

final report

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Technical review role for The Food and Agriculture Organisation (FAO) Water working group

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Executive summary

The Food and Agriculture Organisation (FAO) developed an initiative known as the 'Livestock Environmental Assessment and Performance' (LEAP) Partnership in 2012 with stakeholders across the livestock industries. The overarching objective is to develop comprehensive guidance and methodology for understanding the environmental performance of livestock supply chains. The overarching goal of this initiative is to "contribute to improved environmental performance of the livestock sector while considering social and economic viability". To achieve this, the FAO convened a number of Technical Advisory Groups (TAGs) to provide technical input into the development of methodologies for measuring environmental performance. This project was initiated to support development of the water footprint guidelines. Water has been an important issue for the Australian red meat industry for more than 10 years, and much of the problem surrounding this issue relates to incorrect assessment and reporting of water use from livestock. Hence, development of guidelines in this area is an important priority for the industry. On the water footprint TAG, the Australian industry is represented by Steve Wiedemann. The objectives of this project were to contribute to the development of the guideline via technical input, critique and provision of methodological approaches used in Australian research, to ensure a meaningful guideline is developed. These objectives are primarily to be met through participation in the technical advisory group meetings (face-to-face) and over the phone or internet, for the duration of the project. The present report provides a summary of the second technical meeting, held in Kigali, Rwanda, 14-18th November 2016 and attended by Steve Wiedemann.

Participation in the water TAG involved two technical meetings and contributions to the guideline document, which was in draft form at the completion of this final report. The guideline currently has provided new recommendations for the reporting and assessment of water use for livestock systems and improved assessment methods. These recommendations align well with MLA funded research in this area.

At the time of writing this report, consensus had not yet been reached regarding the accounting or reporting of green water, despite apparent progress being made on this issue at the face-to-face meetings. MLA will be updated in the future on this important issue, with the aim to continue advocating that green water is not reported for livestock.

The guideline does not (at the time of writing) recommend any specific impact assessment method, leaving this open to practitioners to decide. Two methods, the AWARE method and the Sustainability Assessment method, are described in the guideline.

At the time of writing, the draft guideline was under review and further revisions and technical meetings are yet to be decided. It is recommended that MLA maintain a watching brief on these developments.

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1 Background

The Food and Agriculture Organisation (FAO) developed an initiative known as the 'Livestock Environmental Assessment and Performance' (LEAP) Partnership in 2012 with stakeholders across the livestock industries. The overarching objective is to develop comprehensive guidance and methodology for understanding the environmental performance of livestock supply chains. The overarching goal of this initiative is to "contribute to improved environmental performance of the livestock sector while considering social and economic viability".

The Partnership will contribute to achieving this goal by providing guidance documents to improve environmental assessments, thereby supporting decision making. The Partnership promotes an exchange of data and information, technical expertise and research, which is geared towards improving and harmonizing the way in which livestock food chains are assessed and monitored. Following the success of stage 1, LEAP+ is a second, three-year program to advance this work. The tentative plan is shown in Fig. 1.

