FSAC <sup>2</sup>	EUR 11,882.45	EUR 14,863.72	EUR -	EUR 26,746.17
TOTAL	EUR 93,195.66	EUR 124,663.46	EUR -	EUR 217,859.12

<sup>1</sup>OERSA = Other Expenses Related to Scientific Expenditure (e.g. bank charges)

<sup>2</sup>FSAC = Amount received by Grant Holder for Financial Scientific and Administrative Coordination

### II.B. Budget and Participation management

II.B.1 Budget spent in relation to individuals/ institutions outside participating COST countries						
<i>STSMs from or to institutions from countries other than Participating COST countries</i>						
The table below describes the added value STSMs to approved institutions in IPC or NNC or Specific Organisations and any STSMs from an approved institution in an NNC to a participating COST country.						
Grantee		Host		Date	Topic and value added to the Action	
Institution	Country	Institution	Country			
-	-	-	-	-	-	
<i>Invited Speakers</i>						
The table below highlights the added value of Invited Speakers from COST countries that have not accepted the MoU and/ or non-participating NNC, IPC or Specific Organisations whose participation at a meeting or Training School was reimbursed by the Action.						
Participant name		Institution	Country	Event date	Topic and added value to the Action	
-	-	-	-	-	-	
<i>Dissemination meetings</i>						
The table below highlights the added value of Dissemination Meetings financed from Action funds.						
Participant name		Role	Country	Date	Location	Topic and added value to Action
-	-	-	-	-	-	-

## II.C. Participants

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## Annex 1

### Definitions:

<b>COST Action Challenge (main aim)</b>	“The research question addressed by the COST Action targeting scientific, technological, and / or socioeconomic problems”
<b>COST Action Innovation</b>	“The creation and / or development of new or improved concepts, products, processes, services, and / or technologies that are made available to markets, governments and society”
<b>COST Action objectives</b>	“COST Action objectives are the results that an Action needs to achieve in order to respond to meet its challenge. These are SMART (Specific, Measurable, Achievable, Relevant, Timely) and twofold: research coordination objectives and capacity building objectives.”
<b>COST Action research coordination objectives</b>	“Achieving these objectives turns COST Actions from initially scattered teams into one transnational team and leverages the existing funded research. These objectives entail the distribution of tasks, sharing of knowledge and know-how, and the creation of synergies among Action participants to achieve specific outputs.”
<b>COST Action capacity building objectives</b>	“Achieving these objectives entail building critical mass to drive scientific progress, thereby strengthening the European Research Area. They can be achieved by the delivery of specific outputs and / or through network features or types and levels of participation.”
<b>COST Action networking activities</b>	“any activities organised by the COST Action (whether or not directly funded by COST) in order to achieve research coordination and capacity building objectives.”
<b>COST Action networking tools</b>	“instruments through which eligible activities can be funded”
<b>COST Action outputs</b>	“direct results from the COST Action activities. These can be codified knowledge, tacit knowledge, technology, and societal applications.”
<b>COST Action impact</b>	“the short- to long-term scientific, technological, and / or socioeconomic changes produced by a COST Action, directly or indirectly, intended or unintended.”
<b>COST Action deliverable</b>	“a distinct, expected and tangible output of the Action, meaningful in terms of the Action’s overall objectives such as a report, a document, a technical diagram, a software etc. Action deliverables are used to measure its progress and success.”
<b>COST Action milestones</b>	“Control points in the Action that help to chart progress. They are also needed at intermediary points so that, if problems have arisen, corrective measures can be taken. A milestone may be a critical decision point in the Action where, for example, the MC must decide which of several technologies to adopt for further development (e.g. core group and MC meetings, mid-term reviews)”
<b>Inclusiveness Target Country (ITC):</b>	Current COST Member Countries targeted by the COST inclusiveness Policy (“Inclusiveness Target Countries” (ITC)): EU 13 (Bulgaria, Cyprus, Czech Republic, Estonia, Croatia, Hungary, <b>Lithuania</b> , Latvia, Malta, <b>Poland</b> , Romania, <b>Slovenia</b> , <b>Slovakia</b> ), EU candidate countries (the former Yugoslav Republic of <b>Macedonia</b> , Montenegro, Republic of Serbia, <b>Turkey</b> ) and potential EU candidate countries (Bosnia and Herzegovina). In addition, to comply with the EC criteria for ‘Spreading Excellence and Widening Participation’, <b>Portugal</b> and Luxemburg are included.