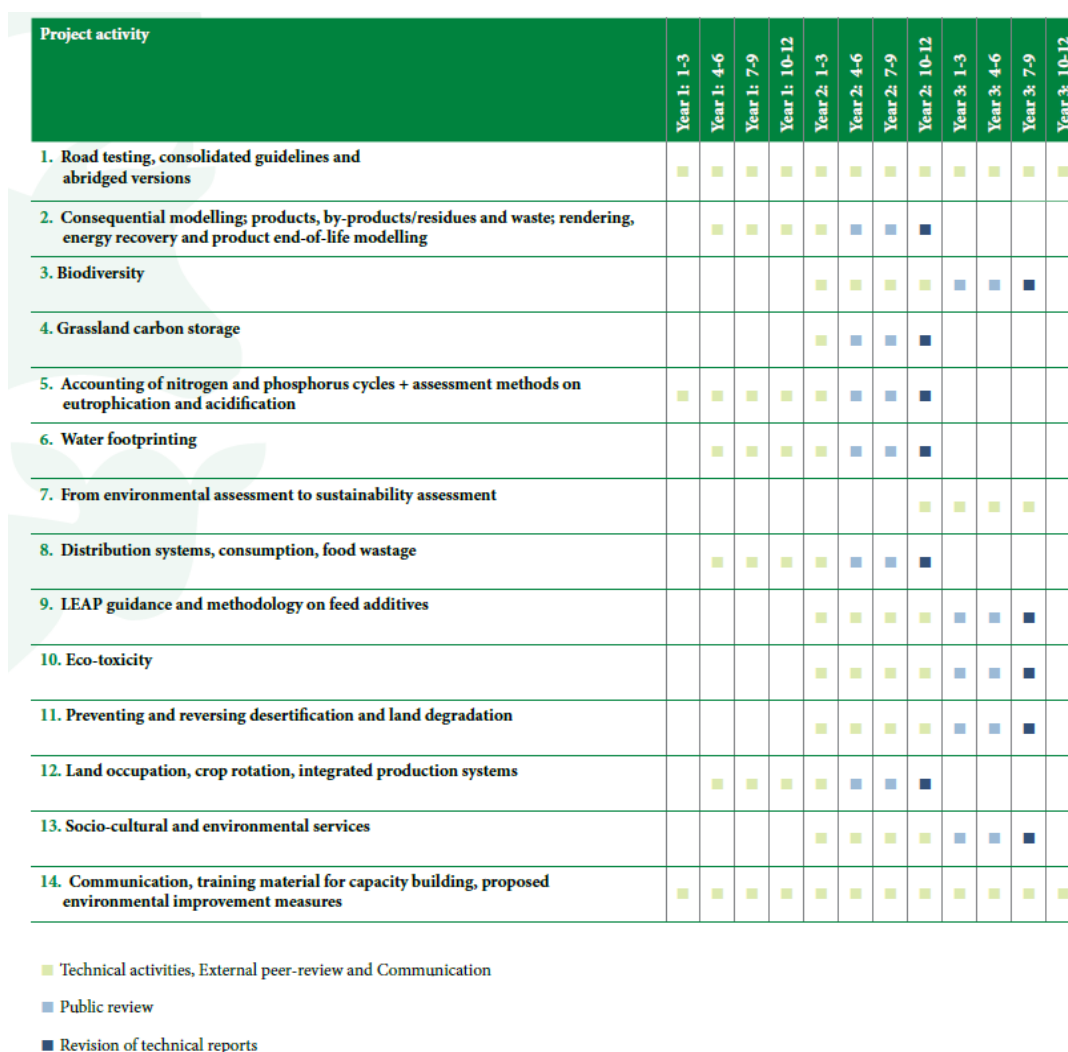


Fig. 1 – Livestock Environmental Assessment and Performance (LEAP+) Partnership - Program plan 2016-2018.

To achieve this, the FAO convened a number of Technical Advisory Groups (TAGs) to provide technical input into the development of methodologies for measuring environmental performance.

Meat and Livestock Australia, via the International Meat Secretariat, is a member of the LEAP partnership. On the water footprint TAG, the Australian industry is represented by Steve Wiedemann. A summary of the outcomes of the initiative are provided in this report.

2 Project objectives

The project has the following broad objectives:

- Contribute to and advancement of technical issues relating to water footprinting, with the aim of promoting guidelines that are comprehensive, logical and also workable at the farm, regional and national scale.
- To critique and influence FAO methods and assumptions.
- To propose methodological approaches to global researchers based on published Australian research, which is more advanced in the area of on-farm water use.
- To provide input into the method development stage with consideration of downstream aspects of the red meat supply chain, to ensure a meaningful guideline is produced.

These objectives are primarily to be met through participation in the technical advisory group meetings (face-to-face) and over the phone or internet, for the duration of the project. The present report provides a summary of the second technical meeting, held in Kigali, Rwanda, 14-18th November 2016 and attended by Steve Wiedemann.

3 Overview of the Water Footprint Technical Working Group

The water footprint TAG was established to develop methods for water footprinting in agriculture that adequately capture the specificities of livestock production systems.

Building on existing standards and methods (both the Water Footprint Network and ISO water footprint methods were mentioned), the activity will focus on building global consensus on water footprinting of livestock supply chains.

Some of the questions that will be answered by the TAG include the following:

1. Which water footprinting approaches and impact assessment methods are currently recommended for applications at various scales and in different application contexts (e.g. environmental benchmarking at the level of farms, regions and countries; product water footprinting; environmental assessments of technology alternatives)? What are their key features, application contexts, strengths and limitations?

2. Do the plausible water footprints show similarities when the mainstream approaches and methods are applied for assessments of livestock supply chains?
3. Which accounting rules and models will be incorporated into the LEAP guidelines to ensure that fair results are obtained, and that also reflect performance in water use efficiency? What livestock water requirements can be recommended to estimate water flow volumes whenever measurements are either not taken or cannot be taken?
4. How to capture soil water retention changes due to e.g. deposition of manure and soil compaction by livestock?

Accounting of nutrients and assessment of water quality is outside the scope of this TAG.

Guidance from the Water TAG is relevant for livestock supply chains including feed production from croplands and grasslands, and the production and processing of livestock products. It will address all livestock production systems and livestock species considered in existing LEAP guidelines.

4 Summary of guideline development and meetings

4.1 Technical meeting two

Substantial progress has been made to develop a draft guideline, though several major decisions remained to be addressed at the face-to-face meeting. Prior to the meeting, a substantial contribution was made to the inventory section of the report and a review of all other sections.

Several major issues were addressed and resolved during the meeting, pertaining to the divergent opinions of the two major groups represented, i.e. the LCA water researchers and the Water Footprint Network researchers. Major issues and resolutions reached are as follows:

- Water data in the inventory are to be collected (modelled) using robust water balances for each major process. This point was emphasised to ensure studies are comprehensive, and to address the inadequacies of many research studies done in the past.
- Clear definitions were established for green water as follows: “green water is precipitation that is transpired or evaporated at the place where it falls” and is therefore defined as a flow rather than a stock. This is significant, as various confusing definitions exist for green water and this will provide needed clarity.
- Water data in the inventory stage, according to the above points, was resolved to include all water flows including those from rainfall (green water).
- It was resolved that the method would specifically guide users not to report inventory data summed across the whole supply chain. This point was strongly debated and ultimately carried. The significance of this can't be overstated, as it represents an agreement by the Water Footprint Network to move away from methods that propagate large and potentially misleading inventories of 'water use' (including green water) for livestock products.

- A lengthy discussion was had regarding impact assessment methods and specifically the LCA method known as AWARE, and the water sustainability assessment method. Neither of these methods have been applied in Australian livestock systems to the author's knowledge and this will be part of the case study testing. This point was also strongly debated and ultimately carried to the next stage of drafting of the method, opening the way for a consensus methodology between the water footprint community (as represented by the WFN) and the LCA community.
- A series of indicators were selected to improve understanding around water productivity, to enable reporting and improved understanding of water use efficiency in different parts of a livestock supply chain.
- A method was proposed and carried, to address modified landscapes, such as feedlots or farm dams, by determining fresh water consumption relative to a reference system (i.e. the system before modification). This approach will reduce apparent water consumption in these systems and represents a method pioneered in previous MLA studies.
- Further discussion was held regarding the treatment of land use change and impact on water flows. A method will be proposed to determine water flows from historic land use change but to treat this separately to the main results of the study, in much the same way as land use change emissions from carbon are treated separately. Further work is required on the document to elaborate on this proposal, but the main implication is that water flows will be shown to increase in response to land clearing.

4.2 Status of the Draft method

Following the Kigali meeting, an initial draft of the guidelines was produced for internal review. This document was reviewed by the TAG and received >600 comments, and identified a number of areas where consensus was not reached. Several points from the Kigali meeting were re-evaluated in response to the completion of the draft. Notably, it was resolved that no recommendation would be put forward regarding impact assessment methods, though two methods (AWARE and Sustainability Assessment) would be 'described' in the guidelines.

At the point of completing this final report, the following important issues were yet to be resolved:

- 1.Accounting green water, specifically in grazed pastures
- 2.Consideration of changes in green water flows resulting from livestock production
- 3.Water productivity (Aggregation, Calculation/Components, Benchmarks, other aspects)

Following this draft, the TAG has been invited to provide further input. Additionally the LEAP Secretariat will now review the draft and provide comments (by end of March 2017). The TAG Water will then have time to address any open issues, either via remote meetings or an additional physical meeting.

5 Conclusions/recommendations

Participation in the water TAG has led to new recommendations for the reporting and assessment of water use for livestock systems. Improved assessment methods, such as the use of water balances and inclusion of supply system losses have been incorporated and align well with previous MLA funded research.

While the guideline sought to recommend new impact assessment methods for livestock, consensus in this area was not achievable because of the strong differences in opinion in this sector, and because new methods were proposed that had not been tested yet. Thus, there still remains no recommendation in this area.

At the time of writing this report, consensus had not yet been reached regarding the accounting or reporting of green water, despite apparent progress being made on this issue at the face-to-face meetings. MLA will be updated in the future on this important issue, with the aim to continue advocating that green water is not reported for livestock.

5.1 Progress to completion

A draft guideline has been produced and will be reviewed by the LEAP Secretariat by the end of March. Following this, a decision will be made about the need for an additional meeting to reach consensus regarding outstanding issues. It is important to the red meat industry that the issue of green water is successfully addressed and removed from reporting under the guidelines. Consequently, it is requested that MLA maintain a watching brief on these developments (informed by the author of this report) and the merit of attending further meetings be assessed as information comes to hand.

5.2 Appendices

Appendix 1 – Participant list

Appendix 2 – Terms of Reference provided by the LEAP secretariat

6 Appendix 1

List of technical experts

Name	Surname	Affiliation	Country	Present in 1 st face-to-face meeting
David	Bray	SAFMA - Stock Feed Manufacturers' Council of Australia	Australia	No
Brad	Ridoutt	CSIRO	Australia	No
Steve	Wiedemann	IntegrityAg Services	Australia	Yes
Brent	Clothier	The New Zealand Institute for Plant & Food Research Limited	New Zealand	Tentative
Ranvir	Singh	Soil and Earth Sciences Group, Massey University	New Zealand	Yes
Ridha	Ibidhi	National Institute of Agricultural Research of Tunisia	Tunisia	Yes
Valentina	Russo	University of Cape Town	South Africa	Yes
Matts	Lannerstad	ILRI	Kenya	Yes
Tim	Hess	Cranfield University	UK	Yes
Sophie	Bertrand	IDF-CNIEL	France	Yes
Armelle	Gac	French Livestock Institute	France	No
Nicolas	Martin	European Sustainable Consumption and Production Roundtable, FEFAC	Belgium	Yes
Arjen	Hokstra	University of Twente	Netherlands	Yes
Ashok	Chapagain	Water Footprint Network	Netherlands	Yes
Katrin	Drastig (TAG co-chair)	Leibniz-Institute for Agricultural Engineering Potsdam-Bornim	Germany	Yes
Davy	Vanham	JRC	Austria	Pending
Stephan	Pfister (TAG supervisor)	ETH Zurich	Switzerland	Yes
Alessandro	Manzardo	Centro Studi Qualità Ambiente-Università degli Studi di Padova	Italy	Yes
Maite	Aldaya	UNEP-Public University of Navarra	Spain	No
Masaharu	Motoshita	National Institute of Advanced Industrial Science and Technology	Japan	Pending
Liu	Junguo	South University of Science and Technology of China	China	Yes
	Amanullah	University of Agriculture Peshawar	Pakistan	Yes
Anne-Marie	Boulay (TAG co-chair)	École Polytechnique Montreal-CIRAIG	Canada	Yes
Aung	Moe	Alberta Agriculture and Forestry	Canada	No
Tim	McAllister	Agriculture and Agri-Food Canada	Canada	Yes
Marty D.	Matlock	University of Arkansas	US	No
Sandra	Vijn	WWF	US	Yes
Yiwen	Chiu	California Polytechnic State University	US	Pending
Ricardo	Morales	AgroDer	Mexico	Yes
Ernesto	Reyes	Agribenchmark	Colombia	Yes
Barbara	Civit	CONICET-UTN FRM	Argentina	Yes
Veronica	Charlon	INTA EEA Rafaela	Argentina	Yes
Julio Cesar Pascale	Palhares	Embrapa Southeast Livestock	Brazil	Yes
Giacomo	Pirlo	Centro di ricerca per le Produzioni Foraggere e Lattiero-Casearie	Italy	Yes
Gloria	Salmoral	University of Exeter	UK	Yes
Michael	Lathuillière	University of British Columbia	Canada	Yes
Liu	Zuohua	Chongqing Academy of Animal Science	China	Yes
Li	Baoming	China Agricultural University	China	Yes

7 Appendix 2

7.1 Technical Advisory Group (TAG) on Water Footprinting

7.1.1 Terms of reference for TAG members

7.1.2 Background

Water is an essential production input for feed and livestock supply chains. In several geographical areas, water is an increasingly scarce resource whose availability varies widely over temporal and spatial scales. In addition, other challenges such as climate change and increasing competition with other users (e.g. other agriculture sectors, household, industry, tourism, etc.) is exacerbating water scarcity. Efficient management of this resource is essential to ensure food security and viability of livestock supply chains and better future for next generations.

Water Footprint Network (WFN) spearheaded the development of water footprint indicators. However, the assessment framework introduced by the WFN has often been questioned in scientific literature and alternative approaches have been proposed. Recent progress has been made for instance through the development of the ISO 14046:2014 that highlights the principles and life cycle approach for the calculation of product water footprints. In order to complement the ISO assessment framework with blue water assessment methods, the UNEP SETAC Life Cycle Initiative (WULCA project) has developed a set of blue water footprint indicator(s) and related characterization factors.

At the sectoral level, the International Dairy Federation (IDF) is expected to release soon guidelines on water footprinting of dairy systems. The reduction of the amount of water use per unit of animal product can reduce the pressure of current practices on this scarce resource especially in the area where water stress indexes are higher. Therefore, the development of clear guidelines on water footprinting can support water management solutions through the identification of hotspot of water use in livestock supply chains.

7.1.3 Aims of the Activity

The Livestock Environmental Assessment and Performance (LEAP) Partnership

members called for sound recommendations on water footprinting that adequately capture the specificities of livestock production systems. Building on existing standards and methods, the activity will focus on building global consensus on water footprinting of livestock supply chains. This is deemed necessary to build confidence in the assessment results that water footprinting studies deliver and to expand the scope of existing LEAP guidelines. Some of the questions that will be answered by the TAG include the following:

- Which water footprinting approaches and impact assessment methods are currently recommended for applications at various scales and in different application contexts (e.g. environmental benchmarking at the level of farms, regions and countries; product water footprinting; environmental assessments of technology alternatives)? What are their key features, application contexts, strengths and limitations?
- How plausible water footprints look alike when the mainstream approaches and methods are applied for assessments of livestock supply chains?

- Which accounting rules and models shall be incorporated into the LEAP guidelines in order to obtain fair results that also reflect performance in water use efficiency? What livestock water requirements can be recommended to estimate water flow volumes whenever measurements are either not taken

Accounting of nutrients and assessment of water quality is instead outside the scope of this TAG.

Guidance from the Water TAG is relevant for livestock supply chains including feed production from croplands and grasslands, production and processing of livestock products. It will address all livestock production systems and livestock species considered in existing LEAP guidelines.

7.1.4 Deliverables

- LEAP guidelines on water footprinting
- Peer-reviewed paper for publication in scientific journal

7.1.5 Timeframe

An indicative timeline for the work programme of the Water TAG is for completion during the 2016/2017 financial year.

7.1.6 Engagement

TAG members are warmly invited to participate in-person and actively contribute to the two face-to-face meetings on the way to be scheduled this year. Each meeting will last two-three days.

Besides participation in the two meetings, TAG members are requested to continue to work on TAG deliverables under the overall guidance of the TAG co-chairs in order to deliver quality technical products on schedule.

Without active participation in TAG activities, no co-authorship of the LEAP technical products is granted.

TAG members report to TAG co-chairs.

LEAP will not grant any honorarium to TAG members, who are also expected to arrange their own trips autonomously. Trips will be pre-arranged by FAO only in specific circumstances (e.g. ensuring balanced participation of regional experts from developing countries).

7.1.7 Qualifications

TAG members are technical experts having a strong background in one or more of the following subjects: water footprinting, water footprints of livestock supply chains, animal science, soil science, agriculture science, hydrology, and LCA.

Ideally, TAG members have a proven track record in research and/or have built technical expertise by implementing water footprinting schemes.

Minimum requirements include:

- Working knowledge of English
- Skilled in team working and hence in sharing views and knowledge in a constructive manner
- Highly-motivated and committed to develop sound tools enabling to support transparent decision making at various scales and in all regions worldwide
- Respect of cultural and scientific diversity of TAG members

7.1.8 Application

Candidates are kindly requested to submit their CVs to the LEAP Secretariat

(Livestock-Partnership@fao.org). CVs must include an updated list of publications and work experiences by March 22nd, 2016.

All applications will be reviewed by the LEAP Secretariat and LEAP Steering Committee. Merit, balanced regional representation of participants and gender balance are